

Question #	Reference
6	Steam tables AOP 2.10.1 Figures 1A, B, C; 2A, B, C, and Att 3
84	NOP-OP-1015 Rev 5
86	Steam Tables
87	EAL matrix
88	Tech Spec 3.3.2 pgs 1-13
92	Tech Spec 3.3.3 pgs 1-4 Modified 2OST-6.7 pg 30
95	TS 3.4.16 pg 1-3 TS 3.7.13 pg 1 LRM 3.4.2 pg 1-3
96	TS 3.8.4 pg 1-2 TS 3.8.6 pg 1-3
98	NOP-OP-4010 Rev 8 NOP-OP-4107 Rev 16

Updated 10/16/17

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	EPE007 EA2.02 Ability to determine or interpret the following as applied to Rx trip: Proper actions to be taken if the automatic safety functions have not occurred.	

Importance:	4.3	4.6
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Question: #1

Which of the following contains NO direct or RNO operator actions called for by FR-S.1 in the event of ATWT?

- 1.) Locally Open Reactor Trip Breakers
 - 2.) Check PRZR pressure LESS THAN 2375 PSIG
 - 3.) Open Rod Drive MG Set Output Breakers
 - 4.) Verify TDAFW Pump Steam Supply Valves – OPEN
 - 5.) Initiate SI
 - 6.) Initiate MSLI
-
- a. 1 and 3
 - b. 2 and 6
 - c. 2 and 5
 - d. 4 and 6

Answer: c

Explanation / Justification

- a. Incorrect. Both are valid FRS1 actions
- b. Incorrect. 6 is an RNO action
- c. Correct. Actual actions are verify < 2330 for emergency boration and verify SI if initiated.
- d. Incorrect. Both are valid FRS1 actions

Technical References:	FR-H.1
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41 (b)10

Examination Outline Cross-Reference:	Level	<u>RO</u>	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	008 AK3.04	_____
	Importance Rating	4.2	_____

008 AK3.04: Knowledge of the reasons for RCP tripping requirements as they apply to Pressurizer Vapor Space Accident.

Proposed Question:

2)

The plant is operating at 100% power with all systems in NSA.

- A PRZR vapor space accident occurs.
- PRZR pressure drops to 1200 psig.
- The Highest Steam Generator pressure is 1000 psig.
- HHSI flow is 800 gpm and stable.
- **NO** Orange or Red path conditions exist.
- The crew is performing the actions of E-1, Loss of Reactor or Secondary Coolant.
- At Step 2, Check if RCPs should be stopped, the crew is directed to Stop **ALL** RCPs.

Why **MUST** the RCPs be stopped at this time?

The RCPs are tripped to:

- A. prevent possible pump damage by running the RCPs under highly voided conditions in order to save the pumps for potential future use.
- B. prevent excessive depletion of RCS water inventory which might lead to severe core uncover if the RCPs were tripped later in the event.
- C. remove their added heat input, thereby ensuring the steam generators will be capable of performing the subsequent RCS cooldown.
- D. ensure the RCP seal package is not damaged by the excessive temperature or steam voiding associated with this event.

Proposed Answer:

B

Explanation (Optional):

- A. Incorrect This is the reason they are stopped in FR-C.2
- B. Correct. IAW with E-1 step 2 basis and RCP trip generic issue. D/P < 205 psid between highest SG pressure and RCS pressure, and HHSI is indicated.
- C. Incorrect. Plausible since RCPs are tripped in FR-H.I to remove their heat input, but it is done to extend the effectiveness of the remaining inventory. This is also plausible since tripping the pumps will remove the heat input and removing the heat input will ensure the only heat that Will be required to be removed is from decay heat alone BUT this is not the reason why they are tripped in E-I.
- D. Incorrect. This is the consequence of losing both seal injection and RCP thermal barrier cooling.

Technical Reference(s): E-1, step 2 bases; 2OM-53B.5GI-6 page 6 2nd paragraph.

(Attach if not previously provided, _____
including version/revision number) _____

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 2LOT6 #2
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(5)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	G2.4.6 Knowledge of EOP mitigation strategies	

Importance:	3.7	4.7
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Question: #3

The plant has experienced a LOCA and loss of all feed from 100% power. Plant conditions are:

- SG pressures 900psig, trending down slowly
- SG narrow range levels are off scale low
- RCS pressure 600 psig, trending down slowly
- All other ECCS equipment has operated properly

The crew has just entered FR-H.1 from E-0. What action is required?

- a. Remain in FR-H.1 to restore feed.
- b. Exit FR-H.1, return to E-0 due to plant conditions.
- c. Remain in FR-H.1, perform in parallel with E-0
- d. Exit FR-H.1, transition to E-1.

Answer: b

Explanation / Justification

- a. Incorrect. FR-H1 exit conditions exist
- b. Correct. RCS < SGs, heat sink not reqd
- c. Incorrect. Exit FR-H.1
- d. Incorrect. Exit FR-H.1

Technical References:	FR-H.1
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41 (b)10

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	011 EA1.06	_____
	Importance Rating	4.2	_____

K/A Statement: Ability to operate and monitor the D/Gs as they apply to a Large Break LOCA.

Proposed Question:

4. The plant is at 100% power.

- A Large Break LOCA occurs
- EOP Procedure E-1, Loss Of Reactor Or Secondary Coolant has been entered
- Step 15 of E-1, Check If Diesel Generators Should Be Stopped is being performed

What action will be taken for the Emergency Diesel Generators (EDGs) and what is the bases for this action?

The crew will stop the EDGs and enable _____(1)_____.

The EDGs are secured because _____(2)_____.

- A. (1) a Manual start ONLY
(2) the EDGs should not be run extensively unless they are carrying load
- B. (1) a Manual start ONLY
(2) the load sequencer must be allowed to reset prior to reclosing the output breaker
- C. (1) both a Manual or Automatic start
(2) the EDGs should not be run extensively unless they are carrying load
- D. (1) both a Manual or Automatic start
(2) the load sequencer must be allowed to reset prior to reclosing the output breaker

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. EDGs are secured and then set up for a Manual or Automatic start. The bases is correct, unloaded diesels are to be secured per manufacturer direction.
- B. Incorrect. EDGs are secured and then set up for a Manual or Automatic start. The bases is not correct for unloaded diesels, it is a valid concern for the EDG sequencers. The load sequencer uses electromechanical timers that do not reset instantly but must time-out their cycle.
- C. Correct. EDGs are secured and then set up for a Manual or Automatic start. unloaded EDGs are not to be run for an extended period of time per manufacturer recommendation and the EOP step bases.
- D. Incorrect. EDGs are secured and then set up for a Manual or Automatic start, the bases is not related to the sequencer operation.

Technical Reference(s): 2OM-53B.4.E-1 iss. 3 rev.1 page 66.

(Attach if not previously provided, _____
including version/revision number.) _____

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (as available)

Question Source: Bank # 1LOT14 #3
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 1LOT14

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b(8)
55.43 _____

Comments:

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AK2.07 Knowledge of the interrelations between RCP malfunctions (loss of RC flow) and the RCP seals	

Importance:	2.9	2.9
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Question: #5

Which of the following requires an immediate trip of an RCP?

- a. #1 seal leakoff flow is >6 gpm
- b. The seal return line has isolated.
- c. CCW to the thermal barrier heat exchanger has been isolated > 1 min.
- d. The seal leakoff line relief has lifted.

Answer: a

Explanation / Justification

- a. Correct Limit is 6 gpm
- b. Incorrect. Relief will lift for flowpath
- c. Incorrect. Still have seal injection
- d. Incorrect. Not a trip criterion

Technical References:	AOP 2.6.8
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41 (b)10

Group #	1	_____
K/A #	025 AA2.05	_____
Importance Rating	3.1	_____

K/A Statement:

AA2.05: Ability to determine and interpret the limitations on LPI flow and temperature rates of change as they apply to the Loss of Residual Heat Removal System.

Proposed Question:

6)

- The reactor was shutdown from an extended full power run at 1400 THREE (3) days ago.
- RCS temperature is 140 °F
- RCS pressure is 200 psig
- PRZR level is 22%
- It is currently 1700 and a COMPLETE Loss of RHR occurred
- RCS loop isolation valves are closed

IAW AOP 2.10.1, Loss of Residual Heat Removal Capability, to the nearest time, when will the RCS be at saturation?

- A. 1715
- B. 1740
- C. 1800
- D. 1925

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Plausible if the applicant uses Figure 1B and uses the 140 °F temperature line.
- B. Incorrect. Plausible if the applicant uses Figure 2C, determining heatup rate to be 6.2 °F/min. The T_{sat} for 255 psig is 387.8 °F $(387.8 - 140) / 6.2 = 39.97$ minutes. Also plausible if the applicant uses Figure 1A, and 45 minutes is the intersection of time to boiling from 140 °F.
- C. Correct. The applicant correctly uses Figure 2B, determining the heatup rate to be 4.3 °F/min. $(387.8 - 140) / 4.3 = 57.63$ minutes.
- D. Incorrect. Plausible if the applicant uses Figure 2A, determining heatup rate to be 1.6 °F/min. $(387.8 - 140) / 1.6 = 154.88$ minutes.

Technical Reference(s): AOP 2.10.1 rev 12

Proposed references to be provided to applicants during examination: Steam tables
AOP 2.10.1 Figures
1A, B, C; 2A, B, C.

Learning Objective: 2SQS10.1 obj. 21 (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam N/A

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(14)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	G2.2.38 Loss of CCW knowledge of conditions and limitations in the facility license	

Importance:	2.9	2.9
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Question: #7

Which of the following results in a Technical Specification requirement to immediately initiate corrective action?

- a. Loss of both trains of CCW
- b. RCS pressure exceeds the Technical Specification safety limit in Mode 1
- c. RCS pressure exceeds the Technical Specification safety limit in Mode 5.
- d. The Rod-Insertion Limit Lo-Lo alarm annunciates.

Answer: a

Explanation / Justification

- a. Correct TS required action
- b. Incorrect. 1 hour
- c. Incorrect. 5 minutes
- d. Incorrect. SDM, 1 hour.

Technical References:	TS 3.7.7
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	memory
10CFR Part 55 Content:	55.41 (b)8

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	029 ATWS G2.4.49	
	Importance Rating	4.6	_____

K/A Statement:

Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.

Proposed Question:

8) Beaver Valley unit 2 is operating at 100% power when 1 main feed pump is tripped. The reactor and turbine do **NOT** trip. After verifying the reactor did not trip, in order, what actions should be taken next?

- A. Insert control rods, manually trip the turbine, and ensure steamlines isolated.
- B. Verify AFW status, insert control rods, and manually trip the turbine.
- C. Manually trip the turbine, ensure steamlines isolated, and insert control rods.
- D. Manually trip the turbine, insert control rods, and verify AFW status.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Ensuring steamlines isolated is not an immediate operator action of this procedure.
- B. Incorrect. Verifying AFW status is the third option.
- C. Incorrect. Ensuring steamlines isolated is not an immediate operator action.
- D. Correct. This is the correct order of steps IAW FR-S.1

Technical Reference(s):

FR-S.1, Response to Nuclear Power Generation – ATWS
issue 2, revision 0.

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New _____X_____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____X_____
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b(10)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	EA2.04 Ability to determine or interpret radiation levels as they apply to a SGTR.	

Importance:	3.9	4.2
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Question: #9

The plant is operating at 100% power. Which of the following rad monitors will give the earliest indication of a SG tube leak, and at what leakrate?

- a.) Air ejector monitor, ALERT at 5 gpd
- b.) N16 monitor, ALERT at 5 gpd
- c.) Air ejector monitor; ALERT at 30 gpd.
- d.) N16 monitor; ALERT at 30 gpd

Answer: b

Explanation / Justification

- a. Incorrect.
- b. Correct. Applicant must know which monitor is most sensitive and value.
- c. Incorrect.
- d. Incorrect.

Technical References:	RMS lesson plan
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	memory
10CFR Part 55 Content:	55.41 (b)8

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	040 AK2.02	_____
	Importance Rating	2.6	_____

K/A Statement: Knowledge of the interrelations between the Steam Line Rupture and sensors and detectors.

Proposed Question:

10)

A Unit shutdown is in progress for a refueling outage with the following conditions:

- Pressurizer pressure is 1700 psig
- Steam Line Pressure is 700 psig

Subsequently:

- A large steam line break occurs upstream of the "B" MSIV and outside containment.
- "B" completely depressurizes.

No operator action has occurred.

Based on these conditions:

Safety Injection _____(1)_____ automatically occur.

Main Steam Isolation automatically occurred due to _____(2)_____ **ONLY**.

- A. (1) did NOT
 (2) HIGH negative rate of "B" steam line pressure
- B. (1) did NOT

(2) LOW "B" steam line pressure

- C. (1) did
(2) HIGH negative rate of "B" steam line pressure

- D. (1) did
(2) LOW "B" steam line pressure.

Proposed Answer: A

Explanation (Optional):

- A. Correct. Since below P-11 (2000 psig), SI is blocked to prevent automatic actuation of the low pressure setpoint of 500 psig. Steam Lines will isolate on high negative rate on "B" steam line pressure only. The low steam line pressure is blocked at P-11 in order to prevent a SLI at the low pressure setpoint of 500 psig. However, when the low pressure SLI is blocked, a SLI can still occur due to a high rate of decrease (100 psig/sec with 50 second time constant).
- B. Incorrect. First Part is correct. Second part is plausible because the applicant may not realize that this input would have been blocked.
- C. Incorrect. First part is plausible if the applicant realizes that S/G pressure has previously decreased below the SLI setpoint but does not realize that pressurizer low pressure SI is also below the setpoint. Second part is correct.
- D. Incorrect. See first part of distractor "C". Second part see second part of distractor "B."

Technical Reference(s): 2SQS21.1 PPNT rev. 23 page 43

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2SQS21.1 rev 23 OBJ 11

Question Source: Bank # 2013 Catawba #10
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2013 Catawba

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(4)
55.43 _____

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	Knowledge of the reasons for the length of time for which battery capacity is designed as applied to SBO.	
Importance:		2.7	3.4

Question: #11

Which of the following describes the capacity of the station batteries during a station blackout?

- a. 2 hours during worst case loading (no ECA-0.0 load shed).
- b. 2 hours assuming ECA-0.0 load shedding.
- c. 8 hours during worst case loading (no ECA-0.0 load shed).
- d. 8 hours assuming ECA-0.0 loads are shed.

Answer:

Explanation / Justification

- a. Correct.
- b. Incorrect.
- c. Incorrect.
- d. Incorrect.

Technical References:	125vdc lesson plan
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41 (b)5

Comments:

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	056 AA2.75	
	Importance Rating	3.0	_____

K/A Statement:

AA2.75: Ability to determine and interpret CVCS makeup as it applies to the Loss of Offsite Power.

Proposed Question:

12)

The Unit is MODE 3

- VCT level is at 5%
- 2-1 EDG is out of service

The Unit then experiences a loss of offsite power. Ever

After the loss of offsite power, what is the expected configuration of the charging pump(s)?

- A. 2CHS*P21A & B running and taking suction from the RWST
- B. **ONLY** 2CHS*P21B running and taking suction from the RWST
- C. 2CHS*P21A & B running and taking suction from the VCT
- D. **ONLY** 2CHS*P21B running and taking suction from the VCT

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Plausible if the applicant thinks that one diesel can pick up both charging pumps or doesn't read that the 2-1 EDG is out of service. Second part correct due to automatic swap over at 5% VCT level.
- B. Correct. Only the 21B charging pump will load on from the 2-2 EDG. Automatic swap over occurred.
- C. Incorrect both parts. This would be the expected configuration if the VCT level > 5% and no EDG out of service.
- D. Incorrect. Correct first part. Incorrect second part.

Technical Reference(s): 2SQS7.1 PPNT rev. 23 slide 102.

(Attach if not previously provided, 2OM-37.5.B.7 rev. 42

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam N/A

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b(7/8)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AK 1.01 knowledge of the operational implications of battery charger equipment and instrumentation as applied to loss of DC power.	

Importance:	2.8	3.1
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Question: #13

The plant is operating at 60% power when the following alarms are received:

[A9-100], 125VDC BATTERY CHGR 1 FAILURE

[A9-98], 125VDC BUS 1 VOLTAGE LOW

Several minutes after the alarms are received:

The plant continues to operate at 60% power.

125 VDC BUS 1 Voltage indicates approximately 124 VDC and is slowly DROPPING.

Station Battery Charger Breaker [BAT-CHG1-1A] has been verified closed and 480V MCC1-E9 is energized.

No operator actions have yet occurred.

For the given indications, which ONE of the following describes the 125VDC BUS 1 status?

- a. Battery Charger 1-1A has failed. Station Battery #1 is supplying 125VDC Bus 1.
- b. Station Battery #1 has failed. Battery Charger 1-1A is supplying 125VDC Bus 1.
- c. Station Battery #1 and Battery Charger 1-1A have failed. 125 VDC Bus 1 is degraded.
- d. Station Battery #1 and Battery Charger 1-1A are operating normally. A large ground has occurred on 125 VDC Bus 1.

Answer: a

Explanation / Justification

- a. Correct.
- b. Incorrect.
- c. Incorrect.

ES-401**Sample Written Examination
Question Worksheet**

Form ES-401-5

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	062 AK3.03	
	Importance Rating	4.0	_____

AK3.03: Knowledge of the reasons for the guidance actions contained in EOP for loss of nuclear service water as they apply to the Loss of Nuclear Service Water.

Proposed Question:

14. The plant is operating at 100% power with all systems in NSA.
- A Service Water/Normal Intake Structure Loss has occurred.
 - A Steam Generator Blowdown Test Tank discharge is in progress.

Step 2 of AOP-2.30.1, Service Water/Normal Intake Structure Loss instructs the operating crew to secure any liquid waste discharges IF service water header pressure cannot be restored above 34 psig.

Under these conditions, WHY are liquid waste discharges secured?

- A. The required liquid waste discharge dilution water flow cannot be assured.
- B. The liquid waste discharge radiation monitor will be inoperable.
- C. Liquid waste discharge flow control will be unavailable.
- D. Steam generator cleanup ion exchanger temperature control cannot be assured.

Proposed Answer: A.

Explanation (Optional):

- A. Correct. IAW OM Fig. 31-1 and 25-4 Dilution water for liquid waste discharges is provided by the service water system.
- B. Incorrect. The liquid waste discharge radiation monitor is not cooled by river water and will remain operable during loss of service water.
- C. Incorrect. Air will still be available to the flow control valve since domestic water is manually aligned to cool the air compressors. Therefore there will be no loss of air.
- D. Incorrect. Steam Generator Blowdown Test Tank ion exchangers are used to clean-up the water before they are prepared for discharge NOT during the discharge. Additionally, the need to cool evaporator distillate at Unit 2 has been removed since the evaporators have been retired in place.

Technical Reference(s): OM Fig. 31-1 and 25-4

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # 2LOT6 #14 _____
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2LOT6
(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(12)
55.43 _____

Comments

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AK3.03 Effect on plant operation of isolating certain equipment from instrument air.	

Importance:	2.9	3.4
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Question: #15

What effect does a loss of instrument air to containment have on the RCPs?

- a. Loss of stator and bearing cooling only.
- b. Loss of seal injection flow only.
- c. Loss of thermal barrier cooling flow only
- d. Loss of all stator, bearing, and thermal barrier cooling.

Answer:

Explanation / Justification

- a. Incorrect.
- b. Incorrect. Sump and rad monitors indicate safeguards area
- c. Correct. Return flow fails shut.
- d. Incorrect.

Technical References:	CCW lesson plan
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41 (b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	077 AK1.01	
	Importance Rating	3.3	_____

K/A Statement: Knowledge of the operational implications of the definition of terms: volts, watts, amps, VARs, power factor as they apply to Generator Voltage and Electric Grid Disturbances.

Proposed Question:

16)

Initial Main Generator/345KV Switchyard Conditions:

- Real Load: 960 MWe
- Reactive Load: 240 MVARs out
- Switchyard Voltage: 345KV
- Frequency: 60.0 Hz

The grid becomes unstable, and the BOP reports the following parameters:

Switchyard Voltage has dropped to 330 KV.

Frequency has remained at 60.0 Hz.

Assuming the reactor does NOT trip, how will Main Generator Amps respond to this event; and which limit (MWe or MVAR) will most likely be exceeded?

<u>Generator Amps</u>	<u>Limit Most Likely to be Exceeded</u>
A. Increase	MVARs
B. Decrease	MVARs
C. Increase	MWe
D. Decrease	MWe

Proposed Answer: A

Explanation (Optional): Since Frequency has not changed, turbine speed remains constant, since it is tied to the grid. The turbine control valves will remain steady, maintaining real load

constant ("C" and "D" wrong). A generator's MVAR load increases when generator terminal voltage increases above grid voltage. This can be caused either by raising excitation voltage, or by decreasing grid voltage, which has happened in the transient described in the stem of the question. "A" is correct, and "B" wrong, since raising MVARs increases generator amps. "B", "C", and "D" are plausible, since a transient is in progress.

Technical Reference(s): GO-GPF-C5 rev. 2 page 116

(Attach if not previously provided,
including version/revision number.)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # 2011 Millstone 3 #18
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2011 Millstone 3

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(4)
55.43

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	EA1.1 Ability to operate or monitor components and functions of safety systems as they apply to LOCA Outside Containment.	
Importance:		4.0	4.0

Question: #17

A safety injection has occurred on low pressurizer pressure. Plant conditions are:

- RCS pressure at the SI setpoint, trending down
- Reactor and turbine are tripped
- Pressurizer level decreasing rapidly.
- SG pressures 900 psig, trending down slowly
- Containment pressure - stable
- Containment rad levels - no alarms
- Containment sump level - stable
- Safeguards rad level - Hi alarm
- SAFEGUARDS AREA SUMP LEVEL HIGH annunciating

What is the event?

- a. LOCA inside containment
- b. LOCA outside containment
- c. Multiple SG depressurization inside containment
- d. Multiple SG depressurization outside containment

Answer:

Explanation / Justification

- a. Incorrect. No indications of containment issue
- b. Correct. Sump and rad monitors indicate safeguards area
- c. Incorrect. Rad monitors indicate LOCA.
- d. Incorrect. Rad monitors indicate LOCA

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	W E11 EK2.2	
	Importance Rating	3.9	_____

K/A Statement:

EK2.2: Knowledge of the interrelations between the (Loss of Emergency Coolant Recirculation) and the 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.

Proposed Question:

18. The crew is performing ECA-1.1, Loss of Emergency Coolant Recirculation.

- 1) Which of the following describes the reason for depressurizing the RCS IAW ECA-1.1?
 - 2) After commencing the RCS cooldown in ECA-1.1, which of the following sequences will be used to depressurize the RCS?
- A.
 - 1) To minimize RCS leakage.
 - 2) Reduce/terminate HHSI flow, then depressurize the RCS while maintaining minimum RCS subcooling.
 - B.
 - 1) To determine if recirculation spray pumps are cavitating due to CNMT sump blockage.
 - 2) Reduce/terminate HHSI flow, then depressurize the RCS while maintaining minimum RCS subcooling.
 - C.
 - 1) To minimize RCS leakage.
 - 2) Depressurize the RCS while maintaining maximum RCS subcooling, then stabilize RCS temperature while attempting to restore makeup sources.
 - D.
 - 1) To determine if recirculation spray pumps are cavitating due to CNMT sump blockage.
 - 2) Depressurize the RCS while maintaining maximum RCS subcooling, then stabilize RCS temperature while attempting to restore makeup sources.

Proposed Answer: A

Explanation (Optional):

- A. Correct. The RCS is depressurized to minimize RCS leakage. This is accomplished by commencing plant cooldown, reducing or terminating the HHSI flow to help minimize the RWST outflow, then the RCS is depressurized to minimize subcooling and reduce flow from the LOCA. (Major action step 4)
- B. Incorrect. The first step of ECA-1.1 checks for LHSI pump cavitation due to containment sump blockage. Plausible distractor because reducing RCS pressure will raise LHSI pump flow, which could cause cavitation indications to appear, but this is not the reason for depressurization which comes much later in ECA-1.1. Second part is correct.
- C. Incorrect. The RCS is depressurized to minimize RCS leakage. Second part is plausible because the candidate must understand that depressurization of the RCS is to minimize, not maximize subcooling so RCS pressure can be decreased to the lowest pressure possible without losing subcooling. After depressurization, plant cooldown will still occur by procedure and attempting to restore makeup sources will continue.
- D. Incorrect. The first step of ECA-1.1 checks for LHSI pump cavitation due to containment sump blockage. Plausible distractor because reducing RCS pressure will raise LHSI pump flow, which could cause cavitation indications to appear, but this is not the reason for depressurization which comes much later in ECA-1.1. Second part is plausible because the candidate must understand that depressurization of the RCS is to minimize, not maximize subcooling so RCS pressure can be decreased to the lowest pressure possible without losing subcooling. After depressurization, plant cooldown will still occur by procedure and attempting to restore makeup sources will continue.

Technical Reference(s): 2OM-53B.4.ECA-1.1 Iss. 3 Rev. 0 pgs. 3 & 46 (step 32)

(Attach if not previously provided, _____
including version/revision number.) _____

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # 1LOT 16 #17
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 1LOT16

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(10)
55.43 _____

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	AA 1.16 ability to monitor or operate Tave meters as they apply to emergency boration.	
Importance:		3.3	3.2

Question: #19

A rapid load reduction at 5% per minute has been initiated from 100% power. Emergency boration is in progress as directed by AOP 2.51.1 Unplanned Power Reduction.

Which of the following conditions requires a reactor trip?

- a. Rods fail to insert in AUTO at +1.5 deg F temperature deviation.
- b. Temperature deviation exceeds + /- 5 deg F.
- c. Temperature deviation exceeds +/- 10 deg F.
- d. Tave decreases to 543 deg F when load reduction is complete.

Answer: a

Explanation / Justification

- a. Incorrect. Plausible because of auto rod malfunction
- b. Incorrect. Plausible because desired control band
- c. Correct.
- d. Incorrect. Trip is 541 per procedure

Technical References:	AOP 2.5.1
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41 (b)10

Comments:

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	2	_____
	K/A #	028 G2.4.46	_____
	Importance Rating	3.9	_____

K/A Statement:

G2.4.46: Ability to verify that the alarms are consistent with the plant conditions.

Proposed Question:

20)

The Unit is at 100% power for the last 50 days. Pressurizer level is in the normal programmed band.

- LT-460 and LT-461 are in service (PZR LEVEL CONTROL CHANNEL SELECTOR in position II & III)
- LT-461 pegs high

- 1) If **NO** operator action is taken, what effect, if any, is on PZR level?
- 2) Two seconds after LT-461 pegging high, A4-1B, "PRESSURIZER CONTROL LEVEL HIGH/LOW", annunciator _____ lit.

- A. 1) No effect on PZR level
2) will **NOT** be
- B. 1) No effect on PZR level
2) will be
- C. 1) PZR level decreases
2) will **NOT** be
- D. 1) PZR level decreases
2) will be

Proposed Answer: C

Explanation (Optional):

In position II & III, LT-461 will be the controlling channel and send a false high value to the level error comparator. PZR Level Control 2RCS-LK459F compares charging flow and the level error and will send a negative value to the Charging Pumps Discharge Flow Control VLV 2CHS*FCV122. 2CHS*FCV122 will start to close causing **PZR level to decrease**.

LT-461 does not feed the high level bistable in position II & III, but does in position I & III. The A4-1B, "Pressurizer Control Level High/Low" annunciator does come in on low level due to LT-460, but **WILL NOT come in right away as it takes time for level to drop to <14%**.

All other distractors are plausible because it can be correct depending on the position of the switch. To answer this question, the applicant requires knowledge of the circuit.

Technical Reference(s): 2OM-6.4.IF rev. 13 page 12

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam N/A

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(7)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	AK2.01 Knowledge of interrelations between loss of SRNI and power supplies, including switch positions.	

Importance:	2.7	3.1
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Question: #21

With the Unit at 100% power, NSA, If the N31 Source Range Detector High Voltage (HV) Manual Switch on the N31 drawer is placed in the HV ON position, the detector high voltage will:

- a. HV Turn ONs; no reactor trip will occur.
- b. HV Remains OFF due to the P-10 interlock; no reactor trip will occur.
- c. HV Remains OFF due to the P-6 interlock; no reactor trip will occur
- d. HV Turns ON, resulting in a reactor trip

Answer: A

Explanation / Justification

- a. Correct. Switch turns on HV, P-10 blocks trip signal
- b. Incorrect. Manual switch turns on HV
- c. Incorrect. Manual switch turns on HV
- d. Incorrect. Trip blocked.

Technical References:	Excore NIS lesson plan
Proposed References to be provided:	None
Learning Objective:	
Question Source:	Bank, modified
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41 (b)7

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	2	_____
	K/A #	037 AK3.06	
	Importance Rating	3.6	_____

K/A Statement: Knowledge of the reasons for the normal operating precautions to preclude or minimize SGTR as they apply to the Steam Generator Tube Leak.

Proposed Question:

22) The Unit is shutdown due to tube leak, (1) what is preferred cooldown method and, (2) why?

- A. (1) 25 deg/hr to atmosphere, (2) natural circulation rate because proc assumes no condenser.
- B. (1) 90 deg/hr to atmosphere (2) max TS rate, because the procedure assumes no condenser available.
- C. (1) 25 deg/hr to condenser, (2) natural circulation rate and minimize offsite release.
- D. (1) 90 deg/hr to condenser, (2) max TS rate and minimize offsite release.

Maintain cooldown rate within the capacity of a single charging pump.

Proposed Answer: D

Explanation (Optional):

- A. incorrect. Incorrect answer with incorrect explanation.
- B. Incorrect. Correct rate (to wrong location) with incorrect reason.
- C. Incorrect. Incorrect rate (to correct location) with correct reason.
- D. Correct.

Technical Reference(s): 2OM-53C.4.2.6.4 rev. 28, "Steam Generator Tube Leakage"

(Attach if not previously provided, _____
including version/revision number.) _____

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 _____

Comments:

Examination Outline Cross-Reference:	Level	RO	SRO
Tier #		1	_____
Group #		2	_____
K/A #		061 AK3.02	
Importance Rating		3.4	_____

K/A Statement: Knowledge of the reasons for the guidance contained in alarm response for ARM system as they apply to the Area Radiation Monitoring (ARM) System Alarms.

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	G4.2.11 Knowledge of AOPs	

Importance:	4.0	4.2
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Question: #23

A plant power ascension is in progress after an outage. The plant is currently at 250 MW. The crew notices a slow trend down in MW and diagnoses a lowering condenser vacuum. Vacuum is 24.5", lowering slowly. What action is required?

- Trip the reactor, then trip the turbine.
- Trip the turbine. Reactor trip is not required.
- Restore vacuum to greater than 26.2" within 5 minutes, or else trip turbine. Reactor trip is not required.
- Reduce load to maintain vacuum. If vacuum cannot be maintained Greater than 19.5", trip the turbine. Reactor trip is not required.

Answer: A

Explanation / Justification

- Incorrect. <49%
- Incorrect. 5 min to restore vacuum
- Correct.
- Incorrect. 26.2"

Technical References:	AOP 2.26.2
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41 (b)10

Proposed Question:

24)

Given the following:

- The Unit has experienced a Steam Generator tube leak with high RCS activity from a fuel failure
- The Aux Building has rising radiation indications
- The Control Room Radiation Monitor, 2-RMC-RQ-201 and -202, alert was received
- The appropriate Alarm Response Procedure was entered.
- The Control Room is determined to be habitable

Which ONE of the choices below completes the following statement?

In accordance with Control Room Monitor ARP, the crew will depress the Control Room Emergency Ventilation System ____ (1) ____ pushbutton because ____ (2) ____.

- A. (1) Actuation
(2) this trips 2HCV-FN241A,B to isolate outside air from the control room
- B. (1) Actuation
(2) this aligns filtered air to the Control Room envelope to maintain an acceptable environment for operating personnel
- C. (1) Isolation
(2) this trips 2HCV-FN241A,B to isolate outside air from the control room
- D. (1) Isolation
(2) this aligns filtered air to the Control Room envelope to maintain an acceptable environment for operating personnel

Proposed Answer: B

- A. Incorrect. First part correct. Second part plausible because the CR Emergency Supply fans (2HCV-FN241A,B) are NOT used in toxic gas.
- B. Correct. The crew will depress the Control Room Emergency Ventilation System Actuation pushbutton for high radiation to start 2HCV-FN241A,B to maintain an acceptable environment.
- C. Incorrect. Isolation is plausible because this is what the crew would do for a toxic gas environment. (AOP-1/2.44A.1). The second part is plausible because that does happen when the isolation pushbutton is depressed.
- D. Incorrect. See distractor "C" for reason for first part. Second part is plausible if the applicant gets the functions of isolation and actuation confused.

Explanation (Optional):

Technical Reference(s): 2OM-43.4.AAU/AAV rev. 3 Local – Control Room Area
Alert Alarm Level, step 1.d
2SQS 44A.1 rev. 6 PPNT Control Area Ventilation System
slide 44, 45
1/2OM-53C.4A.44A.A, "Toxic Gas release" rev. 22

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2SQS-44A.1 rev. 6 OBJ 17 (as available)

Question Source: Modified Bank # 2014 North Anna #24 Changed to match
BV2 plant.

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(11)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	EA2.03 Ability to determine availability of turbine bypass valves for cooldown for inadequate core cooling	

Importance:	3.8	4.1
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Question: #25

A large break LOCA in containment has occurred. All SI, RHR, and charging pumps have failed; all other components have actuated properly. The crew is has entered FR-C.1, Response to Inadequate Core Cooling. The CRS orders SG depressurization. How will this be accomplished?

- a. Dump steam using condenser using steam dumps at a rate not to exceed 100 deg F in one hour.
- b. Dump steam using condenser steam dumps at maximum rate.
- c. Dump steam using atmospheric steam dumps at a rate not to exceed 100 deg F in one hour.
- d. Dump steam using atmospheric steam dumps at maximum rate.

Answer: d

Explanation / Justification

- a. Incorrect. Applicant must realize LB LOCA cont press MSLI isolates condenser dumps
- b. Incorrect. Condenser dumps not avail
- c. Incorrect. Max rate
- d. Correct

Technical References:	FR-C.1
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41 (b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	2	_____
	K/A #	076 AA1.04	
	Importance Rating	3.2	_____

K/A Statement: ability to operate and/or monitor the failed fuel-monitoring equipment as they apply to the High Reactor Coolant Activity.

Proposed Question:

26)

From the last refuel outage, a loose part hit a fuel assembly damaging a fuel pin. What would indicate that the fuel is damaged and which AOP do you enter?

- A. High radiation as indicated by 2CHS-RQ101A, Letdown Radiation Monitor, and enter AOP 2.6.6, High Reactor Coolant Activity.
- B. High radiation as indicated by 2RMR-RQI303, Containment Airborne Radiation Monitor, and enter AOP 2.6.6, High Reactor Coolant Activity.
- C. High radiation as indicated by 2CHS-RQ101A, Letdown Radiation Monitor, and enter AOP 2.49.1, Irradiated Fuel Damage.
- D. High radiation as indicated by 2RMR-RQI303, Containment Airborne Radiation Monitor, and enter AOP 2.49.1, Irradiated Fuel Damage.

Proposed Answer: A

Explanation (Optional):

- A. Correct. The letdown radiation monitor is the radiation monitor that monitors for failed fuel. AOP 2.6.6 is the procedure to be entered.
- B. Incorrect. Plausible radiation monitor if the applicant thinks that the containment airborne radiation monitor will pick up on activity inside the RCS. Correct procedure to be entered
- C. Incorrect. Correct radiation monitor. Plausible AOP given the name Irradiated Fuel Damage.
- D. Incorrect. Incorrect radiation monitor and incorrect AOP.

Technical Reference(s): AOP 2.6.6 and AOP 2.49.1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)

ES-401**Sample Written Examination
Question Worksheet**

Form ES-401-5

New

X

Question History:

Last NRC Exam

N/A

Question Cognitive Level:

Memory or Fundamental Knowledge
Comprehension or Analysis

X

10 CFR Part 55 Content:

55.41 b(11)

55.43

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	EK1.3 Knowledge of operational implications of annunciators and condition indicating signals and remedial actions associated with High Containment Radiation	

Importance:	3.0	3.3
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Question: #27

Which of the following parameters distinguish between a steamline rupture in containment and a LOCA?

- a. Containment Pressure
- b. Pressurizer Level
- c. Containment Radiation
- d. RCS Pressure

Answer: b

Explanation / Justification

- a. Incorrect. Pressure increase for both events
- b. Incorrect. Pressure level for both events
- c. Correct. RCS coolant vs clean steam
- d. Incorrect. Pressure decreases for both events.

Technical References:	E-0
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41 (b)11

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u> 2 </u>	<u> </u>
	Group #	<u> 1 </u>	<u> </u>
	K/A #	<u> A3.05 </u>	<u> </u>
	Importance Rating	<u> 2.7 </u>	<u> </u>

003 Reactor Coolant Pump

K/A: A3.05: Ability to monitor automatic operation of the RCPS, including RCP lube oil and bearing lift oil pumps.

Proposed Question:

28) The Reactor Operator (RO) is in the process of a normal Reactor Coolant Pump startup. The RO is ready to place the [2RCS*P21C] Reactor Coolant Pump (RCP) control switch to START. Which of the following is the expected sequence of events following placement of the RCP control switch to START

- A) [2RCS*21C] RCP starts, the 21C RCP Bearing Lift Oil Pump starts, RCP starting amps drop off to normal running amps, then the RCP Bearing lift oil pump **STOPS**.
- B) [2RCS*21C] RCP starts, RCP starting amps drop to normal running amps, the 21C RCP Bearing Lift Oil Pump starts and remains **RUNNING**.
- C) 21C RCP Bearing Lift Oil Pump starts, [2RCS*21C] RCP starts, RCP starting amps drop off to normal running amps, and the 21C RCP Bearing Lift Oil Pump remains **RUNNING**.
- D) 21C RCP Bearing Lift Oil Pump starts, [2RCS*21C] RCP starts, RCP starting amps drop off to normal running amps, and the 21C RCP Bearing Lift Oil Pump **STOPS**.

Proposed Answer: D

Explanation (Optional):

- A) The RCP starting first is plausible since the switch is called the Reactor Coolant Pump Control Switch. However, the RCP must be tripped if the RCP starts before the RCP bearing lift oil pump
- B) See above.
- C) The bearing lift oil pump remaining running is plausible if the applicant confuses the bearing lube oil pump with the lift oil pump.
- D) This is the correct sequence.

Technical Reference(s): 2OM-6.4.a Rev19 Reactor Coolant Pump Start part IV.c

(Attach if not previously provided,
including version/revision number)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New _____X_____

Question History: Last NRC Exam _____
(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 __b(3)____
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K6.07 Knowledge of the effect a loss or malfunction on the following CVCS components: heat exchangers and condensers.	

Importance:	2.7	2.8
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Question: #29

The temperature control valve for the letdown non-regenerative heat exchanger has failed closed. What effect does this have on plant operation?

- a. Letdown diverts to degassifiers.
- b. Bypass of letdown ion exchangers.
- c. Inability to use auxiliary spray due to high charging to sprayline delta T.
- d. Potential flashing in the letdown line.

Answer: b

Explanation / Justification

- a. Incorrect.
- b. Correct.
- c. Incorrect
- d. Incorrect..

Technical References:	VCS lesson plan
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41(b)10

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	005 K5.05	_____
	Importance Rating	2.7	_____

K/A Statement: knowledge of the operational implications of the plant during "solid plant": pressure change due to the relative incompressibility of water as they apply to the RHRS.

Proposed Question:

30)

The RCS is solid

The RCS pressure is at 300 psig

The RCS temperature is stable

RHR is in service and supplying letdown

Letdown Orifice HCVs are open.

If the air line separates from the 2CHS*PCV145 actuator, "NRHX Discharge Pressure Control Valve," actuator, RCS pressure will (1).

AND

If the air line separates from the 2CHS*HCV142 actuator, "RHR Hx Outlet Flow Control Valve 605," actuator, RCS pressure will (2).

- A. Increase; Increase
- B. Increase; Decrease
- C. Decrease; Decrease
- D. Decrease; Increase

Proposed Answer: D

Explanation (Optional):

All other distractors are plausible because the applicant is required to know the system, if the valve fails open or closed, and how that effects pressure.

D. Correct. 145 fails open which will cause pressure to lower. 142 fails shut and controls the flow out of the RHR heat exchanger. Once this valve goes shut, temperature in RHR will increase causing the RCS to heat up. As temperature increases, RCS pressure will increase significantly due to a solid system.

Technical Reference(s): AOP-2.34.1 rev. 20
(Attach if not previously provided, OM FIG 7-1A rev 22
including version/revision number.) _____

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank #

Modified Bank # 2012 North Anna #8 changed the 122 valve to 145 valve. Thus changing
the answer.

(Note changes or attach parent)

New

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(7)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	G2.2.42 Ability to recognize system parameters that are entry level conditions for TS	

Importance:	3.9	4.6
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Question: #31

Which of the following is a **NOT** in compliance with Technical Specifications?

- a. Plant is in Mode 5, loops unisolated and filled.
Two SGs are at 30% Narrow Range level.
One RHR pump is in operation.
One RHR pump is tagged for maintenance.
- b. Plant is in Mode 5, midloop.
Two SGs are at 30% Narrow Range level.
Both RHR pumps are operable.
Both RHR pumps were stopped for 5 minutes during equipment rotation.
- c. Plant is in Mode 5, loops unisolated and filled.
Two SGs are at 30% Narrow Range level.
One RHR pump is in operation; one RHR pump is tagged for maintenance.
PZR level is being raised.
- d. Plant is in Mode 5, midloop.
Two SGs are at 30% Narrow Range level.
One RHR pump is in operation.
One RHR pump is tagged for maintenance.

Answer: d

Explanation / Justification

- a. Incorrect. sat
- b. Incorrect. sat

- c. Inorrect
- d. Correct. Midloop means SGs not available.

Technical References:	TS 3.4.7 & 8
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41(b)10

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K1.03 ECCS Knowledge of the physical connections or cause effect relationships between ECCS and MFW.	

Importance:	2.9	3.3
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Question: #32

The plant is operating at 100% power. A spurious SI signal occurs. The reactor trip breakers (RTBs) fail to open. All functions not dependent on open trip breakers operate normally. What is the effect on Main Feedwater?

- a. MFW will continue to control SG level; no isolation will occur because the RTBs have not opened.
- b. Si will provide a trip signal to actuate the P-4 interlock MFRV closure on low Tave.
- c. Si will initiate a full feedwater isolation and trip of main feed pumps.
- d. Si will close HYV157A,B,& C; MFW pumps will not trip because the RTBs have not opened.

Answer: c

Explanation / Justification

- a. Incorrect. Plausible due to ATWT
- b. Incorrect. No trip, no P4
- c. Correct
- d. Incorrect. Plausible due to no P4

Technical References:	SI, MFW lesson plans
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41(b)7

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	007K5.02 PRT Knowledge of the operational implications of the method of forming a steam bubble in the pressurizer as they apply to the PRT	

Importance:	2.9	3.3
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Question: #33

Which one of the following statements describes how a steam bubble is formed in the PRZR during an RCS heat in preparation to returning the plant to service?

- The PZR is filled with one PORV OPEN until a level rise is observed in the PRT. The PORV is then closed, and the PZR is heated to 250-275°F, THEN RCS Pressure is lowered to 25-30 PSIG as level is lowered. At these conditions the combination of heaters and Letdown flow being greater than Charging will cause a bubble to form in the PZR
- The PZR is filled until water vents from [2RCS*600] by local observation. Then the PZR is heated to 250-275°F, THEN RCS Pressure is lowered to 25-30 PSIG as level is lowered. At these conditions the combination of heaters and Letdown flow being greater than Charging will cause a bubble to form in the PRZR
- The PZR is filled to $\geq 80\%$ with [2RCS*600] open. Then [2RCS*600] is closed and the PZR is heated until RCS pressure is approximately 150 psig. THEN the PORV is cycled and RCS Pressure is kept at 150 PSIG as level is lowered. At these conditions, the PZR is purged of noncondensable gas as a steam bubble is formed.
- The PZR is filled to $\geq 80\%$ with one PORV open. The PORV is then CLOSED, and the PZR is heated to 250-275°F. THEN RCS Pressure is lowered to 25-30 PSIG as level is lowered. At these conditions, dissolved noncondensable gases are minimized while avoiding solid plant conditions.

Answer: b

Explanation / Justification

- a. Incorrect. Plausible due to correct bubble forming process
- b. Correct.
- c. Incorrect. Plausible because 80% is solid plant, incorporates 150# to open PORV
- d. Incorrect. Plausible due to 80%, correct bubble parameters, requires knowledge of PORV ops

Comment from review: PORV needs 150 psig to open, PORV distractors not plausible
Fix: Added 150# to one distractor; system knowledge of PORV reqd to toss others

Technical References:	2OM50.4L
Proposed References to be provided:	None
Learning Objective:	
Question Source:	Modified to address PRT
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41(b)10

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	103 G2.4.4	
	Importance Rating	4.5	_____

K/A Statement:

G2.4.4: Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.

Proposed Question:

34)

A steam line break inside containment has occurred, resulting in an automatic reactor trip.

When SI is **required**?

- A. Pressurizer pressure at 1900 psig
- B. Steam Generator Steam Pressure at 700 psig
- C. Containment Pressure at 6 psig
- D. Steam Line pressure at 5 psig

Proposed Answer: C

Explanation (Optional):

- A. No, less than 1860 psig
- B. No, less than 500 psig
- C. Yes, greater than 5 psig
- D. No, doesn't exist.

Technical Reference(s): E-0, Reactor Trip or Safety Injection.

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: New x

Question History: Last NRC Exam N/A

Question Cognitive Level:	Memory or Fundamental Knowledge	X
	Comprehension or Analysis	_____

10 CFR Part 55 Content: 55.41 b(7)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K1.02	

Importance:	2.9	3.3
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Question: #35

Given the following conditions:

- The crew is responding to a Component Cooling Water System Leak
- The "A" and "B" headers have been split
- The crew is isolating the "A" containment header in an attempt to identify the location of the leak.
-

After isolating the "A" containment header, which ONE of the following components will still be supplied with CCW flow?

- a. 21 RCP Thermal barrier HX
- b. Neutron Shield Tank Cooler
- c. Excess Letdown HX
- d. Primary Drains Cooler

Answer: a

Explanation / Justification

- a. Correct
- b. Incorrect.
- c. Incorrect
- d. Incorrect.

Technical References:	SI, MFW lesson plans
Proposed References to be provided:	None
Learning Objective:	
Question Source:	Bank
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41(b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	008 A1.04	
	Importance Rating	3.1	_____

K/A Statement:

A1.04: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including surge tank level.

Proposed Question:

36)

CCP pump discharge pressure is 120 psig

Alarm 6H-1H, PRIMARY COMPONENT COOLING WATER SYSTEM TROUBLE is in.

High Radiation as indicated on 2CCP-RQI100.

- (1) What has happened?
 - (2) If no operator action is taken, what is the **main** concern associated with the event?
- A. (1) CCW system in leakage.
(2) Spread of contamination and radioactivity to the public.
 - B. (1) CCW system in leakage.
(2) Loss of CCP pumps from cavitation.
 - C. (1) CCW system out leakage.
(2) Spread of contamination and radioactivity to the public.
 - D. (1) CCW system out leakage.
(2) Loss of CCP pumps from cavitation.

Proposed Answer: A

Explanation (Optional):

- (1) CCW system in leakage occurred due to the rising surge tank level causing 6H-1H annunciator to come in and high radiation on 2CCP-RQI100. The annunciator would come in for out-leakage, but the radiation would not.
- (2) Spreading contamination and radiation is a concern with system in leakage. Loss of CCP pumps from cavitation is plausible but is not the primary concern.

Technical Reference(s): 2SQS15.1 PPNT rev. 9 iss 2, slide 42

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2SQS15.1 OBJ Rev 9 OBJ 18

Question Source: New X

ES-401**Sample Written Examination
Question Worksheet**

Form ES-401-5

Question History: Last NRC Exam N/A

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X10 CFR Part 55 Content: 55.41 b(
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K4.01 Knowledge of PZR Pressure control system design features or interlocks which provide for spray valve warmup.	

Importance:	2.7	2.9
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Question: #37

Auxiliary spray is being placed in service due to a loss of all RCPs. The RCS is at normal operating temperature. The VCT is at 120 deg F. How is thermal shock to the pressurizer spray nozzle prevented when charging is aligned to provide spray?

- a. The pressurizer spray bypass valves maintain the spray line warm.
- b. Aux spray is not placed in service unless letdown and the regen HX are in service.
- c. Spray line cooldown rate is monitored and maintained < 100 deg F in one hour.
- d. Spray is not initiated if pZR to spray temperature difference is > 100 deg F.

Answer: a

Explanation / Justification

- a. Incorrect. True, but not relevant to aux spray
- b. Correct. P&L
- c. Incorrect.
- d. Incorrect. Spray must be initiated slowly in this case

Technical References:	2OM-6.2.A P&Ls
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41(b)4

p 4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	K3.03	_____
	Importance Rating	3.1	_____

012 K3.03: Knowledge of the effect that a loss or a malfunction of the RPS will have on the Steam Dump System.

Proposed Question:

Unit 2 is operating at 100% power when the following occurs:

- The reactor automatically trips
- **ONLY** the "B" Reactor Trip Breaker opens.

Which one of the following describes the response of the Steam Dump Valve System **DIRECTLY** following the reactor trip? (Assume no operator action)

- A) The Reactor Trip Controller modulates all 4 banks of steam dump valves.
- B) The Load Rejection Controller modulates all 4 banks of steam dump valves.
- C) The Reactor Trip Controller modulates **ONLY** the 1st and 2nd banks of steam dump valves.
- D) The Load Rejection Controller modulates only the 1st and 2nd banks of steam dump valves.

Proposed Answer: C

Explanation (Optional):

- A) Incorrect. Correct that the reactor trip controller is in service; however, only two versus all four banks modulate to control temperature. It is true that all four banks are armed since the "A" did not open. In order to close the C-7B contact, the reset switch would need to be taken to reset.
- B) Incorrect. The Reactor Trip Controller is in service due to the "B" RTB opening. Incorrect that all four banks modulate.
- C) Correct. Opening "B" RTB places the Reactor Trip Controller into service. The first and second banks of steam dump valves arm from a C-7A signal, the third and fourth bank banks arm from the C-7B signal. Since the maximum Reactor Trip Controller signal demand signal can only open the first and second banks of steam dumps, they are the only banks that modulate to bring Tavg to 547 F.
- D) Incorrect. The Reactor Trip Controller is in service. Correct that only two banks modulate.

Technical Reference(s): 2OM-21.1.D,

(Attach if not previously provided, _____
including version/revision number) _____

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 17 from [2LP-SQS-21.1]
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____
(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis _____X_____

10 CFR Part 55 Content: 55.41 ___b(7)___
55.43 _____

Comments

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A3.05 Ability to monitor automatic operation of the RPS, including single and multiple channel trip indicators.	

Importance:	3.6	3.7
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Question: #39

The plant is operating at 100% power.
 Pressurizer Pressure channel 1 fails LOW.
 What effect does this have on the setpoints for OP Δ T and OT Δ T?

- a. Loop 1 OP Δ T only is affected, and indicates LOWER than normal.
- b. Loop 1 OT Δ T only is affected, and indicates LOWER than normal..
- c. Loop 1 OP Δ T only is affected, and indicates HIGHER than normal.
- d. Loop 1 OT Δ T only is affected, and indicates HIGHER than normal.

Answer: b

Explanation / Justification

- a. Incorrect. No pressure input to overpower delta T
- b. Correct. Pressure low is a negative penalty
- c. Incorrect. No pressure input
- d. Incorrect. Negative penalty

Technical References:	RPS PPT slide 59
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41(b)10

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	<u>1</u>	_____
	K/A #	013 K4.13	_____
	Importance Rating	3.7	_____

K/A Statement: Knowledge of the Engineered Safety Features Actuation System (ESFAS) design feature(s) and/or interlock(s) which provide for the MFW isolation/reset.

Proposed Question:

40. Given the following plant conditions:

- The Unit is operating at 100% with all systems in NSA.
- A Feed Flow instrument failure on the 21B Steam Generator (S/G) causes 2FWS*FCV488, "Main Feed Regulating Valve" to go full open.
- A turbine/reactor trip occurs from the resultant 21B Hi-Hi S/G water level.
- Reactor Coolant System (RCS) temperature is 547°F and stable.
- All equipment operates as designed and no operator action has occurred.

Based on these conditions, what will be the status of the following feedwater components, **30 seconds after the trip**?

	<u>2FWS*FCV488</u> (Main FRV)	<u>2FWS*FCV489</u> (Main FRV Bypass)	<u>Main Feedwater Pumps</u>
A.	OPEN	CLOSED	RUNNING
B.	CLOSED	CLOSED	TRIPPED
C.	CLOSED	CLOSED	RUNNING
D.	CLOSED	OPEN	TRIPPED

Proposed Answer: B

Explanation (Optional):

- A.** Incorrect. 2FWS*FCV488 closes on a full FWI signal. It is plausible that this valve would reopen once the Hi-HI S/G water level signal clears as it taps off above the set/reset device. It is possible that on a reactor trip, the S/G water level will shrink down far enough to clear the Hi-HI signal and thus any feedwater/steamflow mismatch would reopen 2FWS*FCV488. The MFP will trip due to Full FWI and will not restart without operator action.

- B. Correct. In accordance with 2OM-24.4.N, Feedwater Isolation occurs on a Hi-HI S/G level. This results in MFRV's and MFRBV's closing and the MFP's tripping.
- C. Incorrect. This would be the correct response for a partial FWI signal. On a Low Tavg (< 554 F) and a reactor trip, a partial feedwater isolation will occur. As a result, 2FWS*FCV488 will close and not reopen. MFRBV's NSA position is closed in manual, so therefore 2FWS*FCV489 will be closed. The MFP will remain running on a partial FWI.
- D. Incorrect. Incorrect 2FWS*FCV489 position. Correct MFP status. Correct 2FWS*FCV488 status. Plausible if the candidate does not understand the feedwater isolation logic.

Technical Reference(s): UFSAR Figure 7.3-18, Rev. 9

(Attach if not previously provided,

including version/revision number.)

Proposed references to be provided to applicants during examination:

Learning Objective: (as available)

Question Source:

Bank #

2LOT7 #44

Modified Bank #

(Note changes or attach parent)

New

Question History:

Last NRC Exam

2LOT7

Question Cognitive Level:

Memory or Fundamental Knowledge

Comprehension or Analysis

X

10 CFR Part 55 Content:

55.41 b(7)

55.43

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K6.01 Knowledge of the effect a loss or malfunction of sensors or detectors will have on ESFAS	

Importance:	2.7	3.1
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Question: #41

The plant is at 100% power. One SG level channel has been placed in the tripped condition for maintenance. A second channel fails low. What is the plant response?

- a.) Reactor trip, all AFW pumps start.
- b.) Reactor trip, no AFW pumps start.
- c.) Reactor trip, only MDAFW pumps start.
- d.) Reactor trip, only TDAFW pump starts.

Answer: a

Explanation / Justification

- a. Incorrect.
- b. Incorrect.
- c. Incorrect
- d. Correct. Single SG logic starts TDAFW pump

Technical References:	RPS lesson plan
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41(b)7

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	022 A2.03	
	Importance Rating	2.6	_____

K/A Statement:

A2.03: Ability to (a) predict the impacts of fan motor thermal overload/high-speed operation on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of fan motor thermal overload/high-speed operation

Proposed Question:

42. Given the following initial conditions:

- Plant is at 100% power
- 'A' and 'B' CNMT Air Recirc (CAR) Fans are RUNNING
- 'C' CNMT Air Recirc Fan is aligned to Bus 2N, with the control switch GREEN targeted

Subsequent conditions:

- A11-6G, Containment Air Recirc Fan Auto Stop is in alarm
- 'A' CNMT Air Recirc Fan indicating light is Bright WHITE

Based on the above conditions, complete the following statements.

'C' CAR fan will _____ (1) _____.

Cooling water _____ (2) _____ automatically aligned to the 'C' Containment Air Recirculation Cooling Coils.

- A. 1) auto start
2) is
- B. 1) auto start
2) is NOT
- C. 1) remain shutdown
2) is
- D. 1) remain shutdown
2) is NOT

Proposed Answer:

D

Explanation (Optional):

- A. Incorrect. Cnmt Air Recirc Fans do not auto start. Plausible distractor because the CS in the control room is STOP-AUTO-START, and the stem stated the CS was green targeted and aligned to the same bus that 'A' CAR fan is energized from. Second part is plausible because some valves do auto align on a system startup.
- B. Incorrect. Cnmt Air Recirc Fans do not auto start. Plausible distractor because the CS in the control room is STOP-AUTO-START, and the stem stated the CS was green targeted and aligned to the same bus that 'A' CAR fan is energized from. Second part is correct.
- C. Incorrect. 'C' CAR fan will remain shutdown. Second part is plausible because some valves do auto align on a system startup.
- D. Correct. 'C' CAR fan will remain shutdown. Second part is also correct. OM-44C.4.D states to align cooling water if it is necessary for containment temperature control.

Technical Reference(s): 2OM-44C.4.AAC rev. 6
2OM-44C.4.D rev. 19

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2SQS 44 ELO-4, 11

Question Source: Bank # 1LOT16 #40
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 1LOT16

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(9)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	AK2.1 Knowledge of bus power supplies to containment spray pumps	

43

Importance:	3.4	3.6
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Unit 2 is operating at full power with all equipment in NSA when the following events occur:

Time	Event
T = 0	The reactor trips due to a LOCA inside CNMT.
T = 30 seconds	Bus 2AE de-energizes due to an overcurrent fault.
T = 10 minutes	Containment Isolation-Phase B (CIB) automatically actuates.
T = 40 minutes	The RWST level is 367 inches and lowering on all channels.

Which of the following conditions exist 40 minutes after the LOCA occurred?

1. Recirc Spray Pump 21D discharge aligned to the High Head Safety Injection suction header.
2. Service Water flowing through the "B" Train Recirc spray heat exchangers.
3. Recirculation Spray Pump 21A running with discharge aligned to the spray rings.
4. Quench Spray Pump 21A discharge isolation valve 2QSS*MOV101A open.

- a. 1, 2 and 4 only.
- b. 2 and 3 only.
- c. 2 and 4 only.
- d. 1, 3 and 4 only.

Answer: a

Answer Explanation:

With CIB actuated Service Water will be aligned to the RSS heat exchangers and with RWST level < extreme low, RSS 21D aligned to the HHSI suction. QSS pump discharge valve is NSA open. RSS P21A has no power.

Explanation / Justification

- a. Correct

- b. Incorrect. No power
- c. Incorrect Recirc spray > HHSI suction
- d. Inorrect. No power

Technical References:	Containment depress lesson plan
Proposed References to be provided:	None
Learning Objective:	
Question Source:	Bank, mod
Question Cognitive Level:	Compehension
10CFR Part 55 Content:	55.41(b)7

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	013 K4.13	_____
	Importance Rating	3.7	_____

K/A Statement:

K4.13: Knowledge of the Engineered Safety Features Actuation System (ESFAS) design feature(s) and/or interlock(s) which provide for the MFW isolation/reset.

Proposed Question:

44)

A DBA LOCA has occurred. Quench Spray pumps cannot be started. What are the consequences of this malfunction?

- A. Peak containment pressure will exceed containment design limits.
- B. Recirc spray pumps must be crosstied to backup Quench Spray to maintain containment pressure to within design limits.
- C. NaTB will not be injected and containment sump pH will not be adequate to maintain off site releases within accident analysis containment leakage assumptions.
- D. Peak containment pressure will be turned by passive heat sinks, but containment pressure reduction will not occur within accident analysis assumptions

Proposed Answer: D

Explanation (Optional):

- A. Incorrect, peak pressure is turned by passive heat sinks. 2SQS13.1 PPT slide 6
- B. Incorrect, no such crosstie. Plausible if the applicant does not know the system flowpath and plausible since they both are spray systems.
- C. Incorrect, NaTB baskets are a passive system and will be injected and spread using the recirculation spray system.
- D. Correct.

Technical Reference(s): 2SQS13.1 PPT rev. 18

(Attach if not previously provided,
including version/revision number.)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2SQS13.1 #14 (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)

ES-401**Sample Written Examination
Question Worksheet**

Form ES-401-5

New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X10 CFR Part 55 Content: 55.41 b(8)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A4.07 Ability to manually monitor or operate in the control room the steam dump valves.	

Importance:	2.8	2.9
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Question: #45

Given the following conditions:

- A load rejection from 100% power has occurred.
- Reactor power is currently 65%
- Tave is 11 deg F higher than Tref

How many banks of condenser steam dumps will be fully or partially open?

- a. 1
- b. 2
- c. 3
- d. 4

Answer: b

Explanation / Justification

- a. Incorrect. $(11-2)/6.5 > 1$ bank
- b. Correct. 2 deg deadband, additional 6.5 deg mismatch to fully open each additional bank
- c. Incorrect. $(11-2)/6.5 < 3$ banks
- d. Incorrect. $(11-2)/6.5 < 4$ banks

Technical References:	Main Steam Lesson Plan
Proposed References to be provided:	None
Learning Objective:	
Question Source:	Bank
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41(b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	059 K3.02	
	Importance Rating	3.6	_____

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

Proposed Question:

46. Given the following plant conditions and sequence of events:

- The plant is operating at 100% power with all systems in NSA EXCEPT:
 - 2FWE*P23B, "B Motor Driven Auxiliary Feedwater Pump" is OOS for 4 hours.
- A Loss of Offsite power coincident with a turbine trip occurs.
- Bus 2AE has an overcurrent lockout.
- All systems function as designed.

With no operator action, which ONE of the following describes the response of the Auxiliary Feedwater (AFW) System?

A total AFW flow of approximately ____ (1) ____ GPM will be provided to ALL Steam Generators through the ____ (2) ____.

- A. (1) 375
(2) "A" Header ONLY.
- B. (1) 750
(2) "B" Header ONLY.
- C. (1) 750
(2) "A" Header ONLY.
- D. (1) 900
(2) "A" AND "B" Headers.

Proposed Answer: ____B____

Explanation (Optional):

- A. Incorrect. Incorrect capacity and incorrect header. Plausible if the candidate believes NSA is to the "A" header or believes the impact of 2FWE*P23A is realignment of 2FWE-P22 to the "A" header.
- B. Correct. Correct capacity. Correct header. A loss of offsite power coincident with a

turbine trip results in a reactor trip and subsequent loss of both MFW pumps. The EDGs are designed to start on a loss of power to AE and DF bus which will power both electric AFW pumps. In the stated conditions, with an overcurrent condition on the AE bus, 2FWE*P23A will not have power. Since 2FWE*P23B is already OOS, only 2FWE-P22 (Turbine Driven AFW pump) will start to provide approximately 750 gpm AFW flow. The AFW system is designed to feed all three S/G based on NSA requirements. When 2FWE*P23B is OOS, corrective action has 2FWE-P22 aligned to the "B" Header.

- C. Incorrect. Plausible if the candidate believes NSA is to the "A" header or believes the impact of 2FWE*P23B is realignment of 2FWE-P22 to the "A" header.
- D. Incorrect. Correct capacity. If the candidate does not know the capacities or understand the impact based on initial plant conditions, then it is plausible that AFW flow would be provided through the "A" header by 2FWE-P22 and the "B" header by 2FWE*P23A. In this case the total flow will be 900 gpm based on limiting orifices which limit flow to 300 gpm per S/G. Incorrect because 2FWE*P23B has no power.

Technical Reference(s): 2OM-24.1.C, Rev.3, pg. 5 & 6
2SQS-24.1, Rev. 26 PPNT slide 71

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank #
Modified Bank # 2LOT8 #42—changed to 2AE bus, changed
the motor driven AFW pump which changed
the answer choice.
(Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(7)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K1.07 knowledge of physical connections or cause/effect relationships between AFW and emergency water source. Reselected from 1.10 due to 1.10 was physically n/a.	

Importance:	2.8	2.9
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Question: #47

A loss of offsite power has occurred at 100% power. What is the design heat removal capacity with the PPDWST as the water source, and what is the first alternate water source per 2OM53A.1.A-1.8 Makeup to PPDWST as PPDWST is level drops?

- a. Maintain Hot Standby for 16 hours.
Alternate source is gravity feed from DWST, then Service Water crosstie.
- b. Maintain Hot Standby for 9 hours
Alternate source is gravity feed from DWST, then Service Water crosstie.
- c. Maintain Hot Standby for 16 hours
Alternate source is gravity feed from DWST, then Fire Protection crosstie.
- d. Maintain Hot Standby for 9 hours
Alternate source is gravity feed from DWST, then Fire Protection crosstie.

Answer: d

Explanation / Justification

- a. Incorrect. 9 hours. Plausible because 16 hours is a reasonable number.
- b. Correct.
- c. Incorrect. 9 hours
- d. Incorrect. Plausible because FP is clean, seems preferable to SW

Technical References:	FW lesson plan, 2OM-53.A-1.8
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory

10CFR Part 55 Content:

55.41(b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	062 A1.01	
	Importance Rating	3.4	_____

K/A Statement: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ac distribution system controls including significance of D/G load limits.

Proposed Question:

48. Given the following plant conditions:

- The Unit is operating at 100% power.
- 2OST-36.2, "Emergency Diesel Generator (2EGS*EG2-2) Monthly Test" is in progress.
- 2-2 EDG is paralleled to the grid, carrying about 50% load.
- A grid disturbance causes frequency to drop very slightly.
- Grid Voltage remains constant.

Which **ONE** of the following describes the response of 2-2 EDG **AND** what is the significance of operating the EDG above 4535 KW for extended periods of time?

The response of 2-2 EDG is that ____ (1) ____ AND the significance of operating this EDG > 4535 KW is excessive ____ (2) ____.

- A. (1) KW output RISES and KVAR output is STABLE.
(2) mechanical stress on the EDG engine
- B. (1) KW output LOWERS and KVAR output is STABLE.
(2) accumulation of combustion and lubricating products in the exhaust system
- C. (1) KW output and KVAR output RISES.
(2) mechanical stress on the EDG engine
- D. (1) KW output and KVAR output LOWERS.
(2) accumulation of combustion and lubricating products in the exhaust system

Proposed Answer: A

Explanation (Optional):

- A. Correct. If frequency drops, the EDG will attempt to increase speed, which will pick up real load. TS Surveillance 3.8.1.3 bases states that the load band (3814 to 4238 kW)

which is more restrictive than the rated load in 2OST-36.2 (4535 kW) is to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations for DG OPERABILITY.

- B. Incorrect. KW output will rise when the EDG attempts to raise grid frequency. The reason for significance of EDG loading is for ensuring loading is maintained >50% for an hour when operating the EDG at low loads for extended periods of time. This limit is plausible in that it is more associated with operating the EDG at low loads and could be confused by the candidate.
- C. Incorrect. KVAR output will remain essentially constant if grid voltage is constant. If it did change it would change in the opposite direction of KW. Significance of operating above rated limit is correct as explained above.
- D. Incorrect. KW will rise. Reason for load limit is incorrect as explained above.

Technical Reference(s): GP Electrical Theory, Rev. 2
2OST-36.2, Rev. 73
TS 3.8.1 & Bases. Amend. 278/161 Rev. 0

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # 2LOT7 #47
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2LOT7

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(8)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	G2.2.39 DC elect Knowledge of less than or equal to one hour TS for systems.	

Importance:	3.9	4.5
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Question: #49

Which of the following states the correct required action for the stated plant mode and malfunctions? All equipment is operable other than the stated failures.

- a. The plant is in Mode 1. A loss of "A" 4kv bus occurs.
Required Action: restore within one hour.
- b. The plant is in Mode 6. A loss of "A" EDG occurs.
Required Action: immediately suspend core alterations
- c. The plant is in Mode 1. A loss of "A" 4kv bus and "B" 125vdc bus occurs.
Required Action: enter T.S. 3.0.3
- d. The plant is in Mode 6. A loss of "B" 125vdc bus occurs
Required Action: immediately suspend core alterations.

Answer: b

Explanation / Justification

- a. Incorrect. 8 hrs
- b. Incorrect. Only 1 required
- c. Correct. Loss of power to one train, control power to the other
- d. Incorrect. One train required.

Technical References:	T.S. section 3.8
Proposed References to be provided:	None
Learning Objective:	
Question Source:	Bank
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41(b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	064 K2.03	_____
	Importance Rating	3.2	_____

K/A Statement: Knowledge of bus supplies to control power.

Proposed Question:

50)

Which of the following provides control power to the 2-1 EDG?

- A. DC*SWBD2-1
- B. DC*SWBD2-3
- C. DC*SWBD2-5
- D. DC*SWBD2-6

Proposed Answer: **A**

Explanation (Optional):

- A. Correct
- B. Incorrect. Emergency power supply
- C. Incorrect. Selectable
- D. Incorrect. Normal power supply to the 2-2 EDG.

Technical Reference(s): EDG LP 36.2 rev 21
(Attach if not previously provided, 2SQS 36.2 PPNT rev 21 Christophe 03-17-16
including version/revision number.) _____

Proposed references to be provided to applicants during examination: **NONE**

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam N/A

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

ES-401**Sample Written Examination
Question Worksheet**

Form ES-401-5

10 CFR Part 55 Content: 55.41 b(8)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K4.01 Knowledge of EDG design features or interlocks which provide for trips while loading.	

Importance:	3.8	4.1
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Question: #51

An EDG has started and sequence loaded during a station blackout. Which of the following engine or breaker trips are still active in this event?

- a.) High crankcase pressure.
- b.) High jacket water temperature.
- c.) Loss of exciter field.
- d.) Engine overspeed.

Answer: d

Explanation / Justification

- a. Incorrect.
- b. Incorrect.
- c. Incorrect
- d. Correct

Technical References:	EDG lesson plan
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41(b)7

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	073 A4.01	_____
	Importance Rating	3.9	_____

K/A Statement:

A4.01: Ability to manually operate and/or monitor effluent release in the control room.

Proposed Question:

52)

Given the following plant conditions:

- The plant is operating at 100% with all systems in NSA.
- A liquid waste discharge is in progress to the Unit 1 Cooling Tower Blowdown.
- [2SWS-RQI102], "Component Cooling HX SW" fails upscale **HIGH**.
- [2CCP-RQI100], "Component Cooling Water" is reading normal and is unchanged.
- The following alarms are received:
 - A4-5A, "RADIATION MONITORING SYSTEM TROUBLE"
 - A4-5C, "RADIATION MONITORING LEVEL HIGH"
- On RM-11, it is confirmed that COMPONENT COOLING HX SW [2SWS-RQI102] is blinking RED.
- No other alarms are present and no operator action has occurred.
- All systems function as designed.

What will be the impact of this process monitor failure on the effluent release in progress?

The release will _____

- A. automatically terminate immediately.
- B. continue and **IS** required to be manually terminated.
- C. automatically terminate after a short time delay.
- D. continue and is **NOT** required to be manually terminated.

Proposed Answer: D

Explanation (Optional):

**Explanation/Ju
stification:**

- A** Incorrect. Plausible if the candidate confuses this monitor with 2SGC-RQ100 which would result in auto termination if an upscale failure occurred.

- B** Incorrect. Correct that release will continue and plausible but incorrect that the release must be manually terminated. The candidate must understand system interrelationships. With CCP in normal there is no reason to believe there is any radiation coming from the CCP system into the SW system.
- C** Incorrect. Plausible if the candidate confuses this monitor with 2SGC-RQ100 which would result in auto termination if an upscale failure occurred and they also confuse or do not know that there is no time delay with this failure.
- D** Correct. The candidate must understand how the failure of 2SWS-RQ1102 will impact the effluent release in progress. There is no automatic action associated with this radiation monitor. Therefore an upscale failure will have no impact on the release. The candidate must also know the system interrelationships between CCP and SW. If there were a leak from the RCS into CCP, then there would be an alarm from 2CCP-RQ1100. The ARP does not require any release to be terminated.

Technical Reference(s):	2OM-43.4.AAA rev. 9	2OM-43.4.AEI rev 7
	2OM-43.4.AAC rev 1	2OM-43.4.ACO rev 7
	2OM-43.4.ACG rev 5	2OM-43.1.C rev. 5

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2SQS-43.1

Question Source:	Bank #	2LOT8 #51
	Modified Bank #	_____ (Note changes or attach parent)
	New	_____

Question History: Last NRC Exam 2LOT8

Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	X

10 CFR Part 55 Content: 55.41 b(7)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	076K2.08 Knowledge of power supplies to ESF actuated MOVs.	

Importance:	3.1	3.3
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Question: #53

While operating at 100% Power with all systems in NSA, A small break LOCA and LOOP occurs. SI, CIA, and CIB signals actuate, but a fault occurs on Bus 2DF and the supply breakers 2D10 and 2F7 trip. The 2-2 EDG starts but does not load due to the fault. Which of the following states a consequence of the loss of Bus 2DF in this event?

- a. 2SWS-MOV113C SWS Supply to 2-2 EDG FROM A SWS HEADER must be opened to prevent damage to the 2-2 EDG.
- b. MCCs E05 & E06 must be jumpered to close [2SIS*MOV865B] and [2SIS*865C] Accumulator Outlet Isolation Valves during the post LOCA cooldown.
- c. Local handwheel operation of MOV701B RHR Suction Isolation Valve will be required to place RHR in service.
- d. Charging Pump Suction from the VCT will fail to isolate on the SI.

Answer: b

Explanation / Justification

- a. Incorrect. EDG must be shut down if unable to power bus
- b. Correct. Per MCC 2E05 load list, 2OM 37.5.b.7 table 37-7
- c. Incorrect. Power can be crosstied
- d. Incorrect. One valve fails to close.

Technical References:	2OM37.5.B.7 table 37-7
Proposed References to be provided:	None
Learning Objective:	
Question Source:	Modified/New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41(b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	078 K3.02	
	Importance Rating	3.4/3.6	_____

K/A Statement:

K3.02: Knowledge of the effect that a loss or malfunction of the Instrument Air System (IAS) will have on systems having pneumatic valves and controls.

Proposed Question:

54)

Following a loss of instrument air which of the following valves fails **OPEN**

- A. 2SGC-TCV150, Disch Line Temp Control Valve
- B. 2CNM-AOV100, Condensate FW Heater Bypass
- C. 2ESS-AOV109, First Point Heater Extraction Steam Line Drain Valve
- D. 2SWS-AOV114, CNMT Air Recirc Coolers Chilled Water Return

Proposed Answer: C

Explanation (Optional):

- A. Fails closed
- B. Fails as is
- C. Correct
- D. Fails closed

Technical Reference(s): AOP 2.34.1 attachment G rev 20

(Attach if not previously provided, _____
including version/revision number.) _____

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (as available)

Question Source: Modified Bank # 2005 NRC #27 common. Changed the
valves and answer choices.

Question History: Last NRC Exam N/A

Question Cognitive Level: Memory or Fundamental Knowledge X

ES-401**Sample Written Examination
Question Worksheet**

Form ES-401-5

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 b(4)
55.43

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A1.01 Ability to predict or monitor changes in parameters associated with operating containment controls to (to prevent exceeding design limits).	
		.	

Importance:	3.7	4.1
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Question: #55

A large break LOCA occurred 24 hours ago. Containment sprays have reduced containment pressure and radiation levels. Plant conditions are as follows:

- Containment pressure peaked at 50 psig, but has been reduced to 4 psig.
- Containment area radiation was 1E+5 R/hr for the first 12 hours, but has been reduced to 1E+4 R/hr.

Is the use of ADVERSE containment values still required?

- a. Yes, once ADVERSE values have been required they remain in effect even after the entry criteria has been cleared.
- b. Yes, the integrated CNMT radiation criteria has been exceeded.
- c. Yes, CNMT radiation still exceeds the ADVERSE value.
- d. No, the use of ADVERSE values is no longer required

Answer: b

Explanation / Justification

- a. Incorrect.
- b. Correct. 1.2E+6 integrated exposure
- c. Incorrect.
- d. Incorrect. Integrated rad value exceeded.

Technical References:	E-0 Adverse criteria
Proposed References to be provided:	None
Learning Objective:	
Question Source:	Bank
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41(b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	2	_____
	K/A #	001 K2.05	_____
	Importance Rating	3.1	_____

K/A Statement: Knowledge of bus power supplies to the M/G sets

Proposed Question:

56.

Which ONE of the following describes the sequence of components from power supply to the Control Rod Drive Mechanism (CRDM's)?

(RTB's = Reactor trip Breakers)

(RDMG's = Rod Drive Motor Generators)

- A. 480 VAC Substation 2-8 & 2-9, RDMG's, RTB's, Power Cabinets.
- B. 480 VAC Substation 2-8 & 2-9, Power Cabinets, RDMG's, RTB's.
- C. 480 VAC Substation 2-1 & 2-2, RDMG's, RTB's, Power Cabinets.
- D. 480 VAC Substation 2-1 & 2-2, Power Cabinets, RDMG's, RTB's.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Plausible incorrect emergency power supply with correct flowpath.
- B. Incorrect. Plausible emergency power supply with incorrect flowpath.
- C. Correct. The candidate must know the power supply to the Motor Generator Sets and have understanding of the flowpath of this power to the Control Rod Drive Mechanisms. 480 VAC Substation 2-1 supplies power to 2RDS-MG21 and 480 VAC Substation 2-2 supplies power to 2RDS-MG22. The proper flowpath is via the RDMGs via the RTBs through the power cabinets to the CRDMs.
- D. Incorrect. Correct power supply with plausible incorrect flowpath.

Technical Reference(s):

2OM-1.3.C, Rev. 27, pg. 13

3SQS1.3 Powerpoint, Rev. 7, slide 62

(Attach if not previously provided,
including version/revision number.)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # 2LOT8 #56
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2LOT8

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b(2)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	A4.03 Ability to manually operate and/or monitor PZR heaters in the control room	

Importance:	3.3	3.1
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Question: #57

The plant was at 100% power with all systems in normal system alignment EXCEPT all PRZR Heaters are in AUTO.

The plant has experienced a load rejection resulting in an 8% pressurizer level surge.

What is the current status of the pressurizer heaters How does this affect the pressurizer heaters?

- a. All heaters are OFF.
- b. All heaters are ON.
- c. Only Backup heaters only are ON.
- d. Only Proportional heaters only are ON.

Answer: c

Explanation / Justification

- a. Incorrect. Plausible intuitive response
- b. Incorrect. Applicant has to realize BU htrs have level input
- c. Correct.
- d. Incorrect. Applicant has to know prop htrs no level input

Technical References:	RCS pzs LP
Proposed References to be provided:	None
Learning Objective:	
Question Source:	Bank
Question Cognitive Level:	Memory

10CFR Part 55 Content:

55.41(b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	2	_____
	K/A #	014 A1.04	_____
	Importance Rating	3.5	_____

K/A Statement: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RPIS controls, including axial and radial power distribution.

Proposed Question:

58)

The plant is at 100% RTP when a 30% load rejection occurred. What happens to axial flux distribution and what is the preferred method to restore it?

- A. Lowers, dilute
- B. Lowers, borate
- C. Increases, dilute
- D. Increases, borate

Proposed Answer: B

Explanation (Optional):

B. Correct. When the rods are near the bottom, all the power is produced by the bottom of the core. The correct action IAW AOP 2.35.2, is to borate.

The other distractors are incorrect but plausible because it requires knowledge of the AFD equation as well as procedural knowledge of the immediate operator actions of the Load rejection procedure.

Technical Reference(s): AOP 2.35.2, Load Rejection rev. 20

(Attach if not previously provided,
including version/revision number.)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (as available)

Question Source:

Bank #

Modified Bank #

New

X

_____ (Note changes or attach parent)

Question History:

Last NRC Exam

Question Cognitive Level:	Memory or Fundamental Knowledge	X
	Comprehension or Analysis	_____

10 CFR Part 55 Content: 55.41 b(1)
55.43

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	ITM A2.01 Ability to a) predict the impact of TC open or short ckt and b) use procedures to mitigate the consequences.	

Importance:	3.1	3.5
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Question: #59

Which one of the following describes the impact on the indication of a core exit thermocouple if it were to short or become an open circuit?

Short Open

- | | | |
|----|------|------|
| a. | Low | Low |
| b. | Low | High |
| c. | High | Low |
| d. | High | High |

Answer: a.

Explanation / Justification

Comment – part b) of KA not met, not operationally relevant due to 51 TCs

- a. Correct. TCs are based on voltage diff between metals, open or short means no delta volts
- b. Incorrect.
- c. Incorrect.
- d. Incorrect.

Technical References:	Incore Nuclear Instruments LP
Proposed References to be provided:	None
Learning Objective:	

Question Source:

Question Cognitive Level:

10CFR Part 55 Content:

Bank

Memory

55.41(b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	2	_____
	K/A #	041 K3.02	_____
	Importance Rating	3.8	_____

K/A Statement:

K3.02: Knowledge of the effect that a loss or malfunction of the SDS will have on the RCS.

Proposed Question:

60)

The plant is operating at 100% power with all systems in NSA.

- An inadvertent turbine trip occurs.
- The "B" reactor trip breaker **FAILS** to OPEN.
- The steam dumps fail to open
- All other systems function as designed.

Without any operator action, where will RCS temperature automatically stabilize?

- A. 541°F
- B. 547°F
- C. 550°F
- D. 554°F

Answer D

Explanation/Justification:

- A. Incorrect. This is where RCS would stabilize if it were relying on the steam dump lo-lo Tavg interlock to stop a cooldown.
- B. Incorrect. This is where RCS would stabilize if it were being controlled by the Rx trip controller. However, with "B" trip breaker still closed, the steam dumps will function on the load rejection controller which has a 3°F deadband before it will open the steam dumps.
- C. Incorrect. This is where the RCS temperature would stabilize if they operated properly. IAW 2OM-21.5.A.12.
- D. Correct. This is where RCS would stabilize if it were relying on the SG safeties to control temperature. This would be necessary if the steam dumps were NOT armed. However, the "A" reactor trip breaker opening will arm the dumps.

Technical Reference(s): 2OM-21.5A.12

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source:	Bank #	_____
	Modified Bank #	2LOT6 #62. Changed the stem which changed the correct answer from C to D. (Note changes or attach parent)
	New	_____
Question History:	Last NRC Exam	2LOT6
Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	X
10 CFR Part 55 Content:	55.41 b(4)	
	55.43 _____	
Comments:		

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	SFP Cooling K4.03 Knowledge of features/interlocks which provide for anti-siphon devices.	

Importance:	2.6	2.9
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Question: #61

A pipe break occurs in the spent fuel pool cooling system. What is the lowest design level to which water can be siphoned by the beak, and what is basis for that level?

- a. 23' over the top of fuel assemblies in the fuel racks, to ensure building accessibility and cooling if the break occurs during fuel movement.
- b. 10' over the top of an assembly being moved, to ensure compliance with technical specifications in the event of a pipe break.
- c. 23' over the top of fuel assemblies in the fuel racks, to ensure compliance with technical specifications in the event of a pipe break.
- d. 10' over the top of fuel assemblies in the fuel racks, to ensure building accessibility and fuel cooling in the event of a pipe break.

Answer: d.

Explanation / Justification

- a. Incorrect. Plausible if applicant remembers 23', but not what it's for.
- b. Incorrect. Plausible because 10' above seated fuel is the actual design value.
- c. Incorrect. Plausible because 23' is the TS number, but not anti-siphon number
- d. Correct.

Technical References:	SF lesson plan
Proposed References to be provided:	None

Learning Objective:

Question Source:

Question Cognitive Level:

10CFR Part 55 Content:

Bank

Memory

55.41(b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	2	_____
	K/A #	034 G2.1.27	
	Importance Rating	3.9	_____

K/A Statement: Knowledge of system purpose and/or function.

Proposed Question:

62) Which component's function is to maneuver the control rod drive shaft unlatching tool?

- A. Manipulator Crane Gripper
- B. Manipulator Crane Auxiliary Hoist
- C. Spent Fuel Bridge Crane
- D. Manipulator Crane Mast

Proposed Answer: B- Aux Hoist

Explanation (Optional):

Technical Reference(s): 3SQS6.13 LP Rev 6: Fuel Handling Operations

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b(13)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	K5.03 Knowledge of the operational implications of the shrink and swell concept as they apply to the SGs	

Importance:	2.6	2.9
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Question: #63

A condenser steam dump fails open at 100% power. What is the response of SG level? Assume normal response of the SG level control system.

- a. Initial level rise, then return to program value.
- b. Initial level decrease, then return to program value
- c. Initial level rise, then stabilize above program value.
- d. Initial level decrease, then return to program value.

Answer: a

Explanation / Justification

- a. Correct. Swell, then SGWLC reacts
- b. Incorrect. Applicant may think flow MM reduces flow until level control responds.
- c. Incorrect. Applicant may think flow error affects level
- d. Incorrect. Applicant may think flow error affects level

Technical References:	Main Steam, Main Feed LP
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41(b)4

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	068 A3.02	
	Importance Rating	3.6	

K/A Statement: Ability to monitor automatic operation of the Liquid Radwaste System including: Automatic isolation

Proposed Question:

64)

Given the following:

- The Unit is operating at 100% power with all systems in NSA.
- A liquid waste discharge is in progress to the Unit 2 cooling tower basin.
- A **HIGH** radiation alarm occurs on [2SGC-RQ100], Liquid Waste Process Monitor.

Which ONE of the following describes the action that will occur?

- A. Manually close 2SGC-HCV100, High Radiation Valve terminating the release.
- B. Verify 2SGC-HCV100, High Radiation Valve closes automatically immediately terminating the release.
- C. Manually open 2SGC-HCV100, High Radiation Valve diverting the release to the Unit 1 boron recovery test tank.
- D. Verify 2SGC-HCV100, High Radiation Valve opens automatically immediately diverting the release to the Unit 1 boron recovery test tank.

Proposed Answer: **B**

Explanation (Optional):

- A. Incorrect. The valve closes automatically. Plausible if the applicant believes that the HCV must be manually closed.
- B. Correct.
- C. Incorrect. Opening HCV100 will not divert to U1 boron recovery system. Plausible because the path to Unit 1 BRS is **DOWNSTREAM** of HCV100 and would prevent liquid waste from being discharged.
- D. Incorrect. Opening HCV100 will not divert to U1 boron recovery system.

Technical Reference(s): 2SQS-17.1 PPNT rev. 9 slide 6 (Attach if not previously provided)
& 14

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2SQS-17.1 Objective 6 (As available)

Question Source: Bank # 2005
BVPS u2
2005 #36
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam 2005 NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 b(13)
55.43

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	K1.05 Knowledge of the physical connections and/or cause effect relationships between the ARM and the MRSS	

Importance:	2.8	2.9
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Question: #65

Which of the following describes the purpose and operation of these rad monitors:

- Main Steam Line Radiation Monitors [2MSS-RQ[101A, B & C]
 - Main Steam Line N16 Radiation Monitors [2MSS-RQI102A, B & C]
- a. The 102 channels are low range SG tube leak monitors; the 101 channels are high range monitors. Monitors are continuously in-service.
 - b. The 101 channels are SG tube leak monitors. The 102 channels are release monitors which are in-service whenever a steam release flowpath is open.
 - c. The 102 channels are indication only monitors, The 101 channels have an auto isolation function.
 - d. The 101 channels are SG tube leak monitors with an auto isolation function. The 102 channels are release monitors that auto initiate on an SI.

Answer: d

Explanation / Justification

- a. Incorrect. 101s initiate on SI
- b. Incorrect. 101s initiate on SI.
- c. Incorrect. backwards
- d. Correct

Technical References:	Main Steam, RMS LP
Proposed References to be provided:	None

Learning Objective:

Question Source:

Question Cognitive Level:

10CFR Part 55 Content:

New

Memory

55.41(b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	_____
	Group #	_____	_____
	K/A #	_____	_____
	Importance Rating	_____	_____

K/A Statement:

Proposed Question:

66)

You are instructed to escort a group of visitors around the plant to do some maintenance. They are required to go into the Protected and Vital areas. They were given badges that can scan through doors. (1) What is the maximum number of visitors that you can escort by yourself? (2) You and your visitors come across a keycard locked door, what is the correct method to proceed through the door?

- A. (1) 5
(2) Enter first and the visitors follow
- B. (1) 5
(2) Allow the visitors to enter first and you follow
- C. (1) 10
(2) Enter first and the visitors follow
- D. (1) 10
(2) Allow the visitors to enter first and you follow

Proposed Answer: B

Explanation (Optional):

IAW NOP-LP-1205, Visitor control, 5:1 ratio is the maximum for a vital area, 10:1 is for a protected area. Since they are going into a vital area, a maximum of 5 visitors is allowed. The second part correct method is to allow the visitors to enter first and then follow. It is plausible that it is the other way around because BVPS requires you to close the door after each person passes and an applicant may think that he or she should be on the other side of the door first when that happens.

Technical Reference(s): NOP-LP-1205 rev. 5

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # _____

ES-401**Sample Written Examination
Question Worksheet**

Form ES-401-5

Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b(9/10)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.1.3 Knowledge of Shift or short-term relief turnover practices.	

Importance: 3.7

Question: #67

A shift turnover **shall not** be conducted in which of the following circumstances?

- a. A plant startup is in progress. The generator has just been synced to the grid, and SG level control is in manual.
- b. A reactor startup is in progress. SRNIs have indicated 3 doublings since rod withdrawal commenced.
- c. A diesel surveillance is in progress, diesel is running loaded
- d. A one hour LCO is in effect and will expire during the turnover.

Answer: b.

Explanation / Justification

- a. Incorrect. Plausible because infrequent evolution, component in manual
- b. Correct. Per OP-1002, no shift turnover during approach to criticality.
- c. Incorrect. Plausible because surveillance test; COO proc says undesirable for evolution to take place and operator may need to remain on station, turnover not prohibited.
- d. Incorrect. Offgoing operator may need to remain on station, but turnover proceeds

Technical References:	NOP=OP-1002
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41(b)10

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	3	_____
	Group #	_____	_____
	K/A #	G2.2.13	_____
	Importance Rating	4.1	_____

K/A Statement: Knowledge of tagging and clearance procedures.

Proposed Question:

68)

In an emergency, which position has the authority to use Human Clearances?

- A. Clearance Authority
- B. Operations Manager
- C. Shift Manager
- D. Unit Supervisor

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Clearance Authority is plausible given the name, but does not have authority here.
- B. Incorrect. Plausible because the Operations Manager has overall responsibility for the implementation of the procedure.
- C. Correct. IAW NOP-OP-1001, page 14, section 4.2.4, the SM "determines the appropriateness of the use of Human Clearances in times of emergency.
- D. Incorrect.

Technical Reference(s): NOP-OP-1001, Clearance/Tagging Program rev. 24 page 14 section 4.2

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level:	Memory or Fundamental Knowledge	X
	Comprehension or Analysis	_____
10 CFR Part 55 Content:	55.41 b(10)	
	55.43 _____	

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.2,6	Knowledge of the process for making changes to procedures

Importance: 3.0

Question: #69

You are the first person performing the latest revision of a pump surveillance. While lining up for the surveillance, you realize based on your system knowledge that the procedure incorrectly requires you to verify "CLOSED" a valve that needs to be "OPEN". What category of error is this and what action is required to perform the surveillance?

- a. This is a Typographical Error; annotate a correction and continue with the surveillance.
- b. The procedure requires an Enhancement; annotate a correction and continue the surveillance.
- c. This is a Deficiency; the procedure cannot be continued until the procedure is revised.
- d. This is a change of procedure Intent; the procedure cannot be continued until the procedure is revised.

Answer: c.

Explanation / Justification

- a. Incorrect. "Open" v "Closed" specifically excluded as typo
- b. Incorrect. Does not match definition in NOP-LP-2601.
- c. Correct. Procedure cannot be implemented as written.
- d. Incorrect. "Intent" is not a category.

Technical References:	NOP-LP-2601
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.41(b)10

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.12	
	Importance Rating	3.0	

K/A Statement: Knowledge of surveillance procedures.

Proposed Question:

70)

When performing an OST procedure, which one of the following conditions **PROHIBITS** the use of "N/A" in the sign-off spaces provided?

- A. Performance of partial tests.
- B. Inability to perform the OST as written.
- C. Performing an OST that pre-establishes conditions for non-performance of steps.
- D. Performance of steps that cannot be performed due to plant conditions but do not change the intent of the procedure.

Proposed Answer: **B**

Explanation (Optional):

- A. Incorrect. Partial tests allow N/A.
- B. Correct. Situation requires issuing a revision after placing equipment in a safe condition.
- C. Incorrect. N/A is specifically used for this condition.
- D. Incorrect. May use N/A as long as procedure intent is not altered.

Technical Reference(s): 1/2-ADM-0104 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 3SSG-Admin Objective 5 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam BVPS-2
2005 #68

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b(10)
55.43 _____

Comments:
BVPS-1 2002 NRC exam

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.3.4 Knowledge of Radiation exposure limit under normal or emergency conditions.	

Importance: 3.2

Question: #71

A large break LOCA is in progress core damage has occurred, with high radiation levels in accessible plant areas. To prevent further core damage, an individual is dispatched to locally operate a failed MOV in an area surveyed at 100 R/hr area. He becomes injured and immobilized, and two individuals are sent to rescue him.

What are the BVPS voluntary exposure limits for the **original operation**, and the **subsequent rescue** without the need for concurrence of the Senior VP or designee?

- a. valve operation: 5 REM as a Planned Special Exposure.
two rescuers: 25 REM each lifesaving activities.
- b. valve operation: 5 REM as a Planned Special Exposure
two rescuers: 25 MAN-REM combined total for all lifesaving activities.
- c. valve operation: 25 REM as an emergency exposure.
two rescuers: 75 MAN-REM combined total for all lifesaving activities
- d. valve operation: 25 REM as an emergency exposure.
two rescuers: 75 REM each for all lifesaving activities.

Answer: d

Explanation / Justification

- a. Incorrect. This is an emergency exposure, not a planned operation
- b. Incorrect. Emergency, exposure limits are individual
- c. Incorrect. Emergency exposure limits are individual
- d. Correct. 25R to maintain CSF/safe shutdown, 75R for lifesaving.

Technical References:	1/2 EPP-IP-5.3
Proposed References to be provided:	None

Learning Objective:

Question Source:

Question Cognitive Level:

10CFR Part 55 Content:

New

Comprehension

55.41(b)10

ES-401**Sample Written Examination
Question Worksheet****Form ES-401-5**

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	3	_____
	Group #	2	_____
	K/A #	G2.3.12	_____
	Importance Rating	3.2	_____

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

Proposed Question:

72)

You have been assigned the task of venting a radioactive system that is located in a Locked High Radiation Area (LHRA).

When you open the vent valve you receive an **UNEXPECTED** dose rate alarm on your electronic alarming dosimeter (EAD).

IAW NOP-WM-7025, High Radiation Area Program, what are your **REQUIRED** actions for these conditions?

Commented [Office1]: Different procedure

- A. Immediately notify Radiation Protection (RP) and stay in the area to wait for personnel for decontamination.
- B. Close the vent valve and report the alarm to the control room supervisor and Radiation Protection (RP).
- C. Immediately exit the area and perform whole body frisk.
- D. Close the vent valve and immediately exit the area.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. These are the correct actions personnel contamination.
- B. Incorrect. These would be appropriate actions for an alarming air monitor.
- C. Incorrect. Frisking is required before exiting the RCA but not necessarily required as part of LHRA exit.
- D. Correct. IAW NOP-WM-7025 step 4.2.12 on page 6 and 7.

Technical Reference(s): NOP-OP-4104, Job Coverage, 4.8.1 step 3 and 5 on page 17 &18

(Attach if not previously provided, _____
including version/revision number.) _____

ES-401**Sample Written Examination
Question Worksheet****Form ES-401-5**

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # 2LOT6 #71

Changed distractor A

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis10 CFR Part 55 Content: 55.41 b(12)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.4.2.5 Knowledge of Fire protection Procedures	

Importance: 3.1

Question: #73

A serious fire is in progress in the Primary Auxiliary Building, elevation 755. The Shift Manager has determined that the Safe Shutdown Following A Serious Fire in the Primary Auxiliary Building procedure must be entered. In which time critical order should the following actions be completed to maintain engineering commitments?

1. Isolate Hydrogen to the VCT
2. Isolate Charging Pump Suction from the VCT
3. Isolate PG Water

- a. 3, 1, 2
- b. 1, 3, 2
- c. 3, 2, 1
- d. 1, 2, 3

Answer: b

Explanation / Justification

- a. Incorrect.
- b. Correct.
- c. Incorrect.
- d. Incorrect

Technical References:	Fire Protection lesson plan
Proposed References to be provided:	None
Learning Objective:	

Question Source:

Question Cognitive Level:

10CFR Part 55 Content:

Bank, Modified

Memory

55.41(b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	3	_____
	Group #		_____
	K/A #	G2.4.17	
	Importance Rating	3.9	_____

K/A Statement: G2.4.17: knowledge of EOP terms and definitions.

Proposed Question:

74)

Following a reactor trip, the crew entered E-0.

- (1) When is the crew required to perform continuous action steps (CAS)? and,
 - (2) When is the crew allowed to terminate monitoring for CAS?
- A. (1) As soon as the crew enters the EOP.
(2) After exiting that EOP.
 - B. (1) When that step is reached in the procedure.
(2) After exiting that EOP.
 - C. (1) As soon as the crew enters the EOP.
(2) After exiting **ALL** EOPs.
 - D. (1) When that step is reached in the procedure.
(2) After exiting **ALL** EOPs.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. First part is plausible if the applicant confuses CAS with symptom based actions. Second part correct.
- B. Correct. The action is performed when reaching that step in the procedure and continuous throughout the rest of that EOP.
- C. Incorrect. First part is plausible if the applicant confuses CAS with symptom based actions. Second part is plausible if the applicant believes that a CAS is always valid in

the EOPs.

- D. Incorrect. First part correct. Second part is plausible if the applicant believes that a CAS is always valid in the EOPs.

Technical Reference(s): 3SQS53.1 rev 2 page 36.

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 3SQS53.1 PPNT rev. 2: State from memory and apply ALL of the EOP user's guide rules of usage as defined in 1/2-OM53B.2

Question Source: New X

Question History: Last NRC Exam N/A

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b(10)
55.43 _____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.4.2.9 Knowledge of the emergency plan.	

Importance: 3.1

Question: #75

A station event has just been classified as a Site Area Emergency. You are the communicator. Which of the following describes the time requirement for Local and State notifications?

- a. 30 minutes from the initiation of the event.
- b. 15 minutes from the classification of the event
- c. 15 minutes from the completion of the initial contact message form.
- d. 15 minutes from the time the communicator acknowledges the briefing from the Shift Manager/ Emergency Director

Answer: b

Explanation / Justification

- a. Incorrect. Applicant may think 15 min to classify, then additional 15 min to notify.
- b. Correct.
- c. Incorrect. Applicant may think classification time includes form prep
- d. Incorrect. Applicant may think he has 15 minutes from time he receives form.

Technical References:	E-plan
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.41(b)10

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	1
	K/A #	015 G2.4.35	
	Importance Rating	_____	4.0

K/A Statement: Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.

Proposed Question:

76. A large Steam break accident inside containment has occurred.
- Containment pressure peaked at 20 psig.
 - All Equipment functioned as designed **EXCEPT** all seal injection flow has been lost.
 - SI, CIA, and CIB have all been reset.
 - SWS has been restored to the CCP heat exchangers.
 - CCP flow has been restored.
 - While performing EOP Attachment A-1.2, Establishing RCP CCP Cooling and Seal Injection, the Reactor Operator is unable to "OPEN" 21A RCP Thermal Barrier Outlet Isol Vlv [2CCP*AOV107A], using the benchboard control switch.

In order to "OPEN" 21A RCP Thermal Barrier Outlet Isol Vlv 2CCP-AOV107A it will be necessary to defeat the "CLOSE" signal to 21A RCP Thermal Barrier Outlet Isol Vlv 2CCP-AOV107A.

IAW EOP Attachment A-1.2, Establishing RCP CCP Cooling and Seal Injection:

What directions are you **REQUIRED** to give the local operator to defeat the "CLOSE" signal to 21A RCP Thermal Barrier Outlet Isol Vlv [2CCP*AOV107A]?

- A. Install jumpers across the opening contacts of the valve's control circuit.
- B. Remove the valve's associated secondary process rack power supply card.
- C. Remove the valve's associated control circuit power supply fuse.
- D. Install jumpers across the contacts of the high discharge flow transmitter.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Although this may open the valve, it is NOT IAW EOP attachment A-1.2.
- B. Correct. IAW EOP attachment A-1.2 step 4.a.3.
- C. Incorrect. This action will fail the valve closed.
- D. Incorrect. This action will only defeat the high flow signal BUT NOT the high pressure

and it is NOT IAW EOP attachment A-1.2

Technical Reference(s): EOP attachment A-1.2 step 4.b.3.

(Attach if not previously provided,
including version/revision number.)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # BVPS 46175
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam ___2LOT6 #100___

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 b(5)

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		1
	Group #		1
	K/A #	EA2.09	
		Ability to determine or interpret main turbine/Rx trip as it applies to ATWS	
Importance:		3.8	4.0

Question: #77

The crew has just entered FR-S.1 due to an ATWS from 100% power. Which of the following conditions allows the crew to exit FR-S.1?

1. Rods are fully inserted by any means.
 2. SI is required
 3. Turbine is verified tripped.
 4. Power less than 5% with negative SUR
-
- a. 1 only
 - b. 1 OR 2 only
 - c. 1 and 3 only
 - d. 4 only

Answer: d

Explanation / Justification

- a. Incorrect. Plausible rods in, but not FR-S.1 exit.
- b. Incorrect. Plausible because implies a new condition, but verify SI in FR.
- c. Incorrect. Plausible because rods in, but 4 is required.
- d. Correct. This is the exit criteria.

Technical References:	FR-S.1
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.43 (b)5

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	1
	K/A #	054 G2.4.6	
	Importance Rating	_____	4.7

K/A Statement: Knowledge of EOP mitigation strategies.

Proposed Question:

Given the following conditions:

- The Unit was at 100% power when a Reactor Trip occurred due to a Loss of Main Feedwater.
- E-0, Reactor Trip or Safety Injection, was exited at Step 4 and the crew transitioned to ES-0.1, Reactor Trip Response.
- While in ES-0.1, a RED path developed on the Heat Sink Critical Safety Function Status Tree due to a loss of all Auxiliary Feedwater flow.
- The crew transitioned to FR-H.1, Response to Loss of Secondary Heat Sink.
- Both Centrifugal Charging Pumps are available.
- Pressurizer pressure is 2000 psig and slowly rising.
- The Reactor Coolant Pumps have been stopped.
- Steam Generator (SG) narrow range levels are as follows:
 - SG A is 5%.
 - SG B is 7%.
 - SG C is 6%.

Which of the following actions must be performed per FRH-1, Response to Loss of Secondary Heat Sink?

FR-H.1, Response to Loss of Secondary Heat Sink, can be exited as soon as narrow range level in any Steam Generator exceeds...

- A. 12%. A transition back to ES-0.1, Reactor Trip Response, is performed and continues at the step in effect.
- B. 31%. A transition back to ES-0.1, Reactor Trip Response, is performed and continues at the step in effect.
- C. 12%. A transition to E-0, Reactor Trip or Safety Injection, is performed and proper Safety Injection actuation and alignment is verified.
- D. 31%. A transition to E-0, Reactor Trip or Safety Injection, is performed and proper Safety Injection actuation and alignment is verified.

Proposed Answer: A

Explanation (Optional):

- A. Correct. Correct setpoint in FR-H.1. And step 8 says to return to procedure and step in

- effect.
- B. Incorrect. Plausible setpoint as this is the setpoint for adverse containment. Correct transition.
 - C. Incorrect. Correct setpoint. Plausible transition because this would be the transition if bleed and feed was established.
 - D. Incorrect. Plausible setpoint and plausible transition.

Technical Reference(s): FR-H.1 issue 2 rev. 1, steps 7, 8, and 15.

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # 2012 Comanche Peak #76
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2012 Comanche Peak

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 b(5)

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		1
	Group #		1
	K/A #	2.4.11	
		Loss of DC knowledge of abnormal condition procedures	
Importance:		3.8	4.0

Question: #79

The reactor has just tripped from 100% power. The following annunciators are illuminated:

- A1-1A, "DC DISTRIBUTION PANEL LOSS OF CONTROL DC"
- A2-3H, "SAFETY SYSTEM TRAIN A INOPERABLE"
- A8-9A, "125VDC BUS 2-1 TROUBLE"

What action is required regarding E-0 and AOP 2.39.1A "Loss of 125VDC Bus 2-1"?

- a. Enter E-0, transition to AOP 2.39.1A when IAs completed.
- b. Enter AOP 2.39.1A, verify Rx trip IA's, remain in AOP 2.39.1A
- c. Enter E-0, perform E-0 or ES-0.1 and AOP 2.39.1A actions concurrently.
- d. Enter E-0 if an SI occurs, otherwise enter and remain in AOP 2.39.1A

Answer: c

Explanation / Justification

- a. Incorrect. Plausible if applicant does not understand concurrent performance.
- b. Incorrect. Plausible because of AOP wording, **check with facility**.
- c. Correct.
- d. Incorrect. Plausible because SI requires actions a trip doesn't.

Technical References:	AOP 2.39.1
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New

Question Cognitive Level:
10CFR Part 55 Content:

Comprehension
55.43 (b)5

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	1
	K/A #	062 AA2.01	
	Importance Rating	_____	3.5

K/A Statement: Ability to determine and interpret the location of a leak in the SWS as it applies to the Loss of Nuclear Service Water

Proposed Question:

80. The Unit is operating at 100% power with all systems in NSA.
- A large leak occurs in the Service Water System.
 - The control room receives A1-4H, "SERVICE WATER SYSTEM TROUBLE" followed shortly after by A1-4G, "SERVICE WATER HEADER PRESSURE LOW".
 - "A" & "B" SW Header Pressures **BOTH** indicate 28 psig and slowly DROPPING.
 - "A" & "B" CCS Water HX Service Water Supply Header Isolation Valves (2SWS-MOV107A/B/C/D) automatically isolate **AND** cannot be re-opened.
 - **AFTER** 2SWS*MOV107A/B/C/D automatically isolate, "A" & "B" SW Header Pressures begin to RISE.
1. Based on these plant conditions, which Service Water System component is leaking?
2. IAW AOP 2.30.1, Service Water/Normal Intake Structure Loss which of the below listed components are **required** to be tripped?
- All Station Air Compressors
 - All Main Feed Pumps
 - All Heater Drain Pumps
 - All Condensate Pumps
- A. (1) The in service Primary Component Cooling Heat Exchangers 2CCP-E21A, B ,C
(2) ONLY the Main Feed Pumps and Condensate Pumps
- B. (1) The in service Centrifugal Water Chillers 2CDS-CHL23A, B, C
(2) ONLY the Main Feed Pumps and Heater Drain Pumps
- C. (1) The in service Primary Component Cooling Heat Exchangers 2CCP-E21A, B ,C
(2) ONLY Station Air Compressors and Heater Drain Pumps
- D. (1) The in service Centrifugal Water Chillers 2CDS-CHL23A, B, C
(2) ONLY the Station Air Compressors and Condensate Pumps

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Incorrect leaking component and condensate pumps are not to be tripped in AOP 2.30.1.
- B. Correct. Since pressure recovered when 2SWS*MOV107A/B/C/D isolated, the leak must be in the secondary side header. The Centrifugal Water Chillers are on the secondary side header and the Primary Component Cooling Heat Exchangers are on the primary side header. The first part of the question can be answered with RO knowledge. The second part is SRO only since it requires specific knowledge of procedure content and cannot be answered with system knowledge alone. All four pumps listed in the stem of the question will lose cooling when the 107 valves close. The SRO must be familiar enough with the AOP content to know what actions are to be taken. The procedure directs the alignment of an alternate cooling water supply to the air compressors, and the starting of one condensate pump if none are running. The SRO must therefore assess plant conditions (normal, abnormal, or emergency) and then select the actions with which to proceed.
- C. Incorrect. Incorrect leaking component and air compressors are not to be tripped in AOP 2.30.1.
- D. Incorrect. Correct leaking component and air compressors and condensate pumps are not to be tripped in AOP 2.30.1.

Technical Reference(s): AOP 2.30.1 Rev. 9 Steps 7,9, & 10.
Simplified SWS Drawing (2SQS-LP-301 slides 6 and 8).

(Attach if not previously provided, _____
including version/revision number.) _____

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2LOT8 #80

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 b(5)

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		1
	Group #		1
	K/A #	EA2.1	
		Ability to determine/interpret procedures as applied to Loss of Emergency Recirculation	
Importance:		2.9	3.5

Question: #81

The reactor has just tripped on low pressurizer pressure from 100% power.

The crew has just completed E-0 immediate actions.

Plant conditions are as follows:

- Reactor trip confirmed.
- SI initiated
- RCS pressure: 1600# lowering rapidly
- PZR level: empty
- SG pressures: approximately 900#, stable
- SG levels: below NR, rising on WR
- Containment pressure: - 1.3 psig, stable
- Safeguards area radiation monitors: alarming
- Safeguards area sump: Hi level alarms

If the crew is unable to isolate the leak, what is the expected EOP flowpath and final plant condition after the RWST level decreases below 30 inches?

- a. E-0 > ECA-1.2 > ECA-1.1
Makeup to RCS as directed by TSC
- b. E-0 > ECA-1.2 > ECA-1.1
Makeup to the RWST
- c. E-0 > E-1 > ES-1.3
Makeup to the RCS as directed by TSC
- d. E-0 > E-1 > ES-1.3
Makeup to the RWST

Answer: a

Explanation / Justification

- a. Correct for unisolable LOCA outside containment. m/u to rcs because than 30 inches RWST
- b. Incorrect. Plausible because if applicant thinks direct ECA 1.2 entry is acceptable.
- c. Incorrect. Plausible if applicant is unfamiliar with LOCA outside procedures
- d. Incorrect. Makeup will be to RCS; wrong flowpath

Technical References:	ECA-1.2, ECA-1.1
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.43 (b)5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	2
	K/A #	003 AK2.05	
	Importance Rating	_____	2.8

K/A Statement: Knowledge of the interrelations between the Dropped Control Rod and the following: Control rod drive power supplies and logic circuits

Proposed Question: 82)

Given the following conditions:

- The Unit is operating at 100% power with all systems in NSA.
- Control Bank "D" indicated position is 229 steps.
- An urgent alarm A4-8A

Which ONE of the following is the cause of the failure **AND** what effect on the rods does it have?

- A. Logic Cabinet Master Cycler failure; rods drop and are inoperable
- B. Power Cabinet Thyristor failure; rods drop, but are operable
- C. Logic Cabinet Master Cycler failure; rods do NOT drop and are operable
- D. Power Cabinet Thyristor failure; rods do NOT drop and are inoperable

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Causes an urgent failure and locks up control rods.
- B. Incorrect. Causes an urgent failure and locks up control rods.
- C. Correct. Could cause loss of power to stationary gripper coils, resulting in a rod drop.
- D. Incorrect. Causes an urgent failure and locks up control rods.

Technical Reference(s): 3SQS-1.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 3SQS-1.3 Objective 6 (As available)

Question Source: Bank # _____
Modified Bank # X (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2005 BVPS
COMMON
58

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 b(6)

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		1
	Group #		2
	K/A #	000059AK2.19 Knowledge of interrelations between accidental liquid rad release and rad liquid monitors	
Importance:		2.7	2.8

Question: #83

Liquid waste process effluent monitor 2SGC-RQ100 is inoperable. Under what conditions may a liquid release be initiated.

- At least two independent samples are analyzed and release calculations and discharge valving independently verified per the ODCM.
- Monitoring is initiated with the comparable alternate channel per the ODCM.
- Sample the cooling tower blowdown line every four hours to ensure the release remains within ODCM limits.
- The release may not be continued until the channel is repaired per Technical Specifications.

Answer: a

Explanation / Justification

- Correct. Per ODCM
- Incorrect. Plausible due to ODCM wording, no such actual channel
- Incorrect. Plausible because 4 hour monitoring is comp for flow instrument.
- Incorrect. Release may continue

Technical References:	ODCM
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.43 (b)4

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	2	_____
	K/A #	060 G2.4.30	_____
	Importance Rating	4.1	_____

K/A Statement:

G2.4.30: Knowledge of which events related to system operations/status should be reported to internal organizations or external agencies such as the state, the NRC, or the transmission system operator.

Proposed Question:

84)

Which of the Following events should be reported? Of those events, who do they report it to?

1. An inadvertent radioactive release with an effective dose rate of 0.22 rem/hr for 18 hours.
2. An inadvertent radioactive release with an effective dose rate of 0.22 rem/hr for 24 hours.

Commented [CE1]: this can be inside or outside the PA. Just want to ensure that theres one correct answer.

- A. Event 2 **only**; NRC **only**
- B. Event 2 **only**; NRC and state and local governments
- C. Both events; NRC **only**
- D. Both events; NRC and state and local governments

Proposed Answer: B

Explanation (Optional):

- A- correct. Only need to report it if its >1 ALI if a person was standing there for 24 hours. Event 1 is not reportable because it only lasted 18 hours. $0.22 \times 18 = 3.96$ rem which is less than 5 rem TEDE. $0.22 \times 24 = 5.28$ rem which would make this reportable under FE's event notification procedure to the NRC Operations Center within 24 hours. The other requirements are eye dose equivalent of exceeding 15 rems and a shallow dose to the skin or extremities exceeding 50 rems.
- B-D Incorrect but plausible if they think that they apply the 24 hour exposure time regardless of how long the release took. Notifying both the NRC and state and local governments is plausible since they might want to know.

Technical Reference(s):

NOP-OP-1015, Event Notifications, rev. 5 Attachment 2
pages 4/28 and 24/28.

ES-401**Sample Written Examination
Question Worksheet****Form ES-401-5**

(Attach if not previously provided, 10 CFR 22.2202
including version/revision number.) _____

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 b(4)

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		1
	Group #		2
	K/A #	EA2.1	
		Ability to determine/interpret conditions and select procedures as applied to SI Termination	
Importance:		3.3	4.2

Question: #85

The plant has experienced a failed open SG safety. The crew has terminated SI IAW ES-1.1 and has just established normal charging flow in that procedure. A safety fails open on a second SG. Plant conditions are as follows:

- Pressurizer level is 50%, trending down slowly.
- Pressurizer pressure is 2220, trending down slowly
- Tc is 350, trending down slowly
- RCPs are stopped
- The initial event occurred 40 minutes ago.

What action is required by ES-1.1?

- a. Reinitiate SI, enter FR-P.1
- b. Reinitiate SI, enter ECA-2.1
- c. Enter E-2, operate ECCS as directed.
- d. Enter ES-0.0, transition as directed.

Answer: c

Explanation / Justification

- a. Incorrect. Plausible if applicant thinks cooldown calls for FR
- b. Incorrect. Plausible because of second faulted SS
- c. Correct
- d. Incorrect. ES-0.0 is optional not required by ES-1.1

Technical References:	ES-1.1
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.43 (b)5

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	2
	Group #	_____	1
	K/A #	007 A2.01	
	Importance Rating	_____	4.2

K/A Statement: Ability to (a) predict the impacts of a stuck-open PORV or code safety on the PRTS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of a stuck-open PORV or code safety.

Proposed Question:

86)

The plant is at 100% power.

- Pressurizer Safety Relief Valve [2RCS-PCVA] begins **LEAKING**.
- Pressurizer Relief Tank Pressure [PI-1RC-472] has **RISEN** to 50 psig.

(1) What will be the **STABLE** Pressurizer Safety Relief line temperature, for these conditions?

(2) **IF** Pressurizer Safety Relief Valve [2RCS-PCVC] is found to lift at 2395 psia what action(s) are **required** IAW LCO 3.4.10?

- A. (1) 281 °F
(2) Restore 1 Pressurizer Safety Relief Valve within 15 minutes.
- B. (1) 281 °F
(2) Be in MODE 3 within 6 hours **AND** be in MODE 4 with any RCS cold leg temperatures \leq the enable temperature specified in the PTLR.
- C. (1) 298 °F
(2) Restore 1 Pressurizer Safety Relief Valve within 15 minutes.
- D. (1) 298 °F
(2) Be in MODE 3 within 6 hours **AND** be in MODE 4 with any RCS cold leg temperatures \leq the enable temperature specified in the PTLR.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Wrong Relief line temperature, this is the relief line temperature for 50 psia NOT 50 psig. Correct TS action.
- B. Incorrect. Wrong Relief line temperature, this is the relief line temperature for 50 psia NOT 50 psig. Incorrect TS action. This is the action if the 15 minutes has passed **OR** if

the applicant believes that a leaking Safety Valve makes the Safety Valve inoperable which would immediately place them in TS 3.4.10 condition B1 AND B2.

- C. Correct. Correct Relief line temperature. Correct TS action TS page 3.4.10-1.
D. Incorrect. Correct Relief line temperature. Incorrect TS action. This is the action if the 15 minutes has passed **OR** if the applicant believes that a leaking Safety Valve makes the Safety Valve inoperable which would immediately place them in TS 3.4.10 condition B1 AND B2.

Technical Reference(s): Steam Tables, TS page 3.4.10-1

(Attach if not previously provided,
including version/revision number.)

Proposed references to be provided to applicants during examination: TS page 3.4.10-1,
Steam Tables

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # modified (Note changes or attach parent)
New _____

Question History: Last NRC Exam 1LOT14 #34

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 b(1)

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		1
	Group #		2
	K/A #	RPS	
		G2.4.41 Knowledge of EAL thresholds and classifications	
Importance:		2.9	4.6

Question: #87

A fire in the control building has forced evacuation of the control room due to smoke.

- The reactor failed to trip manually from the control room.
- The crew was able to reduce power by driving rods'
- The reactor was tripped at 7% decreasing by locally opening trip breakers.
- The control room was evacuated one minute after the trip breakers were opened and 5 minutes after the initial report of the fire.

19 minutes after the initial report of the fire, the fire is out and plant control has been established at remote shutdown panels.

What is the event classification?

- a. Unusual Event
- b. Alert
- c. Site Area Emergency
- d. General Emergency

Answer: b

Explanation / Justification

- a. Incorrect. Plant fire > 15 minutes
- b. Inorrect. CR evac control established < 15 minutes
- c. Ccorrect. CR evac, control established < 15 minutes
- d. Incorrect. No GE condition

Technical References:	ECG
Proposed References to be provided:	EAL matrix
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.43 (b)5

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	2
	Group #	_____	1
	K/A #	ESFAS 013 G2.2.37	
	Importance Rating	_____	4.6

K/A Statement: 2.2.37 Ability to determine operability and/or availability of safety related equipment.

Proposed Question:

88. The plant is in Mode 5 preparing to enter Mode 4.

- Maintenance is performing 2MSP-13.01-I, 2QSS-L104A, Refueling Water Storage Tank 2QSS-TK21 Level Loop Channel I Test.
- All bistables associated with this RWST level channel have been placed in their Tech Spec required condition.
- Maintenance reports the as found setpoint for:

2QSS-LSEL104A RWST Ext-Lo Level SI Switchover Comparator Trip is 29' 6"
(Tech Spec Allowable Value is between 31' 8" and 31' 10")

AND

2QSS-LSL104A Recirc Spray Pump Start Interlock Comparator Trip is 32' 9"
(Tech Spec Allowable Value is between 32' 8" and 32' 10")

(1) What is the status of the following Tech Spec REQUIRED Engineered Safety Feature Actuation System (ESFAS) Instrumentation? (Based on the as found values)

- RWST level Extreme low SI Switchover
- RWST level low Recirc Spray Pump Start Interlock

(2) Assuming all other requirements for Mode 4 entry have been met, what additional actions, if any, would be REQUIRED to enter Mode 4? (Assume the as found setpoints will remain as is)

(1) This channel of RWST _____.

(2) Mode 4 entry is allowed _____.

(Refer to attached reference)

- A. (1) level Extreme low **AND** level low are BOTH **still** OPERABLE
(2) with no additional actions required
- B. (1) level Extreme low is INOPERABLE **AND** level low is **still** OPERABLE
(2) **ONLY** if an additional risk assessment is performed
- C. (1) level Extreme low is INOPERABLE **AND** level low is **still** OPERABLE
(2) with no additional actions required
- D. (1) level Extreme low **AND** level low are BOTH INOPERABLE
(2) **ONLY** if an additional risk assessment is performed

Answer: C**Explanation/Justification:**

- A. Incorrect. Extreme level low is inoperable since it is outside the allowable band on the low side. If it was outside on the high side, it could still be operable dependent on the outcome of an evaluation to determine if it could still perform its function. Since the bistables are already tripped, no additional actions would be required to enter Mode 4 IAW TS 3.0.4. since the action statements allow continued operation for an unlimited period of time.
- B. Incorrect. Correct operability determination. However, since the bistables are already tripped, no additional actions would be required to enter Mode 4 IAW TS 3.0.4. since the action statements allow continued operation for an unlimited period of time.
- C. Correct. IAW TS page 3.3.2-9 item 2.b.2. and page 3.3.2-13 item 7.b and TS 3.0.4
- D. Incorrect. Extreme level low is inoperable since it is outside the allowable band on the low side. If it was outside on the high side, it could still be operable dependent on the outcome of an evaluation to determine if it could still perform its function. Since the bistables are already tripped, no additional actions would be required to enter Mode 4 IAW TS 3.0.4. since the action statements allow continued operation for an unlimited period of time.

Sys #	System	Category	KA Statement	
013	Engineered Safety Features Actuation System (ESFAS)	Generic	Ability to determine operability and/or availability of safety related equipment.	
K/A#	2.2.37	K/A Importance	4.6	Exam Level
References provided to Candidate	New	TS 3.3.2	Technical References:	TS page 3.3.2-9 item 2.b.2. and page 3.3.2-13 item 7.b and TS 3.0.4
Question Source:			Objective:	
Question Cognitive Level:	High - Analysis		10 CFR Part 55 Content:	10 CFR 55.43(b)(1)

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Extreme level low is inoperable since it is outside the allowable band on the low side. If it was outside on the high side, it could still be operable dependent on the outcome of an evaluation to determine if it could still perform its function. Since the bistables are already tripped, no additional actions would be required to enter Mode 4 IAW TS 3.0.4. since the action statements allow continued operation for an unlimited period of time.
- B. Incorrect. Correct operability determination. However, since the bistables are already tripped, no additional actions would be required to enter Mode 4 IAW TS 3.0.4 since the action statements allow continued operation for an unlimited period of time.
- C. Correct. IAW TS page 3.3.2-9 item 2.b.2. and page 3.3.2-13 item 7.b and TS 3.0.4
- D. Incorrect. Extreme level low is inoperable since it is outside the allowable band on the low side. If it was outside on the high side, it could still be operable dependent on the outcome of an evaluation to determine if it could still perform its function. Since the bistables are already tripped, no additional actions would be required to enter Mode 4 IAW TS 3.0.4 since the action statements allow continued operation for an unlimited period of time.

Technical Reference(s): TS page 3.3.2-8 item 2.b.2 and
page 3.3.2-12 item 7.b and TS 3.0.4

(Attach if not previously provided,
including version/revision number.)

Proposed references to be provided to applicants during examination: TS 3.3.2

Learning Objective: _____ (as available)

Question Source: Bank # 2LOT8 #88
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2LOT8

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 (b)(2)

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		2
	Group #		1
	K/A #	062 AC Elect Dist	
		G2.2.22 Knowledge of LCOs and safety limits	
Importance:		4.0	4.7

Question: #89

4KV bus 2AE has tripped due to a fault on the bus. What is the most limiting Technical Specification required action?

- a. Restore the inoperable bus within 2 hours
- b. Restore the inoperable bus within 8 hours.
- c. Lineup the 2CHS-P22B Boric Acid Transfer Pump within 2 hours.
- d. Place "A" PORV in manual within 1 hour.

Answer: c

Explanation / Justification

- a. Incorrect. Right for bus, not PORV block valve
- b. Incorrect. Incorrect. 2 hrs for vital bus
- c. Incorrect. Rqd for loss offsite source
- d. Correct. Rqd for inop PORV block valve.

Technical References:	T.S. 3.8.9 & 3.4.11.C
Proposed References to be provided:	
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Comprehension
10CFR Part 55 Content:	55.43 (b)2

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	2
	Group #	_____	1
	K/A #	059 MFW A2.11	
	Importance Rating	_____	3.3

K/A Statement: Ability to (a) predict the impacts of the failure of feedwater control system on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of the failure of feedwater control system.

Proposed Question:

- 90) The plant is operating at 100% power with all systems in NSA.
- SG Feed Pump 21B Recirculation Valve 2FWR-FCV150B inadvertently fails full OPEN.

Assuming recirculation flow is within the control capacity of the MF reg valves, answer the following:

- 1) With NO operator action, what impact will this failure have on the Steam Generator Water Level Control system?
 - 2) IAW AOP-2.24.1, Loss of Main Feedwater, what actions will be required in response to this failure?
- A. 1) SG levels will decrease continuously.
2) Start the standby condensate pump and reduce power to 80%
- B. 1) SG levels will initially decrease, then return to program level.
2) Place the keylock switch for 2FWR-FCV150B to CLOSE.
- C. 1) SG levels will decrease continuously.
2) Start all AFW pumps and reduce power to 52%
- D. 1) SG levels will initially decrease, then stabilize below program level.
2) Reduce power to 80%, **then** place the keylock switch for 2FWR-FCV150B to CLOSE.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Plausible if applicant does not know flow mismatch and level mismatch error signals. 80% is a power level in the procedure requiring trip
- B. Correct. Failure introduces a flow error, SGWLC will initially increase feed flow to match steam flow and stabilize level, level will then be corrected by integral level error raising level back to program. Correct action per procedure.

- C. Incorrect. Plausible is applicant does not understand separate flow and level error.
D. Incorrect. Level will return to normal, no downpower required.

Technical Reference(s): AOP-2.24.1 rev 7 step 7 RNO and
MFW LP page 56, PPT slide 55

(Attach if not previously provided,
including version/revision number.)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # 2LOT6 #45 (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2LOT6

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 b(5)

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		2
	Group #		2
	K/A #	014 AC RPI A2.06 Ability to predict impact of the loss of LVDT and use procedures to correct, control, or mitigate.	
Importance:		4.0	4.7

Question: #91

Given the following:

The Plant is operating at 100% power.

Then, the lowest (bottom) Data 'A' coil fails (open circuit) for a control rod.

Which one of the following describes the effect, if any, of this failed coil on the Digital Rod Position Indication (DRPI) System?

- A. Rod bottom indication will be lost in the event of a reactor trip; boration will be required due to the rod failing to indicate full insertion.
- B. DRPI will automatically switch to the half-accuracy mode. A General Warning Status light will flash for the affected rod. Enter AOP 2.1.7 RPI Malfunction.
- C. DRPI will automatically switch to the half-accuracy mode. Enter AOP 2.1.7 RPI malfunction and T.S. 3.1.4.B due to indicated rod misalignment,
- D. All indication for the effected rod will be lost. A General Warning Status light will flash for the affected rod. Enter T.S. 3.1.7.1 for a failed RPI.

Answer: B

Explanation / Justification

- a. Incorrect.
- b. Correct.
- c. Incorrect.
- d. Incorrect.

Technical References:	RPI LP, TS 3.1.4, 3.1.7
Proposed References to be provided:	
Learning Objective:	
Question Source:	Bank, Modified distractors
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.43 (b)2

Examination Outline Cross-Reference:	Level	RO	<u>SRO</u>
	Tier #	_____	2
	Group #	_____	2
	K/A #		016 G2.2.22
	Importance Rating	_____	4.7

016 In-Core Temperature Monitor; G2.2.22: Knowledge of limiting conditions for operations and safety limits.

92

Proposed Question:

Attached is a recent surveillance data sheet performed to evaluate CETs operability IAW 2OST-6.7, Accident Monitoring Instrumentation Channel Checks, According to the data sheet, which condition(s), if any, are required to be entered IAW TS 3.3.3?

- A. Sufficient operable CETs, no condition is entered
- B. A **only**
- C. C **only**
- D. A & C **only**

Proposed Answer: D

Explanation (Optional):

Technical Reference(s): TS 3.3.3, 2OST-6.7

(Attach if not previously provided,
including version/revision number)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

10 CFR Part 55 Content: 55.41 _____
55.43 b(2)

Comments

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		2
	Group #		2
	K/A #	086 Fire Protection G2.4.11 Knowledge of Abnormal Condition Procedures	
Importance:		4.0	4.2

Question: #93

A fire in the cable spreading room has forced evacuation of the control room. All required control room actions were completed before the evacuation. As a result of the fire, a spurious Si has occurred and one PORV has failed open. Which of the answer choices lists time critical actions in their correct priority in accordance with 2OM-56C.4.B?

- 1.) Close the PORV
- 2.) Reset SI, CI Phase A, CI Phase B
- 3.) Isolate High Head Injection
- 4.) Start and Load DG 2-1 from the ASP
- 5.) Start and Load DG 2-2 from the ASP
- 6.) Restore AFW flow.
- 7.) Restore Charging

- a. 1, 4, 3, 7
- b. 2, 1, 6, 3
- c. 4, 3, 5, 1
- d. 4, 3, 1, 7

Answer: d

Explanation / Justification

- a. Incorrect. Wrong order
- b. Incorrect. 2 is not a TCA
- c. Incorrect. 5 is not a TCA
- d. Correct. Does not include all required TCAs, but the ones listed are in order.

Technical References:	2OM-56.C.4 ASD from Outside CR US Procedure
Proposed References to be provided:	
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.43 (b)5

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	___3___
	Group #	_____	_____
	K/A #	_____	2.1.35___
	Importance Rating	_____	___3.9___

G2.1.35 Knowledge of fuel handling responsibilities of SROs

94

Proposed Question:

Which position(s) has (have) the authority to bypass interlocks on fuel handling equipment during fuel handling?

- A. Fuel handling equipment interlocks may **NEVER** be defeated
- B. Refueling SRO **ONLY**
- C. Shift Supervisor **ONLY**
- D. **EITHER** Refueling SRO **OR** Shift Supervisor

Proposed Answer: ___B___

Explanation (Optional):

- A) Plausible because interlocks are designed to prevent damage to personnel or equipment. An applicant may think that these interlocks must never be defeated.
- B) Correct. Also allowed if stated in the procedure.
- C-D) Only the Refueling SRO may give permission.

Technical Reference(s): ___1/2RP-1.1: Refueling Administrative Section

(Attach if not previously provided,
including version/revision number)

Proposed references to be provided to applicants during examination: ___N/A___

Learning Objective: _____ (As available)

Question Source:	Bank #	_____
	Modified Bank #	_____ (Note changes or attach parent)
	New	___X___

Question History: Last NRC Exam _____

(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge __X__
 Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 ___b(3)___

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		3
	Group #		
	K/A #	2.1.3.4	
		Knowledge of primary and secondary plant chemistry limits	

Importance: 3.5

Question: #95

Chemistry reports that the latest primary and secondary results are:

RCS Chloride....200 ppb
 RCS H2.....40 cc/kg
 RCS O2.....20 ppb
 SG Chloride.....100 ppb
 RCS Sulfate..... 500 ppb

What is the MOST RESTRICTIVE required action and why?

- Reduce power to less than or equal to 50% power with 8 hours
RCS Chloride exceeds Action Level 1.
- Restore parameter within 24 hours, else be in mode 3 within the following 6 hours.
RCS Chloride exceeds Action Level 2
- Reduce power to less than or equal to 50% power within 24 hours
SG Chloride exceeds Action Level 3
- Initiate an orderly plant shutdown, ensure unit is in Mode 3 within 6 hours.
RCS Sulfate exceeds Action Level 3

Answer: a

Explanation / Justification

- Incorrect. 50% in 8 hrs is a sec chem action
- Correct.
- Incorrect. Cl not L3, wrong action
- Incorrect. Not L3

Technical References:	AOP 2.14.1
Proposed References to be provided:	None
Learning Objective:	

Question Source:

Question Cognitive Level:

10CFR Part 55 Content:

New

Comprehension

55.43 (b)2

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	3
	Group #	_____	_____
	K/A #	G2.2.36	
	Importance Rating	_____	4.2

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

Proposed Question:

96) The Unit is in Mode 2 during a reactor startup when the MCR receives a report that 2 battery chargers on Train B are inoperable (Time zero)
Time Zero + 1 hour, a battery on train A is found to be inoperable.

If no repairs are made, what is the longest time from Time Zero does the crew have before the plant is REQUIRED to be in Mode 3?

AND

IF at Time Zero plus two hours, a repair was made to the battery on Train A, which of the following is the correct action following the repair?

- A. 78 hours; The LCO is met—no limit on operation
- B. 8 hours; continue to shutdown to Mode 3 within 6 hours
- C. 78 hours; continue to shutdown to Mode 3 within 76 hours
- D. 8 hours; The LCO is met—no limit on operation

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Incorrect time and incorrect action.
- B. Correct. IAW TS 3.8.4, DC Sources—Operating.
- C. Incorrect. Incorrect time with correct action.
- D. Incorrect. Correct time with incorrect action.

Technical Reference(s): TS 3.8.4 DC Sources—Operating
(Attach if not previously provided, _____
including version/revision number.) _____

Proposed references to be provided to applicants during examination: TS 3.8.4 DC
Sources—Operating

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 ____b(2)____

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		3
	Group #		
	K/A #	2.2.12	
		Knowledge of surveillance procedures	

Importance: 4.1

Question: #97

The plant is operating at 100% power. An audit discovers that a monthly surveillance has not been performed for 35 days. What action is required?

- a. Plant shutdown must be commenced IAW T.S. 3.0.3.
- b. The overdue surveillance must be completed with 24 hours.
- c. The overdue surveillance must be completed within 1.25x the surveillance frequency.
- d. The overdue surveillance must be completed within .25x the surveillance frequency from time of discovery.

Answer: c

Explanation / Justification – perhaps give days, verify with facility

- a. Incorrect. TS allows extension
- b. Incorrect. 24 hrs or 1.25x, whichever is longer
- c. Correct
- d. Incorrect. 1.25x total, not .25 extension after discovery

Technical References:	T.S. SR 3.02, 3.03
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory, Comprehension if use days
10CFR Part 55 Content:	55.43 (b)5

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	3
	Group #	_____	_____
	K/A #	G2.3.7	
	Importance Rating	_____	3.6

K/A Statement:

Proposed Question:

98

A diving operation in the Spent Fuel Pool is planned to commence later in the shift.

Which ONE of the following completes the statements below?

The dive (1) the requirements of NOP-OP-4010, "Determination of Radiological Risk," to be classified as an ORANGE risk activity.If the rad level in the area of the dive is estimated at 20 Rad/hr, in accordance with NOP-OP-4107, "Radiation Work Permit (RWP)," the RWP would be required to be approved by (2).

- | | |
|-------------------------|-----------------------------------|
| <u>(1)</u> | <u>(2)</u> |
| A. meets | Site Radiation Protection Manager |
| B. meets | Site Vice President |
| C. does NOT meet | Site Radiation Protection Manager |
| D. does NOT meet | Site Vice President |

Proposed Answer: A

Explanation (Optional):

- A. Correct. It meets orange activity for radiological risk in excess of 1000 mrem/hr (attachment 1, activity 6) and for LHRA in excess of 1 rem/hr. Site Radiation Protection Manager approval is required.
- B. Incorrect, NOP-OP-4010, "Determination of Radiological Risk," identifies that Activities involving diving activities near irradiated components. Greater than or Equal to 1000 mrem/hr." to be characterized as HIGH risk and NOP-OP-4107, Radiation Work Permit (RWP) identifies the Site Radiation Protection Manager or designee must approve the RWP. Site VP is plausible because he or she will approve emergency exposures.
- C. Incorrect. Plausible because the applicant might recall NOP-OP-1007, "Risk Management" and on page 41, the instruction calls out diving as yellow risk. However, the manual refers all risk associated with radioactivity to NOP-OP-4107.
- D. Incorrect, Plausible, because the applicant may recall the criteria on the Site High Focus Risk and Attachment 5 'PWR Operational Risk Review' sheet (RED SHEET) and identify that diving is not on the sheet. Also plausible because the Plant Manager and Radiation Protection manager being required to approve in writing entries into areas where whole body dose rates are = 50 Rad/hour is correct

Technical Reference(s): NOP-OP-4107 rev. 16 page 26 and 29
(Attach if not previously provided, NOP-OP-1007 rev. 23 page 41
including version/revision number.) NOP-OP-4010 rev. 8 page 10

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (as available)

Question Source: Bank # _____
Modified Bank # 2013 Sequoyah; changed the stem which
changed the answer and changed the
distractors that can give approval.
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 b(7)

Comments:

Exam Outline Cross Reference:	Level:	RO	SRO
	Tier #		3
	Group #		
	K/A #	2.4.2	
		Knowledge of emergency response facilities	

Importance: 3.8

Question: #99

A general emergency is in progress.

A site evacuation has just been ordered due to high airborne radiation levels on site.

Where do personnel in the OSC go?

- a. All personnel remain in the OSC.
- b. Personnel relocate to the Alternate OSC
- c. Personnel relocate to the TSC
- d. Personnel relocate to a designated off-site muster area.

Answer: b.

Explanation / Justification

- a. Incorrect. OSC is not radiologically protected
- b. Correct.
- c. Incorrect. Plausible due to dedicated ERF with filtered ventilation
- d. Incorrect. Personnel with EP assignments remain on station

Technical References:	E-Plan section 7 Emergency Facilities and Equipment
Proposed References to be provided:	None
Learning Objective:	
Question Source:	New
Question Cognitive Level:	Memory
10CFR Part 55 Content:	55.43 (b)5

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	3
	Group #	_____	_____
	K/A #		2.4.22
	Importance Rating		4.4

K/A Statement: Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.

Proposed Question:

100) Given the following plant conditions:

- The STA informs you of the following Critical Safety Function (CSF) Status Tree information:
 - All Narrow Range S/G Water levels are 5% and LOWERING.
 - Total available Feedwater Flow is Zero (0) GPM.
 - All Core Exit Thermocouples are 750 °F and slowly RISING.
 - RVLIS Full Range is 55% and slowly DROPPING.
 - No RCPs are currently running.

Which procedure transition is immediately required **AND** why?

- A. FR-C.1, "Response to Inadequate Core Cooling" – Extreme Challenge to Clad/Matrix Barrier.
- B. FR-C.1, "Response to Inadequate Core Cooling" – Severe Challenge to Vessel/Containment Barrier.
- C. FR-H.1, "Response to Loss of Secondary Heat Sink" – Extreme Challenge to Clad/Matrix Barrier.
- D. FR-H.1, "Response to Loss of Secondary Heat Sink" – Severe Challenge to Vessel/Containment Barrier.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Although core cooling is a higher priority in terms of sequence, the red path will always trump an orange path condition according to EOP users guide. Incorrect reason why due to severe versus extreme and incorrect barriers challenged. Red path conditions are not met until RVLIS < 40%.
- B. Incorrect. Incorrect in that an orange path is a lower priority than a red path. Based on stated plant conditions an orange core cooling path is met only. Correct reason why.
- C. Correct. In accordance with 1/2OM-53B.2, even though Core Cooling is a higher priority

than Heat Sink, the first red path encountered must be entered, FR-H.1 Bases states that a red path on heat sink is an extreme challenge to clad/matrix barrier and immediate operator attention is warranted, With NR S/G water levels < 12% and available total feedwater flow @ 0 GPM a Red Heat Sink Path exists, SRO is responsible for prioritizing and selecting appropriate procedure.

- D. Incorrect. Correct procedure, The challenge to FR-H.1 is extreme versus severe since a red versus orange path exists. Also the challenge is to the clad versus vessel/containment.

Technical Reference(s): 1/2OM-53B.2, Rev. 7
2OM-53B.4.F-0.2, Issue 3, rev 0
2OM-53B.4.F-0.3, Issue 3, rev 0
2OM-53A.1.F-0.2, Issue 3, rev 0
2OM-53A.1.F-0.3, Issue 3, rev 0
2OM-53B.4.FR-H.1 Issue 2 rev 1

Proposed references to be provided to applicants during examination: NONE

Learning Objective:

3SQS-53.1

2. Concerning CSF restoration, IAW BVPS EOP Executive Volume, state from memory the following: The CFS in the order of priority, the priorities of the color coded end points of the CSFSTs, The red path summary conditions for EOPs.

3SQS-53.3

8. For a given event, apply the CSFS form to advise the operating crew of CSF priorities. (as available)

Question Source:

Bank #

2LOT7 #99

Modified Bank #

_____ (Note changes or attach parent)

New

Question History:

Last NRC Exam

2LOT7

Question Cognitive Level:

Memory or Fundamental Knowledge

Comprehension or Analysis

X

10 CFR Part 55 Content:

55.41 _____

55.43 b(5)

Comments: