

FACILITY NAME: McGuire Nuclear Plant

Section 3

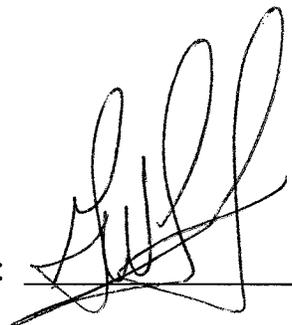
REPORT NUMBER: 05000369/370/2009-301

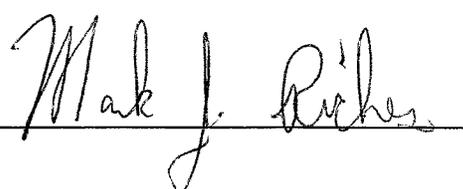
DRAFT SRO WRITTEN EXAM

CONTENTS:

- Draft SRO Written Exam (25Q with ES-401-5 Information)

Location of Electronic Files:

Submitted By:  _____

Verified By:  _____

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

1

Group #

2

K/A #

051AA2.02

Importance Rating

4.1

Loss of Condenser Vacuum

Ability to determine and interpret the following as they apply to (Loss of Condenser Vacuum)

Conditions requiring reactor and/or turbine trip.

Proposed Question: SRO 76

1 Pt

Given the following:

- Unit 2 is operating at 45% RTP
- Turbine load at approximately 540 MW
- A failure of the RC system has occurred resulting in a severe reduction in RC flow to the Main Condenser
- Main Condenser vacuum is at 19" Hg and degrading

Which ONE (1) of the following actions would be required to mitigate the current plant conditions?

- A. Reduce Turbine Generator load and start additional RC pumps per AP-23 (Loss of Condenser Vacuum). Should vacuum continue to degrade, initiate a turbine trip and go to AP-02 (Main Turbine Trip).
- B. Reduce Turbine Generator load and dispatch operators to start Main Vacuum pumps per AP-23 (Loss of Condenser Vacuum). Should vacuum continue to degrade, initiate a turbine trip and go to E-0 (Reactor Trip or Safety Injection).
- C. Check turbine tripped, the crew would then go to AP-02 (Main Turbine Trip), stabilize reactor power at 12-15%, place Steam Dumps in Steam Pressure Mode, and remove one CF pump from service.
- D. Check turbine tripped, trip the reactor, the crew would then go to E-0 (Reactor Trip or Safety Injection). Verify no SI is required and transition to ES-0.1 (Reactor Trip Response).

Proposed Answer: **D**

Explanation (Optional):

For the given plant a condition, the Main condenser vacuum is below the trip setpoint of 20" and the C-9 permissive has been lost rendering the steam dumps unavailable. The plant is below P-8 which, if not for the loss of C-9, would only require a turbine trip. In this condition AP-23 would direct the crew to check the turbine tripped and then trip the reactor. This is not an immediate action of the AP but in understanding the basis of the steps in this procedure the candidate should realize the both the main turbine should have tripped and that a Reactor trip is warranted.

- A. Incorrect:** See explanation above. **Plausible** because both of these actions are directed in Step 5 of AP-23 but would not be appropriate for the plant conditions. It is plausible that the candidate could confuse the Low Vacuum trip setpoint of Main Feed Pumps (14") and therefore would consider that a Main Turbine trip is not required at this time. Step 6 of AP-23 provides guidance should vacuum continue to degrade which adds plausibility but in the scenario given, the crew would never reach this step.
- B. Incorrect:** See explanation above. **Plausible** because both of these actions are directed in Step 5 of AP-23 but would not be appropriate for the plant conditions. Turbine trip not required plausibility as explained above. Guidance to Trip the Turbine and transition to E-0 is directed in Step 6 of AP-23 but once again, not applicable.
- C. Incorrect:** See explanation above. **Plausible** because the Unit is below P-8 and without the loss of C-9 the correct procedure flow path for a turbine trip would be AP-02 (Turbine Trip). The actions listed are consistent with those directed by AP-02.
- D. Correct.**

Technical Reference(s)	AP-23, Loss of Condenser Vacuum Background Doc. (Rev 3) Pg 4	(Attach if not previously provided)
	AP-23, Loss of Condenser Vacuum (Rev 7) Pg 2	(Including version or revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-AP-23 Obj. 2 (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 45.13

Comments:

Loss of Condenser Vacuum

Ability to determine and interpret the following as they apply to (Loss of Condenser Vacuum)

Conditions requiring reactor and/or turbine trip.

KA is matched because the plant condition given is a loss of condenser vacuum and the question requires the candidate to evaluate the plant conditions and choose the correct actions associated with a required Turbine and Reactor trip.

The Analysis Cog level is justified because the question requires the candidate to evaluate overall plant conditions and understand multiple indications (Main Vacuum below trip setpoint, Steam Dumps not available) in order to determine the correct course of action and procedural flowpath.

This Question is linked to 10CFR55.43 (b)(5) Procedures. Justification for SRO level is that system knowledge alone is not enough to correctly answer. The question requires the candidate to assess plant conditions and recall specific actions required which are not simply entry conditions or immediate actions and requires an understanding of one of the major strategies associated with the loss of vacuum AP.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

2

Group #

1

K/A #

012G2.1.32

Importance Rating

4.0

Reactor Protection

Ability to explain and apply all system limits and precautions.

Proposed Question: SRO 77

1 Pt

Given the following:

- Unit 1 is operating at 100% RTP.
- Train 'B' SSPS testing is in progress.

In accordance with OMP 5-3 (Technical Specifications Action Item Log) entry into Tech Spec 3.3.1 (RTS Instrumentation) for "One RTB Train Inoperable" must be made when (1) and if the RTA Bypass breaker is racked in and closed while RTB Bypass breaker is racked in and closed, (2) would trip open.

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

- (1) the RTB Bypass breaker is racked in ONLY
(2) RTA and RTB breakers ONLY
- (1) the RTB Bypass breaker is racked in and closed
(2) RTA and RTB breakers ONLY
- (1) the RTB Bypass breaker is racked in ONLY
(2) RTA, RTB, RTA Bypass, and RTB Bypass breakers
- (1) the RTB Bypass breaker is racked in and closed
(2) RTA, RTB, RTA Bypass, and RTB Bypass breakers

Proposed Answer: **D**

Explanation (Optional):

This is a special case with regards to Tech Spec application. Tech Spec entries are normally made prior to taking action that would make a piece of equipment inoperable. However, as described in OMP 5-3, Tech Spec entry is not made until the RTB Bypass breaker is closed, rendering one RTB train inoperable to allow the maximum amount of time for RTB work in bypass. This is a special case which would not be expected knowledge for a Reactor Operator.

- A. Incorrect:** See explanation above. **Plausible** if the candidate mistakenly believes that racking in the breaker causes a General Warning Annunciator which is the trigger for Tech Spec entry and mistakenly believes that only the RT breakers are tripped when two General Warning Annunciators are received.
- B. Incorrect:** See explanation above. **Plausible** if the candidate believes that only the RT breakers are tripped when two General Warning Annunciators are received. Also, the first part of the question is correct.
- C. Incorrect:** See explanation above. **Plausible** if the candidate mistakenly believes that racking in the breaker causes a General Warning Annunciator which is the trigger for Tech Spec entry. Also, the second part of the question is correct.
- D. Correct.**

Technical
Reference(s)Lesson Plan OP-MC-IC-
IPE, Reactor Protection
System, rev. 28, page 41
and 26(Attach if not previously
provided)OMP 5-3, Technical
Specifications Action
Item Log, rev. 27, page
10(Including version or revision
#)Proposed references to be provided to applicants during
examination:

None

Learning Objective:

OP-MC-IC-IPE, Obj. 9

(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 43.2

Comments:

Reactor Protection
 Ability to explain and apply all system limits and precautions.

KA is matched because the candidate must understand the Limits and Precautions for the Reactor Protection System as well as the application of Technical Specifications related to RTB train operability.

It was necessary to make this a two-part question to meet the selected K/A and meet the requirements for this to be an SRO Only question. The second part of this question regarding what would happen if the second RTB Bypass breaker was racked in and closed is contained within the Limits and Precautions for the Reactor Protection System which meets the selected K/A. This question was raised to the SRO Only level by the first part of the question which includes Tech Spec entry requirements [**10CFR55.43(b)(2)**] in accordance with the facility rules of application as described in OMP 5-3.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

3

Group #

K/A #

G2.2.3

Importance Rating

3.9

Generic: Equipment Control

Knowledge of the design, procedural and operational differences between units.

Proposed Question: SRO 78

1 Pt

Given the following:

- Both units are operating at 100% RTP.
- 'A' Train RN is operating on both units.
- The OTG Supervisor has come to the WCC in preparation for performing 'B' Train RN Quarterly VST performance test.
- Included in this procedure is a stroke test of 0RN-284B, (Train 1B and 2B Discharge to RC).

Which ONE (1) of the following describes the RN System alignment required to mitigate the consequences of stroking 0RN-284B?

- A. No RN system realignment is required because Train 'A' RN is running on both units therefore the PT may continue with no adverse affects.
- B. "A" Train RN will have to be realigned to the SNSWP to prevent the U-1 Non-Essential discharge flowpath to RC from being isolated.
- C. "B" Train RN will have to be realigned to the SNSWP to prevent the U-2 Non-Essential discharge flowpath to RC from being isolated.
- D. Both Trains of RN would have to be aligned to the SNSWP to prevent the RN Non-Essential headers on BOTH Units from being isolated.

Proposed Answer: **C**

Explanation (Optional):

Nuclear Service water is shared between both Units at MNS. The suction and discharge piping is common between the units with the associated valves being designated as Unit "0". While each shares the common flowpaths, the connections are not common. One of these concerns the discharge flowpath for each Unit's non-essential return header. These connections are unit/train specific with the U-1 Non-essential aligned to the "A" Train discharge piping and the U-2 Non-essential aligned to the "B" Train discharge piping. With the both trains normally aligned to discharge to RC (Condenser Circ Water System), this flowpath is isolated via 0RN-184AC (A Train) and 0RN-284B (B Train). If either valve is closed and the associated train is not first aligned to the SNSWP, then the respective Unit's Non-Essential header would be isolated resulting in an interruption of cooling water to the RCP's stator coolers, containment ventilation, and other non-essential loads. If the respective train's discharge is aligned to SNSWP, the flowpath would not be dependent on the position of these valves.

- A. **Incorrect:** See explanation above. **Plausible** that the non-essential returns would be train dependent as with all other systems therefore it would be reasonable to assume the stroking of a "B" Train valve would not be a problem with the "A" Train in service.
- B. **Incorrect:** See explanation above. **Plausible** because the U-1 Non-essential return header is aligned to the "A" train return to RC and if one of the valves being stroked was in this flowpath, = this would be the correct answer.
- C. **Correct.**
- D. **Incorrect:** See explanation above. **Plausible** if the candidate believes that due to the fact that both trains from both units eventually share the same piping, closing 0RN-284B would affect both Units Non-essential returns. This valve is located upstream of where this piping would be common for both units.

Technical Reference(s)	Design Basis Document (Test Acceptance Criteria) <u>DWG-1574-RN.V012-01</u>	(Attach if not previously provided)
		(Including version or revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: PSS-RN Obj 13 (As available)

Question Source: Bank # PSSRNN09
 Modified Bank # _____ (Note changes or attach
 parent)
 New _____

Question History: Last NRC Exam MNS 2007 (Parent Question)

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

10 CFR Part 55 Content: 55.41
 55.43 43.3

Comments:

Generic: Equipment Control
 Knowledge of the design, procedural and operational differences between units.

KA is matched because this question requires the SRO candidate to have knowledge of the design differences between the units associated with the RN system, specifically the Non-essential return piping arrangements. In addition, the operator must understand how a procedural realignment of one train will affect each unit and what action is required to prevent/ mitigate this effect. This is also the basis for this being an analysis level question.

SRO Level Justification: The SRO candidate is being asked to evaluate performing a periodic test (VST of 0RN-284B) based on a given set of plant conditions. This component is shared between both Units and has an operational impact on both. In addition, he must choose what actions are required to mitigate the impact of performing this test. This type of evaluation is a specific SRO function and requires an in-depth knowledge of our Nuclear Service water system and the ability to apply that knowledge to a plausible scenario he may face as a Work Control Center SRO.

Examination Outline Cross-
reference:

Level

RO

SRO

X

DRAFT

Tier #

1

Group #

2

K/A #

003AG2.4.11

Importance Rating

4.2

Dropped Control Rod
Knowledge of abnormal condition procedures.

Proposed Question: SRO 79

1 Pt

Given the following conditions:

- Unit 1 is operating at 75% RTP when a dropped rod occurs
- The crew is performing the actions of AP-14 (Rod Control Malfunction) when it is noted that AFD has exceeded the limits of Tech Specs
- The dropped rod has not yet been recovered

Which ONE (1) of the following describes the actions that should be directed by the SRO and the reason for those actions?

- A. Transition to AP-4 (Rapid Downpower) and reduce power to less than 50% to ensure that the fuel is not damaged due to exceeding Radial peaking factors.
- B. Initiate a reactor trip and transition to E-0 (Reactor Trip or Safety Injection) to ensure that the fuel is not damaged due to exceeding Radial peaking factors.
- C. Transition to AP-4 (Rapid Downpower) and reduce power to less than 50% to ensure that the fuel is not damaged due to exceeding Axial peaking factors.
- D. Initiate a reactor trip and transition to E-0 (Reactor Trip or Safety Injection) to ensure that the fuel is not damaged due to exceeding Axial peaking factors.

Proposed Answer: **D**

Explanation (Optional):

AP-14 checks to determine if AFD is within Tech Spec limits. If Tech Spec AFD limits are exceeded and reactor power is greater than 50%, the operators are directed to trip the reactor and transition to E-0. Although a logical action would be to reduce power to less than 50%, restoring AFD to within limits in an acceptable amount of time to prevent fuel damage without the use of the control rods is not likely to be successful. Therefore, the reactor is tripped to prevent axial peaking factors from causing fuel damage.

- A. **Incorrect:** See explanation above. **Plausible** because the trigger in AP-14 for taking action relative to exceeding AFD limits occurs when reactor power is greater than 50%. Therefore, the candidate may conclude that reducing power to less than 50% will eliminate the AFD concern. Also, the reason for taking action is due to the adverse effect of peaking factors on the fuel. However, the concern is exceeding axial peaking factors as opposed to radial peaking factors.
- B. **Incorrect:** See explanation above. **Plausible** because the correct action is to initiate a reactor trip and transition to E-0. However, the concern and reason for taking action is exceeding axial peaking factors as opposed to radial peaking factors.
- C. **Incorrect:** See explanation above. **Plausible** because the trigger in AP-14 for taking action relative to exceeding AFD limits occurs when reactor power is greater than 50%. Therefore, the candidate may conclude that reducing power to less than 50% will eliminate the AFD concern. The reason provided is correct. The concern is exceeding axial peaking factors.
- D. Correct.**

Technical
Reference(s)

Background Document for
AP/1/A/5500/14 Rod
Control Malfunction, rev. 6,
page 13 and 14

(Attach if not previously
provided)

AP/1/A/5500/14, Rod
Control Malfunction, rev.
11 page 6

(Including version or
revision #)

Lesson Plan OP-MC-AP-
14, rev. 1

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-AP-14, Obj. 2 (As available)
OP-MC-AP-14, Obj. 3

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 43.5

Comments:

KA is matched because candidate must understand the mitigating strategy of AP-14 and the basis for taking those actions in the AP.

This question is an SRO Only question linked to 10CFR55.43(b)(5) (Procedures) because the question can NOT be answered by knowing systems knowledge alone, it can NOT be answered by knowing immediate actions from AP-14, and it can NOT be answered by knowing AP-14 entry conditions. It DOES REQUIRE the candidate to recall specific steps from AP-14.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

2

Group #

1

K/A #

076A2.01

Importance Rating

3.7

Service Water

Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, and mitigate the consequences of those abnormal operation:

Loss of SWS

Proposed Question: SRO 80

1 Pt

Unit 1 is operating at 100% RTP with 'B' train components in service with a normal RN system alignment.

Given the following events and conditions:

- '1B' RN pump amps swinging
- 'B' RN pump suction lo pressure alarm
- 'B' RN pump discharge lo pressure alarm

Which ONE (1) of the following is the correct response to the above conditions based on the implementation of AP-20 (Loss of RN)?

- A. Implement Case 1, Loss of Operating RN Train
Place the '1A' RN pump in service and,
Remain on Low Level Intake
- B. Implement Case 1, Loss of Operating RN Train
Swap alignment to the Nuclear Service Water Pond and,
Place the '1A' RN pump in service
- C. Implement Case 2, Loss of Low level or RC Supply Crossover
Place the '1A' RN pump in service and,
Remain on Low Level Intake
- D. Implement Case 2, Loss of Low level or RC Supply Crossover
Swap alignment to the Nuclear Service Water Pond and,
Place the '1A' RN pump in service

Proposed Answer: **D**

Explanation (Optional):

The swinging amps, lo suction pressure, and lo discharge pressure indicate that the RN pump is cavitating and that the Low Level Intake (LLI) has been lost. Hence Case 2 for Loss of LLI is the appropriate procedure to implement. If the lo suction pressure alarm was not present, it would indicate that the LLI had not been lost and entry into Case 1 Loss of Operating RN Train would be appropriate.

IAW Case 2, the Operators will swap to the Standby Nuclear Service Water Pond (SNSWP) and then swap RN pumps.

- A. **Incorrect:** See explanation above. **Plausible** if candidate does not comprehend that the pump suction lo pressure alarm prompts implementation of Case 2. The other indications alone would prompt entry into Case 1. The remaining actions are correct for Case 1.
- B. **Incorrect:** See explanation above. **Plausible** if candidate does not comprehend that the pump suction lo pressure alarm prompts implementation of Case 2. The other actions are reasonable as they would be the correct actions if Case 2 were implemented.
- C. **Incorrect:** See explanation above. **Plausible** because Case 2 is the correct case to implement. The actions are correct if Case 1 had been implemented.
- D. **Correct.**

Technical Reference(s)	AP/1/A/5500/20, Loss of RN, rev. 25 pages 2 and 29 - 35.	(Attach if not previously provided)
		(Including version or revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-AP-20, Obj. 2 (As available)

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

Question History: Last NRC Exam Nadeau Retake Exam

Question Cognitive Level:	Memory or Fundamental Knowledge	X
	Comprehension or Analysis	_____
10 CFR Part 55 Content:	55.41	
	55.43	<u>43.5</u>

Comments:

Service Water

Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, and mitigate the consequences of those abnormal operation:

Loss of SWS

KA is matched because the candidate must evaluate the provided conditions to determine the impact on the system and determine from those indications which is the appropriate procedural strategy.

This question is an SRO Only question linked to 10CFR55.43(b)(5) (Procedures) because the question can NOT be answered by knowing systems knowledge alone, it can NOT be answered by knowing immediate actions from AP-20, and it can NOT be answered by knowing AP-20 entry conditions alone. It DOES REQUIRE the candidate to recall the AP-20 mitigating strategy and specific procedure steps within the body of AP-20 to be able to correctly answer the question.

Examination Outline Cross-reference:	Level	RO	SRO
			X
DRAFT	Tier #		1
	Group #		2
	K/A #	WE15EA2.2	
	Importance Rating		3.3

Containment Flooding:

Ability to determine and interpret the following as they apply to (Containment flooding) : Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

Proposed Question: SRO 81

1 Pt Given the following on Unit 2:

- A feed line break inside Containment has occurred coincident with a Large Break LOCA
- Containment sump water level is 13 feet

Which ONE (1) of the following describes the significance of this water level AND the sources of water, in addition to the NC system, that could have contributed to this water level?

- This water level is expected for this accident. Potential sources include the entire contents of the FWST and NI Accumulators ONLY.
- This water level is unexpected for this accident. Potential sources include the entire contents of the FWST and NI Accumulators ONLY.
- This water level is expected for this accident. Potential sources include the entire contents of the FWST, NI Accumulators, and additional water from unknown sources.
- This water level is unexpected for this accident. Potential sources include the entire contents of the FWST, NI Accumulators, and additional water from unknown sources.

Proposed Answer:	D
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Explanation (Optional):

FR-Z.2, Response to Containment Flooding provides procedural guidance when the level in Containment is greater than the design flood level (12.5 feet). This level is significant since critical system and components which are necessary to ensure an orderly and safe plant shutdown and provide feedback to the operator regarding plant conditions are normally located above the design flood level.

The maximum water level in Containment after an accident is based on the entire contents of the NC system, FWST, CA Storage Tank, and the NI Accumulators which approximates the maximum water volume introduced into Containment following a LOCA coincident with a steam line or feed line break inside Containment.

Introduction of water into Containment from sources other than those listed above can result in a water level that is higher than the maximum design level and potential compromise of critical systems and components.

Potential sources of water other than those listed above which may result in Containment flooding are:

- Service Water
- Component Cooling Water
- Reactor Makeup Water
- Demineralized Water

- A. **Incorrect:** See explanation above. **Plausible** if the candidate does not realize that the design maximum water level in containment for this event is less than 12.5 feet which is also the entry condition for FR-Z.2. Additionally, the maximum level in Containment includes the entire contents of the NC system, FWST, NI Accumulators, and CA Storage Tank.
- B. **Incorrect:** See explanation above. **Plausible** because this level is unexpected for this event. Additionally, the maximum level in Containment includes the entire contents of the NC system, FWST, NI Accumulators, and CA Storage Tank. However, this level is greater than the maximum level in Containment postulated in the Design Basis assuming all of the sources listed above empty into the sump.
- C. **Incorrect:** See explanation above. **Plausible** if the candidate does not realize that the design maximum water level in containment for this event is

less than 12.5 feet which is also the entry condition for FR-Z.2. It is also plausible to believe that the maximum design level in the Containment sump for this limiting event would include water from unknown sources for conservatism.

D. **Correct.**

Technical Reference(s)	Basis Document for FR-Z.2, Response to Containment Flooding, rev. 2 pages 2 & 7	(Attach if not previously provided)
	<u>FR-Z.2, Response to Containment Flooding, rev 5, page 2</u>	(Including version or revision #)

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 43.5

Comments:

Containment Flooding:

Ability to determine and interpret the following as they apply to (Containment flooding) : Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

KA is matched because in order to comply with the requirements of the procedure (i.e. determine the source of the flooding and isolate that source), the candidate must understand the difference between what is a potential source of the flooding what is a source of water in the Containment sump that is considered "normal" per the Design Basis.

Meets SRO Only criteria linked to 10CFR55.43(b)(5) (Procedures). The correct answer can NOT be discerned from system knowledge, recognizing the entry conditions for FRP-Z.2, or recall of immediate actions. In order to correctly answer this question, the candidate must recall discreet information from specific procedural steps and/or the Design Basis.

Examination Outline Cross-
reference:**DRAFT**

Level	RO	SRO
Tier #		X
Group #		1
K/A #	008AA2.10	
Importance Rating	3.6	3.6

Pressurizer Vapor Space Accident

Ability to determine and interpret the following as they apply to (Pressurizer Vapor Space Accident): High-Pressure injection valves and controllers.

Proposed Question: SRO 82

1 Pt Given the following conditions on Unit 1:

A Loss of Offsite Power has occurred resulting in a partially stuck open PZR Safety and subsequent Safety Injection.

- The 1B D/G failed to start
- Actions in E-0 (Reactor Trip or Safety Injection) are complete
- NC pressure is 1585 PSIG
- RVLIS Lower Range level is 35% and decreasing
- 1NI-9A (NC Cold Leg Inj from NV) is closed and cannot be opened
- CETs are reading 586°F
- Subcooling Monitor is indicating -15°F

Which ONE (1) of the following indicates both the correct procedure and associated strategy which will result in RECOVERY of NC system inventory?

- Go to FR-C.1 (Response to Inadequate Core Cooling) and establish high head injection via the Standby M/U Pump and the PD pump.
- Go to FR-C.2 (Response to Degraded Core Cooling) and establish high head injection via the Standby M/U Pump and the PD pump.
- Go to FR-C.1 (Response to Inadequate Core Cooling) and dump steam from intact S/Gs to allow CLAs and/or ND to recover core cooling.
- Go to FR-C.2 (Response to Degraded Core Cooling) and dump steam from intact S/Gs to allow CLAs and/or ND to recover core cooling.

Proposed Answer: **D**

Explanation (Optional):

The conditions given require the crew to implement FRP C.2 due to indications of degraded core cooling. The first strategy directed in this procedure is to establish/restore injection flow. The high head injection flowpath is via injection valves 1NI-9A and 1NI-10B. Per the conditions given, 1NI-10B has no power (1B D/G failed to start) and 1NI-9A is unavailable as stated. FRP C.2, step 3 RNO a-4 directs the crew to continue efforts to establish SI flow and to have available operator try to establish flow from any available source per Enc 3. Enclosure 3 will direct the operator to start both the Stby M/U pump and the PD pump. Because the SI flow path is unavailable, this will not result in a significant amount of NC system makeup. Nowhere in this procedure is the crew directed to realign to a normal charging flowpath. The procedure will then direct the crew to initiate a depressuration of all intact S/G's to 110 PSIG. This strategy will enable to CLA's to inject to provide core cooling and ultimately result in NC system pressure low enough to allow ND to inject.

- A. **Incorrect:** See explanation above. Wrong procedure, conditions given do not meet entry conditions for FRP C.1 and the strategy indicated is not directed by this procedure. **Plausible** because the conditions given are very close to entry conditions for C.1. The strategy indicated would provide significant primary system makeup flow and would seem a prudent course of action but is not directed by procedure.
- B. **Incorrect:** See explanation above. Correct procedure, wrong strategy. As stated above, this strategy is not directed by FRP C.2. **Plausible** because this action would provide significant primary system makeup flow and would seem a prudent course of action but is not directed by procedure.
- C. **Correct.**
- D. **Incorrect:** See explanation above. Wrong procedure as described above. **Plausible** because this is the correct strategy.

Technical Reference(s)	<u>Lesson Plan OP-MC-EP-FRC Rev 10 Pg 57 and 59</u>	(Attach if not previously provided) (Including version or revision #)
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Proposed references to be provided to applicants during examination: None

Learning Objective: EP-FRC-Obj 2 & 3 (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 43.5

Comments:

Pressurizer Vapor Space Accident

Ability to determine and interpret the following as they apply to (Pressurizer Vapor Space Accident): High-Pressure injection valves and controllers.

KA is matched because the question examines the candidate's knowledge of the effects of a multiple malfunctions of High pressure injection valves on the procedural response to a pressurizer vapor space accident. The candidate must evaluate the overall effect on the integrated plant response in order to protect the core and provide core cooling.

This question meets the level of Analysis because the question requires the candidate to evaluate given multiple failures, understand the impact on ability to provide sufficient primary system make up and apply an understanding of procedural strategies to select the correct procedure and course of action.

This Question is linked to 10CFR55.43 (b)(5) Procedures. Justification for SRO level is that system knowledge alone is not enough to correctly answer. The question requires the candidate to assess plant conditions and recall specific actions required which are not simply entry conditions or immediate actions and requires an understanding of multiple strategies associated with FRP C.2 (Response to degraded core cooling) .

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

1

Group #

1

K/A #

022AG2.4.2

Importance Rating

4.7

Loss of Reactor Coolant Makeup / 2

Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

Proposed Question: SRO 83

1 Pt

Unit 1 is operating at 100% RTP

The following indications are observed:

- NC PUMP SEAL INJ LO FLOW alarm
- CHARGING LINE ABNORMAL FLOW alarm
- REGEN HX LETDN HI TEMP alarm
- NC pump lower bearing temperatures are slowly increasing

Based on the above indications, the CRS should direct entry into _____ (1) _____. The mitigating strategy for this malfunction will have the operators _____ (2) _____.

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

- A. (1) AP-8 (Malfunction of NC Pump)
(2) start the PD pump
- B. (1) AP-12 (Loss of Letdown, Charging, or Seal Injection)
(2) start the PD pump
- C. (1) AP-8 (Malfunction of NC Pump)
(2) operate 1NV-243 (Regen HX Tube Inlet Control Bypass) as necessary
- D. (1) AP-12 (Loss of Letdown, Charging, or Seal Injection)
(2) operate 1NV-243 (Regen HX Tube Inlet Control Bypass) as necessary

Proposed Answer: **B**

Explanation (Optional):

1NV-238 has failed closed isolating both charging and seal injection. Therefore, AP-12 LOSS OF LETDOWN, CHARGING OR SEAL INJECTION would be the appropriate procedure to enter. However, increasing NC pump lower bearing temperatures is one of the symptoms which would prompt entry into AP-8, MALFUNCTION OF NC PUMP.

Starting the PD pump and operating 1NV-243 are both part of the mitigating strategy in AP-12. However, operating 1NV-243 is done if there is a problem with the operation of 1NV-241 and would not be appropriate for a failure of 1NV-238 (1NV-238 and 1NV-241 are in the charging flow path).

A malfunction of 1NV-241 could cause all of the indications observed individually. However, it could not cause all of the indications seen together. For example, if 1NV-241 failed closed, it would result in the CHARGING LINE ABNORMAL FLOW alarm (due to low flow) and the LETDOWN RELIEF HI TEMP alarm but not the NC PUMP SEAL INJ LO FLOW alarm nor the increasing NC pump bearing temperatures. Conversely, if 1NV-241 failed open, it would result in the NC PUMP SEAL INJ LO FLOW alarm, the increasing NC pump bearing temperatures, and possibly a CHARGING LINE ABNORMAL FLOW alarm (on high flow) but would not result in the SEAL INJ LO FLOW alarm.

- A. **Incorrect:** See explanation above. **Plausible** because starting the ND pump is the correct mitigating strategy. Entering AP/8 may seem to be the correct course of action based on increasing NC pump lower bearing temperatures. However, based on all of the indications taken together, the correct procedure to enter is AP-12.
- B. **Correct.**
- C. **Incorrect:** See explanation above. **Plausible** because operating 1NV-243 to control charging and seal injection flow is reasonable if the candidate incorrectly diagnoses that 1NV-241 has failed. Entering AP/8 may seem to be the correct course of action based on increasing NC pump lower bearing temperatures. However, based on all of the indications taken together, the correct procedure to enter is AP-12.
- D. **Incorrect:** See explanation above. **Plausible** because based on all of the indications taken together, AP-12 is the correct procedure to implement. Also, operating 1NV-243 to control charging and seal injection flow is plausible if the candidate incorrectly diagnoses that 1NV-241 has failed.

Comments:

Loss of Reactor Coolant Makeup / 2

Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

KA is matched because the candidate must diagnose the symptoms provided and determine which is the appropriate AP to enter.

This question is analysis level because the candidate must analyze the combination of alarms to determine the initiating event and based on the malfunction select the appropriate mitigating procedure and the appropriate mitigating actions from that procedure.

This is an SRO Only question linked to 10CFR55.43(b)(5), Procedures. This question can NOT be answered using system knowledge alone, knowledge of immediate actions, or knowledge of the entry conditions for the procedure. The candidate must have knowledge of specific steps within the procedure.

Examination Outline Cross-
reference:**DRAFT**

Level

Tier #

Group #

K/A #

Importance Rating

RO

G2.4.20

SRO

X

3

4.3

Emergency Procedures/Plans

Knowledge of the operational implications of EOP warnings, cautions and notes.

Proposed Question: SRO 84

1 Pt

Given the following:

- Unit 1 has experienced a Loss of All AC Power
- ECA-0.0 (Loss of All AC Power) is in effect
- The attempted start of the Standby Make-up Pump was unsuccessful
- In accordance with ECA-0.0 the crew is preparing to depressurize the intact S/Gs to 290 PSIG.

Which ONE (1) of the following describes the procedural requirements for depressurizing the S/Gs?

- S/Gs should be depressurized at the maximum rate. S/G depressurization should NOT be stopped if reactor vessel head voiding occurs.
- S/Gs should be depressurize to establish a cooldown rate close to 100°F / hr. S/G depressurization should NOT be stopped if reactor vessel head voiding occurs.
- S/Gs should be depressurized at the maximum rate. S/G depressurization should ONLY be stopped if reactor vessel head voiding occurs.
- S/Gs should be depressurize to establish a cooldown rate close to 100°F / hr. S/G depressurization should ONLY be stopped if reactor vessel head voiding occurs.

Proposed Answer: **B**

Explanation (Optional):

In ECA-0.0, notes prior to depressurizing the S/Gs to 290 PSIG informs the operator that upper head voiding may occur during the depressurization and that the depressurization should not be stopped if voiding occurs and to depressurize the S/G at a rate to establish a cooldown near 100°F / hr.

The 100°F / hr cooldown limit is specific to MNS and is a departure from the WOG document which directs a cooldown at the maximum rate possible to minimize inventory loss. Establishing a 100°F / hr cooldown rate is designed to minimize the NC system inventory loss while cooling the NC pumps in a controlled manner.

- A. **Incorrect:** See explanation above. **Plausible** because depressurizing the S/Gs at maximum rate is the strategy that is employed in the WOG basis documents and not stopping the depressurization if head voiding occurs is the correct strategy.
- B. **Correct.**
- C. **Incorrect:** See explanation above. **Plausible** because depressurizing the S/Gs at maximum rate is the strategy that is typically employed in the WOG basis documents and stopping the depressurization if head voiding occurs is reasonable as significant voiding could result in core uncover.
- D. **Incorrect:** See explanation above. **Plausible** because depressurizing the S/Gs to establish a 100°F / hr cooldown rate is the strategy that is that is employed at MNS (which is different than the WOG strategy) and stopping the depressurization if head voiding occurs is reasonable as significant voiding could result in core uncover.

Technical
Reference(s)

Background Document for
ECA-0.0, Loss of All AC
Power, rev. 2, page 137

(Attach if not previously
provided)

EP/1/A/5500/ECA-0.0, rev
25 page 22

(Including version or
revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-EP-ECA-0, Obj 4 (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 43.5

Comments:

KA is matched because candidate must understand the basis for why the depressurization of the S/Gs must not be stopped even if Pressurizer level is lost or reactor vessel voiding occurs.

This is an SRO Only question linked to 10CFR55.43(b)(5), Procedures. The candidate can NOT answer this question with systems knowledge alone, knowledge of procedure immediate actions or entry conditions. The candidate must have knowledge of the basis for performing specific procedural steps to correctly answer this question.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

2

Group #

1

K/A #

004G2.1.20

Importance Rating

4.6Chemical and Volume Control
Ability to interpret and execute procedure steps.

Proposed Question: SRO 85

1 Pt

Given the following conditions:

- Unit 1 is operating at 100% power
- AP-12 (Loss of Letdown, Charging, or Seal Injection) has been implemented due to fluctuating charging flow indication and 1B NV pump (the running pump) has been stopped
- It is discovered that the VCT N₂ pressure regulator has failed resulting in a high VCT pressure
- The regulator has been replaced and VCT pressure returned to normal
- Pressurizer level is currently at 25% and decreasing at a rate of 1% / min
- Operators in the field are performing AP-12 Enclosure 1 (NV Pump Venting) and report that it will take at least 15 minutes to complete.

Which ONE (1) of the following is the appropriate per AP-12 for the conditions listed above?

- A. Start the Standby Makeup pump immediately.
- B. Start the Standby Makeup pump if Pressurizer level decreases to less than 17%
- C. Complete the actions of Enclosure 1 and then start an NV pump.
- D. Stop performing Enclosure 1 and start 1A NV pump.

Proposed Answer: **A**

Explanation (Optional):

A continuous action step from AP-12 directs the Operator:

IF AT ANY TIME it is known that a charging pump will not be restored prior to Pzr level reaching 20%, THEN evaluate starting Standby Makeup Pump PER Enclosure 3 (Standby Makeup Pump Startup).

From the AP-12 Background Document:

Several factors should be considered when evaluating whether or not to start the Standby Makeup pump:

It is expected that the NC pump seals and lower bearings will heat up during a loss of Seal Injection event. The value at which these temperatures stabilize is dependent on actual NC pump seal leakoff flow, KC temperature, and thermal barrier KC flow. (The operator should closely monitor NC pump trip criteria during this time.) If the Standby Makeup pump is subsequently started, an uncontrolled NC pump seal cooldown will occur due to inability to throttle flow, resulting in pump vibration going up, possibly to the trip criteria setpoint. Thus, if it appears that a charging pump will be available prior to Pzr level reaching 20%, then it would be advantageous to delay starting the Standby Makeup pump to prevent this uncontrolled NC pump seal cooldown.

Conversely, if the operator knows up front that a charging pump is unlikely to be available prior to going below 20% Pzr level, the Standby Makeup pump should be started as soon as possible for two reasons: (1) to limit the severity of the seal cooldown and possibly avoiding excessive NC pump vibration (2) to ensure enough Pzr level is present so that if the NC pump hi hi vibration setpoint is reached, necessitating a reactor trip, there will be sufficient Pzr level during the NC inventory shrink to prevent tripping Pzr heaters (17%) and prevent dropping below the emergency procedure S/I setpoint (4%).

For these reasons, operators should determine the rate of change of Pzr level and estimate the time that a charging pump will be returned to service. Bottom line: Start the Standby Makeup as soon as it is known that all charging pumps will not be available prior to going below 20% level.

For this particular case, it is going to take approximately 10 minutes to complete venting of the NV pump suction lines. With Pressurizer level at 25% and decreasing at a rate of 1% / minute, by the time the NV pump suction lines are vented and an NV pump is ready to start, Pressurizer level will be at 15%. Therefore, IAW the continuous action in AP-12, since it is known that an NV pump will not be available prior to Pressurizer level decreasing below 20%, the Standby Makeup pump should be started immediately.

- A. **Correct.**
- B. **Incorrect:** See explanation above. **Plausible** because the Standby Makeup pump should be started and there is a Pressurizer level associated with starting the pump. Since pressurizer heaters turn off at 17% and that is discussed in the basis for starting the Standby Makeup pump, this level is plausible in the answer. However, the basis for starting the Standby Makeup pump prior to Pressurizer level reaching 20% is based on preventing shrink from causing Pressurizer level from decreasing below the 17% heater cutoff level should NC pumps have to be stopped. It is possible that the NC pumps would be stopped due to high vibration from a rapid cooling of the seals due to running the Standby Makeup pump.
- C. **Incorrect:** See explanation above. **Plausible** if the candidate does not recall the continuous action step to start the Standby Makeup pump.
- D. **Incorrect:** See explanation above. **Plausible** because the candidate may believe that the 1A NV pump has been unaffected by this event and they may determine a need to start an NV pump immediately due to the rapid decrease in Pressurizer level. However, if an NV pump has experienced gas binding, as directed by procedure, the candidate must vent the NV pump suction lines per Enclosure 1(NV Pump Venting) which includes BOTH NV pumps.

Technical
Reference(s)

Background Document for
AP-12, Loss of Letdown,
Charging, or Seal Injection
pages 11 and 12

(Attach if not previously
provided)

AP-12, Loss of Letdown,
Charging, or Seal
Injection, rev. 20 page 11

(Including version or
revision #)

Proposed references to be provided to applicants during
examination:

None

Learning Objective:

OP-MC-EP-E1 Obj. 2

(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 43.5

Comments:

KA is matched because candidate must understand the function of the NV system during performance of the EP procedures.

This question is analysis level because the candidate must evaluate multiple indications to determine the status of the plant and which procedure must be used to correct the problem.

This is an SRO Only question linked to 10CFR55.43(b)(5). This question can NOT be answered with procedure knowledge alone, or by knowing immediate actions or entry conditions of the procedure. The candidate must evaluate plant conditions based on multiple indications and determine which procedure contains the appropriate strategy to mitigate the consequences of the accident.

Examination Outline Cross-
reference:**DRAFT**

Level

Tier #

Group #

K/A #

Importance Rating

RO

G2.1.5

SRO

X

3

3.9

Conduct of operations

Ability to locate and use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.

Proposed Question: SRO 86

1 Pt

Unit 1 is operating at 100% RTP.

Under which ONE (1) of the following conditions may a licensed STA assume the duties of the Control Room Supervisor?

The CRS or relief SRO is available to return to the control room within (1) and the periods during which the STA assumes SRO duties do not exceed (2) in duration.

- A. (1) 15 minutes
(2) 15 minutes
- B. (1) 15 minutes
(2) 10 minutes
- C. (1) 10 minutes
(2) 15 minutes
- D. (1) 10 minutes
(2) 10 minutes

Proposed Answer: **C**

Explanation (Optional):

Technical Specifications allows the Shift Technical Advisor to assume the control room command function and perform the duties of the control room SRO in Modes 1, 2, 3, and 4 during periods when the CRSRO and the relief SRO are required to be absent from the control room. However, the following requirements must be met:

- The STA must hold an SRO license for the unit.
 - The CRSRO or relief SRO must be available to return to the control room within 10 minutes.
 - The periods during which the STA may perform the control room SRO duties may not exceed 15 minutes in duration or a total of 1 hour for the entire shift.
- A. **Incorrect:** See explanation above. **Plausible** if the candidate confuses the time for the CRSRO or relief SRO to return to the control room with the allowable duration of the relief by the STA.
- B. **Incorrect:** See explanation above. **Plausible** if the candidate confuses the time for the CRSRO or relief SRO to return to the control room with the allowable duration of the relief by the STA.
- C. **Correct.**
- D. **Incorrect:** See explanation above. **Plausible** if the candidate confuses the time for the CRSRO or relief SRO to return to the control room with the allowable duration of the relief by the STA.

Technical Reference(s)	Technical Specification 5.1.2, amendment 213 and 194	(Attach if not previously provided)
		(Including version or revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-ADM-OMP, Obj 3 (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 43.5

Comments:

Conduct of operations
 Ability to locate and use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.

KA is matched because the candidate must understand the control room manning requirements for the individual fulfilling the control room command function.

This is an SRO Only question linked to 10CFR55.43(b)(2), Tech Specs. This questions can NOT be answered by knowing less than 1 hour Tech Spec or TRM action statements. It can NOT be answered by knowing the LCO/TRM information listed "above-the-line" (since this is an Administrative Control). It can NOT be answered by knowing Tech Spec Safety Limits or their basis. The candidate must apply requirements from Section 5.0, Administrative Controls of Technical specifications. Requirements in Section 5.0 are NOT expected knowledge for ROs.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

3

Group #

K/A #

G2.3.14

Importance Rating

3.8

Radiation Control

Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.

Proposed Question: SRO 87

1 Pt

Given the following:

- Unit 2 is responding to a large LOCA with 10 % failed fuel.
- 2NI-184B (1B ND Pump Suction From Cont Sump Isol) would not open during FWST swapover
- 2NI-184B breaker has tripped and will not reset
- The OSM has determined that manual alignment of 2NI-184B is required to protect the health and safety of the general public.
- RP projects that expected dose rates in the area of the valve may exceed 150 REM/hr

Which of the following exposure limits would apply to a worker who volunteered to manually open 2NI-184B?

- Do not exceed 5 REM TEDE.
- Do not exceed 10 REM TEDE.
- Do not exceed 25 REM TEDE.
- The worker(s) may exceed 25 REM TEDE.

Proposed Answer: **D**

Explanation (Optional):

Greater than 25 REM is allowed on a volunteer basis for protection of the public health and safety.

- A. **Incorrect:** See explanation above. **Plausible** since this is the maximum allowable TEDE for non-emergency conditions.
- B. **Incorrect:** See explanation above. **Plausible** since this is the maximum allowable annual TEDE for equipment protection during accident conditions.
- C. **Incorrect:** See explanation above. **Plausible** since this is the maximum allowable annual TEDE for life saving or public safety on a non-volunteer basis.
- D. **Correct.**

Technical Reference(s)	<u>Lesson Plan OP-MC-EP- EMP rev. 12, page 35</u>	(Attach if not previously provided) (Including version or revision #)
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Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-EP-EMP, Obj. 5 (As available)

Question Source:	Bank # <u>EPEMPN01</u>	(Note changes or attach parent)
	Modified Bank # <u> </u>	
	New <u> </u>	

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	<u>43.4</u>

Comments:

Radiation Control

Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.

KA is matched because candidate must have knowledge of the emergency dose limits for lifesaving and equipment saving activities based on whether the individual is a volunteer.

This is an SRO Only question linked to 10CFR55.43(b)(4), Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions. This question requires the candidate to have knowledge of emergency dose for lifesaving and equipment saving activities. This level of knowledge is not expected of a Reactor Operator.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

3

Group #

K/A #

3.2.12

Importance Rating

3.7

Radiation Control

Knowledge of radiological safety principles pertaining to licensed operator duties

Proposed Question: SRO 88

1 Pt

Per RP-10 (NRC Immediate Notification Requirements) which ONE (1) of the following is an event requiring IMMEDIATE notification to the NRC?

- A. Any event that may have caused an exposure of greater than or equal to 70 REM EDE.
- B. Any event that threatens to cause an exposure of greater than or equal to 50 REM CEDE
- C. Any event that may have caused or threatens to cause an exposure of greater than or equal to 25 REM TEDE.
- D. Any event that may have caused or threatens to cause an exposure of greater than or equal to 200 RAD SDE to the skin or extremities.

Proposed Answer: **C**

Explanation (Optional):

Per RP-10, immediate notification must be made to the NRC if an event has occurred that may have caused or threatens to cause an exposure of greater than or equal to 25 REM TEDE.

- A. **Incorrect:** See explanation above. Limit for EDE is 75 rem. **Plausible** because it exceeds the TEDE limit.
- B. **Incorrect:** See explanation above. There is no limit specified for CEDE for reportability. **Plausible** if candidate confuses CEDE with TEDE since the TEDE limit is exceeded.
- C. **Correct.**
- D. **Incorrect:** See explanation above. Limit for SDE is 250 RAD. **Plausible** because it exceeds the TEDE and EDE limits.

Technical Reference(s)	<u>RP/0/A/5700/010, NRC Immediate Notification Requirements, rev 17 Enclosure 4.1 page 2</u> <u>Lesson Plan OP-MC-RAD-RP, rev. 2 page 79</u>	(Attach if not previously provided) (Including version or revision #)
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Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-RAD-RP, Obj. 147 (As available)

Question Source: Bank # RADRP080
 Modified Bank # _____ (Note changes or attach parent)
 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	<u>43.4</u>

Comments:

Radiation Control
Knowledge of radiological safety principles pertaining to licensed operator duties

KA is matched because the candidate is required to understand the potential consequences of not adhering to radiological safety principles.

This is an SRO Only question linked to 10CF55.43(b)(5), Procedures. This question can NOT be answer with systems knowledge alone. It can NOT be answered by knowing immediate actions or procedure entry conditions. To correctly answer this question the candidate must have knowledge of specific procedural requirements related to reporting contained in RP-10 (i.e. 10CFR20.2202 requirements). Knowledge of these requirements is NOT expected knowledge for a Reactor Operator.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

1

Group #

2

K/A #

WE16EG2.4.41

Importance Rating

2.94.6

High Containment Radiation: (Generic) Knowledge of the emergency action level thresholds and classifications

Proposed Question: SRO 89

1 Pt

Given the following conditions:

- 45 minutes ago a large break LOCA occurred on Unit 1
- Containment pressure indicates 9 PSIG
- Containment hydrogen concentration is 1%
- CETs indicate temperatures of 1100°F
- RVLIS lower range level indicates 40%
- EMF 51A indicates 185 R/hr
- Subcooling margin indicates -35°F
- All S/G NR level are off scale low with no CA flow indicated

What is the correct classification and associated EAL Number for this event?

REFERENCES PROVIDED

- A. Site Area Emergency based on EAL # 4.1.S.2
- B. General Emergency based on EAL # 4.1.G.1
- C. Site Area Emergency based on EAL # 4.1.S.1
- D. General Emergency based on EAL # 4.1.G.2

Proposed Answer: **D**

Explanation (Optional):

The candidate has been given a set of conditions associated with a large break LOCA and given a copy of RP-000, asked to classify the event. The conditions given result in the following determinations per RP-000 Enc 4.1 (Fission Product Barrier Matrix)

(Containment Barrier)—1 point—Potential loss due to Containment Rad. Monitor EMF-51A or 51B reading @ time since shutdown (45 min) > 170 R/hr @ 0.5 – 2 hr. (Reading 185 R/hr)

(NCS Barrier)--- 5 Points--- Loss due to "GREATER THAN available makeup capacity as indicated by a loss of NCS Subcooling" (Subcooling margin indicates -35 deg)

(Fuel Clad Barrier)--- 5 Points--- Loss due to Containment radiation monitor EMF 51A or 51B reading >43 R/hr 45 minutes since shutdown.

The result of the evaluation above is a total of 11 points (4.1.G.2) (Loss of Any Two Barriers AND Potential Loss of the Third) and the corresponding classification or "General Emergency".

- A. **Incorrect:** As described above, the correct classification would be General Emergency. **Plausible:** If the candidate failed to recognize that the conditions given represent a "Loss of NCS Barrier". A valid Heat Sink Red Path is represented in the Stem which taken alone would constitute a only 4 Points for the NCS Barrier in the Matrix and a resulting in a total of 10 points and a classification of SAE with an EAL of 4.1.S.2
- B. **Incorrect:** General Emergency **Plausible:** If the candidate incorrectly determines that a loss of the containment barrier exists but correctly determines the loss of the other two barriers. This would result in a total of 13 points, a General Emergency classification with an EAL# 4.1.G.1
- C. **Incorrect:** General Emergency **Plausible:** If the candidate failed to recognize that the conditions given represent a "Loss of Fuel Clad Barrier". A valid Core Cooling Orange Path is given in the Stem which taken alone would constitute a only 4 Points for the Fuel Clad Barrier in the Matrix. This taken with the above determination would yield 9 points and a resulting in a classification of SAE with an EAL of 4.1.S.1
- D. **Correct as described above.**

Technical
Reference(s)

RP/0/A/5700/000 (Rev 14)
Enc 4.1

(Attach if not previously
provided)

EP/1/A/5000/F-0 (Rev 4)
Pg 4

(Including version or revision
#)

Proposed references to be provided to applicants during
examination:

RP/0/A/5700/000

Learning Objective: OP-MC-EP-EMP Obj. 10 (As available)

Question Source: Bank # EPEMPN09
 Modified Bank # _____ (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
 55.43 43.5

Comments:

High Containment Radiation: (Generic) Knowledge of the emergency action level thresholds and classifications

KA is matched because most of the evaluations required in classifying this event require to application of the Containment Radiation levels given in the stem of the question. Two of the three fission product barriers are either a loss or potential loss exclusively due to containment radiation levels.

This Question represents a higher cognitive level of Application because it involves a multi-part mental process of assembling different combinations of given information to select a correct classification.

This question is linked to 10CFR55.43 (b)(7) "Emergency Classification" Per the guidance in 10CFR55.43 and per the MNS objective referenced for this question, assessing plant conditions and determining the proper classification of emergency is considered SRO level.

A reference is being provided for this question because candidates are not expected to have memorized all of the entry conditions for all classifications.

Examination Outline Cross-reference:

DRAFT

Level

Tier #

Group #

K/A #

Importance Rating

RO

G2.2.11

SRO

X

3

3.3

Equipment Control: (Generic)

Knowledge of the process for controlling temporary design changes

Proposed Question: SRO 90

1 Pt

Which one of the following describes the process for notating a Temporarily Modification on a flow diagram or electrical one-line drawing in accordance with OMP 10-2, Temporary Modifications?

- A. Affected drawings are notated with a pink cloud to refer the operator to the TM package.
- B. Flow diagrams and electrical one line drawings SHALL always be red-marked to reflect the temporary modification.
- C. Flow diagrams SHALL be red-marked to reflect the temporary modification, electrical one line drawings shall NOT be red marked to reflect the temporary modification.
- D. Drawings in WCC office may be red-marked at the SRO's discretion, but the drawings in the Control Room and Tagout office must be changed by the responsible engineer.

Proposed Answer: **B**

Explanation (Optional):

Per OMP 10-2, the TM Accountable Engineer shall ensure that any flow diagrams, electrical one line drawings, or boundary interface drawings significantly affected by the installation of the temp mod are notated to refer the operators to the appropriate TM package located at the SSA desk. An example of this notation would be: "This drawing affected by Temp Mod # _____. Refer to the TM package at the SSA desk for details"

- A. **Incorrect:** See explanation above. It is acceptable that drawing be changed via the normal change process. Plausible since this is way this process is usually handled but it is not the only way.
- B. **Correct.**
- C. **Incorrect:** See explanation above. As described above, electrical one lines are to be red marked. **Plausible** because electrical drawings are handled differently in many of our processes and TM rarely affect electrical drawings so it would seem reasonable to assume that they would be different in the TM process.
- D. **Incorrect:** See explanation above. It is specifically directed in the OMP that if the Control room drawings are red-marked, the affected drawings in the WCC and Tagout Office must be marked in a similar fashion. **Plausible** because it is conceivable that the candidate may assume the drawing used to create tagouts and operate the plant would fall under more stringent guidelines that the set kept in the work control center.

Technical Reference(s)	OMP 10-2, Temporary Modifications (Rev 10) Pg 4 of 6	(Attach if not previously provided)
		(Including version or revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-ADM-OMP Obj: 28 (As available)

Question Source: Bank # ADMOMPNO6
 Modified Bank # _____ (Note changes or attach parent)
 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 _____

Comments:

Equipment Control: (Generic)
 Knowledge of the process for controlling temporary design changes

KA is matched because the candidate is required to know the process to update flow diagrams within the process of implementation of a Temporary Modification in order to answer the question.

This question is linked to 10CFR55.43 (b)(3) due to covering administrative processes for temporary modifications. Requirement to be tested on this knowledge is unique to the SRO position.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

3

Group #

K/A #

034G2.4.11

Importance Rating

4.2

Fuel Handling Equipment
Knowledge of abnormal condition procedures

Proposed Question: SRO 91

1 pt

Given the following:

- Core unload is in progress on Unit 1
- A fuel assembly is being transferred from the core to the refueling canal upender when the following alarms are received:
 - INCORE INST ROOM SUMP HI LEVEL
 - 1EMF-16 CONTAINMENT REFUELING BRDG

Which ONE (1) of the following procedures is required to be implemented and what is the correct action directed by the procedure?

- A. AP-40 (Loss of Refueling Cavity Level)
Lower the fuel assembly fully down in the core.
- B. AP-40 (Loss of Refueling Cavity Level)
Place one Outside Air Pressure Filter train in service
- C. AP-25 (Spent Fuel Damage)
Place the refueling cavity in purification.
- D. AP-25 (Spent Fuel Damage)
Place the Containment Aux Carbon Filter Unit in service

Proposed Answer: **A**

Explanation (Optional):

The Containment Refueling Bridge alarm coincident with the Incore Instrument Room Sump Hi Level indicates a leak in the refueling cavity. Therefore, the appropriate procedure to enter is AP-40. In accordance with AP-40, any fuel assembly in the manipulator should be lowered into the core.

- A. **Correct.**
- B. **Incorrect:** See explanation above. Any fuel assembly in the manipulator should be lowered into the core. **Plausible** because placing one Outside Air Pressure Filter train in service is an action per AP-25.
- C. **Incorrect:** See explanation above. The correct procedure is AP-40. **Plausible** because 1EMF-15, Containment Refueling Bridge alarm is a symptom which might prompt entry into AP-25. However, based on the Incore Inst Room Sump Hi Level, the Operator should be prompted to enter AP-40. Also, placing the refueling cavity in purification is an appropriate action for entry into AP-25.
- D. **Incorrect:** See explanation above. The correct procedure is AP-40. **Plausible** because 1EMF-15, Containment Refueling Bridge alarm is a symptom which might prompt entry into AP-25. However, based on the Incore Inst Room Sump Hi Level, the Operator should be prompted to enter AP-40. Also, placing the Containment Aux Carbon Filter Unit in service is an appropriate action for AP-25 entry.

Technical Reference(s)	AP/1/A/5500/040, Loss of Refueling Cavity Level, rev. 6, pages 2, 3, and 6	(Attach if not previously provided)
		(Including version or revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-AP-40, Obj 1 (As available)

Question Source:	Bank #	Catawba NRC Bank 698
	Modified Bank #	_____ (Note changes or attach parent)
	New	_____
Question History:	Last NRC Exam	<u>2003 Catawba NRC Exam</u>
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	<u>X</u>
10 CFR Part 55 Content:	55.41	
	55.43	<u>43.5</u>

Comments:

Fuel Handling Equipment
Knowledge of abnormal condition procedures

KA is matched because candidate must have knowledge of Abnormal Procedure mitigating strategy for Fuel Handling accidents.

This question is analysis level because the candidate must analyze the alarms given to determine that a leak is occurring and not a damaged fuel assembly which allows the candidate to make a determination as to which is the correct procedure to enter.

This is an SRO Only question related to 10CFR55.43(b)(5), Procedures. This question can NOT answered with systems knowledge alone. It can NOT be answered by knowing immediate actions or entry conditions for the procedures. The candidate must have knowledge of specific steps within the procedure to correctly answer the question.

Examination Outline Cross-
reference:**DRAFT**

Level	RO	SRO
Tier #		X
Group #		2
K/A #	086A2.03	
Importance Rating		2.9

Fire Protection:

Ability to (a) predict the impacts of the following on the (Fire Protection) system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations: (Inadvertent actuation of the FPS due to circuit failure or welding.)

Proposed Question: SRO 92

1 Pt

Given the following:

- Unit 1 was operating at 100% RTP
- While performing welding activities in the 1A D/G Room one of the heat detectors associated with the Halon system was inadvertently actuated
- The Halon actuation was successfully aborted by the fire watch depressing the ABORT/OFF pushbutton prior to actual Halon discharge.

How is the 1A D/G Halon system affected and what actions are required per SLC 16.9.3 (Halon Systems)?

- Auto actuation ONLY is blocked
Establish an Hourly fire watch within one hour
- BOTH Manual and Auto actuation of the system is blocked.
Establish a Hourly fire watch within one hour.
- Auto actuation ONLY is blocked
Establish a Continuous Fire Watch within one hour.
- BOTH Manual and Auto actuation of the system is blocked.
Establish a Continuous Fire Watch within one hour.

Proposed Answer: **C**

Explanation (Optional):

The D/G rooms are protected by an installed Halon system. These systems are actuated by any one of 4 installed heat detectors in each D/G room. The system is equipped with a time delay device which will delay the discharge of halon for 20 seconds after an automatic actuation. During this time an operator can abort the discharge utilizing a local Abort switch. This button locks into place and will block auto actuation only. A manual actuation cannot be blocked.

Per SLC 16.9.3 basis, if the Halon system associated with the 1A D/G room becomes inoperable, Condition A is applied because there is impact on redundant equipment. (1CA-42B power cable). Condition A requires the establishment of a continuous fire watch within one hour.

- A. **Incorrect:** See explanation above. **Plausible** because all of the other D/G room Halon inoperability would only require an Hourly fire watch.
- B. **Incorrect:** See explanation above. Only Auto actuation is blocked, and a Continuous Fire Watch is required. **Plausible** because the candidate may not remember Manual cannot be blocked but it would be reasonable to assume that it could. Also, If Halon is determined to be inoperable in any of the 3 remaining D/G rooms; entry is required into Condition B of SLC 16.9.3 which only requires the establishment of an hourly fire watch.
- C. **Correct.**
- D. **Incorrect:** See explanation above. Manual Halon actuation cannot be blocked. **Plausible** because the candidate may not remember Manual cannot be blocked but it would be reasonable to assume that it could. Also, If Halon is determined to be inoperable in any of the 3 remaining D/G rooms; entry is required into Condition B of SLC 16.9.3 which only requires the establishment of an hourly fire watch.

Technical Reference(s)	Lesson Plan OP-MC-SS-RFY (Rev 26) Pg 51	(Attach if not previously provided)
	SLC 16.9.3, Halon Systems and Basis	(Including version or revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-SS-RFY Obj: 22 (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 43.50

Comments:

Fire Protection:

Ability to (a) predict the impacts of the following on the (Fire Protection) system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations: (Inadvertent actuation of the FPS due to circuit failure or welding.)

KA is matched because D/G Halon is inadvertently actuated due to welding near a detector. The candidate must evaluate the resulting impact on the Halon system and mitigate the consequences of the resulting inoperability by applying the appropriate actions in SLC 16.9.3.

This Question is linked to 10CFR55.43 (b)(2) "Facility Operating limitations in the tech specs and their basis". Justification for SRO level lies in the fact that the candidate cannot successfully answer this question without the knowledge contained in the Basis of SLC 16.9.3. In that basis, the 1A D/G room is identified as the only D/G room where Condition A is applied due to presence of redundant train equipment.

Examination Outline Cross-
reference:

Level

RO

SRO

X

Tier #

3

DRAFT

Group #

K/A #

G2.4.23

Importance Rating

4.4

Emergency Procedures/Plans

Knowledge of the basis for prioritizing emergency procedure implementation during emergency operations.

Proposed Question: SRO 93

1 Pt

A large break LOCA is in progress and the operators are responding in E-1 (*Loss of Reactor or Secondary Coolant*). Given the following conditions:

- 1A ND pump is tagged out of service for maintenance.
- Containment pressure is 11 psig.
- FWST level is below the swap over setpoint.

When shifting to cold leg recirc using ES-1.3 (*Transfer to Cold Leg Recirc*), valve 1NI-184B (*1B ND Pump Suction From Cont Sump Isol*) fails to open. The operators implement ECA-1.1 (*Loss of Emergency Coolant Recirculation*).

Which ONE (1) of the following describes how the NS pumps are operated in this condition and the basis for that operation?

- A. Both NS pumps will operate because a total loss of ND causes the NS system to become relatively more important in reducing containment pressure.
- B. One NS pump will operate because this conserves FWST water level while providing sufficient NS flow to reduce containment pressure.
- C. Both NS pumps will operate because FR-Z.1 was implemented in response to an orange path and FRPs have priority over ECA procedures
- D. One NS pump will operate because ECA-1.1 has priority as long as containment pressure remains below Red Path criteria.

Proposed Answer: **B**

Explanation (Optional):

- A. **Incorrect:** See explanation above. **Plausible** because Containment pressure is near the Containment design pressure.
- B. **Correct.**
- C. **Incorrect:** See explanation above. **Plausible** because both NS pump would be run Containment pressure greater than 3 psig if ECA-1.1 were not in effect.
- D. **Incorrect:** See explanation above. **Plausible** because ECA-1.1 does have priority but not for the reason stated. This statement is plausible because after Containment pressure is checked less than 15 PSIG (Red Path criteria) the remainder of FR-Z.1 is performed as a Yellow Path EP.

Technical Reference(s)	FR-Z.1, Response to Containment High Pressure rev. 14 page 4.	(Attach if not previously provided)
	<u>Lesson Plan OP-MC-EP-FRZ, Containment rev. 17 page 25</u>	(Including version or revision #)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: OP-MC-EP-FRZ Objective 4 (As available)

Question Source: Bank # EPFRZN02
 Modified Bank # _____ (Note changes or attach parent)
 New _____

Question History: Last NRC Exam Nadeau Retake Exam

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

10 CFR Part 55	55.41	
Content:		
	55.43	<u>43.5</u>

Comments:

Emergency Procedures/Plans

Knowledge of the basis for prioritizing emergency procedure implementation during emergency operations.

KA is matched because the candidate must know how the NS pumps are operated in FR-Z.1 (i.e. IAW ECA-1.1 if that procedure is in effect) and the basis for why ECA-1.1 takes priority over a Functional Restoration Guideline.

Examination Outline Cross-reference:	Level	RO	SRO
			X
DRAFT	Tier #	_____	<u>2</u>
	Group #	_____	<u>2</u>
	K/A #	<u>072A2.02</u>	
	Importance Rating	_____	<u>2.9</u>

Area Radiation Monitoring

Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, us procedures to correct, control, or mitigate the consequences of those abnormal operation:

Detector failure

Proposed Question: SRO 94

1 Pt Given the following conditions:

- Unit 1 is operating at 25% RTP
- Reactor Power input for 1EMF-71 thru74 (Unit 1 Steam Line N-16 Monitors) has failed to 100% power.

Based on the conditions above, the alarm setpoints for 1EMF-71 thru 74 are (1) for current plant conditions. Per SLC 16.7.6 (Radiation Monitoring for Plant Operations) basis, the MINIMUM sensitivity required to ensure that the monitors remain OPERABLE is (2).

- (1) lower than normal
(2) 30 GPD
- (1) lower than normal
(2) 125 GPD
- (1) higher than normal
(2) 30 GPD
- (1) higher than normal
(2) 125 GPD

Proposed Answer: **C**

Explanation (Optional):

At 40% power or less the N-16 monitors will alarm at 10 CPM above background. Due to much longer loop transport times at lower power, N-16 has more time to decay prior to reaching the area in the main steam lines adjacent to the monitors. Therefore, the alarm setpoint for a 5 GPD leak must be lower than for 100% power to ensure accuracy. The alarm setpoint at 100% power is 100 CPM above background.

IAW with SLC 16.7.6 (Radiation Monitoring for Plant Operations) basis, the minimum sensitivity for the N-16 monitors to remain operable is 30 GPD. With the power input to the setpoint algorithm failing high this is non-conservative and may affect the operability of the monitor.

- A. **Incorrect:** See explanation above. **Plausible** if the candidate does not understand the relationship between loop transport times, N-16 decay, and alarm setpoints. The required sensitivity is correct.
- B. **Incorrect:** See explanation above. **Plausible** if the candidate does not understand the relationship between loop transport times, N-16 decay, and alarm setpoints. The 125 GPD sensitivity is plausible because the Tech Spec limit on SG tube leakage and is a limit listed in AP-10 (NC System Leakage Within the Capacity of Both NV Pump, Case 1, S/G Tube Leakage).
- C. **Correct.**
- D. **Incorrect:** See explanation above. **Plausible** since the alarm setpoint is higher than normal. Additionally, the 125 GPD sensitivity is plausible because the Tech Spec limit on SG tube leakage and is a limit listed in AP-10 (NC System Leakage Within the Capacity of Both NV Pump, Case 1, S/G Tube Leakage).

Technical
Reference(s)

OP-MC-WE-EMF rev 29
pages 45 and 47

(Attach if not previously
provided)

SLC 16.7.6 (Radiation
Monitoring for Plant
Operations) rev 99 page
16.7.6-5

(Including version or
revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-WE-EMF, Obj. 2 & 10 (As available)

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

Question History: Last NRC Exam 2008 McGuire NRC Exam

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

10 CFR Part 55 Content: 55.41
 55.43 43.5

Comments:

Area Radiation Monitoring

Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, us procedures to correct, control, or mitigate the consequences of those abnormal operation:

Detector failure

KA is matched because candidate must understand the operation of the Steam Line Area N-16 monitors to be able to predict the impact of the detector circuitry failure. Knowledge of SLC 16.7.6 and its basis allows the candidate to control the consequences of the failure.

This is an analysis level question since the candidate must analyze the impact of the power input to the detector circuitry failing high to determine the effect on the alarm setpoint.

This is an SRO Only question linked to 10CFR55.43(b)(5). This question can NOT be answered using system knowledge alone. It can NOT be answered by knowing immediate actions or procedure entry conditions. To correctly answer this question the candidate must assess plant conditions and then decide which procedure (if any) should be implemented.

Examination Outline Cross-reference:	Level	RO	SRO
			X
DRAFT	Tier #	_____	<u>2</u>
	Group #	_____	<u>1</u>
	K/A #	<u>063A2.02</u>	_____
	Importance Rating	_____	<u>3.1</u>

DC Electrical Distribution:

Ability to (a) predict the impacts of a (Loss of ventilation during battery charging) on the (DC Electrical Distribution) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of that abnormal operation.

Proposed Question: SRO 95

1 Pt Given the following conditions:

- Unit 1 is at 100% RTP
- Battery EVCB is aligned for an equalize charge

OTG Supervisor has just reported that both Battery Room Exhaust fans are inoperable due to low fan capacity. The measured air flows through the battery rooms are below required values.

Which ONE (1) of the following correctly describes the action(s) according to SLC 16-9-23 (Switchgear Room Ventilation System) and the SLC basis for those actions?

- Immediately suspend the EVCB equalize charge ONLY. This is done to prevent H2 concentration from exceeding the 6% flammability limit.
- Immediately suspend the EVCB equalize charge ONLY. This is done to prevent H2 concentration from exceeding the 2% battery room design operating limit.
- Immediately suspend the EVCB equalize charge AND Lock open all BR-XF Check Dampers. This is done to prevent H2 concentration from exceeding 6% flammability limit.
- Immediately suspend the EVCB equalize charge AND Lock open all BR-XF Check Dampers. This is done to prevent H2 concentration from exceeding the 2% Battery room design operating limit.

Proposed Answer: **D**

Explanation (Optional):

Per SLC 16.9.23, should the battery room exhaust fans become inoperable, Condition D requires all BR-XF check dampers be locked open. If the battery room flow requirements are not met, Condition G requires the immediate suspension of all battery equalize charging.

Per SLC 16.9.23 Basis, these actions are performed to prevent exceeding 2% H2 concentration in the battery rooms.

- A. **Incorrect:** See explanation above. Both actions are required. **Plausible** because suspending the battery charge is the correct action for the inoperability of the BX fans. Also, 6% is the flammability limit for H2 but not the basis for the actions required by this SLC.
- B. **Incorrect:** See explanation above. Both actions are required. **Plausible** because suspending the battery charge is the correct action for the inoperability of the BX fans and the basis given is correct.
- C. **Incorrect:** See explanation above. H2 concentration given as the basis is incorrect. **Plausible** because the actions given are correct and the limit on H2 is correct for flammability but consistent with the basis.
- D. **Correct.**

Technical Reference(s)	SLC 16.9.23, Switchgear Room Ventilation System and Basis (Rev 88)	(Attach if not previously provided)
		(Including version or revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-PSS-VC Obj: 10 (As available)

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

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 43.5

Comments:

DC Electrical Distribution:

Ability to (a) predict the impacts of a (Loss of ventilation during battery charging) on the (DC Electrical Distribution) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of that abnormal operation.

KA is matched because the conditions given represent a loss of ventilation during a battery charge. The impact on the DC electrical distribution system will be a challenge to the battery room atmosphere H2 concentration which the candidate is required to evaluate per the basis on SLC 16.9.23 and the inability to continue the equalize charge on the battery. The action required to mitigate the consequences of this failure are per the immediate actions contained in Condition D along with Condition G which the candidate is required to recall from memory that both actions are required.

This question is comprehension level because the candidate must understand that based on the Battery Room fan inoperability, two distinct and separate remedial actions from the SLC are required.

This Question is linked to 10CFR55.43 (B) (2) "Facility operating limitations in the tech specs and their basis" Justification for SRO level lies in the fact that the candidate cannot successfully answer this question without the knowledge contained in the Basis of SLC 16.9.23. Also the candidate is required to recall remedial actions contained in the SLC.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

1

Group #

1

K/A #

025AA2.07

Importance Rating

3.7

Loss of RHR System

Ability to determine and interpret the following as they apply to ABNORMAL PLANT EVOLUTION:

Pump Cavitation

Proposed Question: SRO 96

1 Pt

Given the following initial conditions:

- Unit 1 is in Mode 6
- NC system is mid-loop at +10"
- Both ND trains are in operation
- NC system temperature is 190°F
- ND system flow rate is 2000 GPM

Current (amps) indication for both ND pumps begins to fluctuate.

Which ONE (1) of the following describes the condition that is causing the abnormal indications and the actions taken in accordance with AP-19 (Loss of ND or ND System Leakage) to mitigate the problem?

- A. ND pumps are cavitating.
Reduce the ND system flow rate.
- B. ND pumps are cavitating.
Stop both ND pumps.
- C. ND pumps are operating at a runout condition.
Reduce ND system flow rate.
- D. ND pumps are operating at a runout condition.
Stop both ND pumps.

Proposed Answer: **B**

Explanation (Optional):

If the ND pumps were experiencing runout, the current indication would be high but would not be fluctuating. After AP-19 is entered and actions are taken to determine if a leak in the system exists, a check for excessive system flow rate is made prior to checking for pump cavitation. If system flow rate is greater than 3000 gpm, actions are taken to reduce system flow rate to less than 3000 gpm. Next, a check is made to see if the ND pump(s) are cavitating. If the pumps are cavitating, both ND pumps are stopped.

- A. **Incorrect:** See explanation above. **Plausible** if the candidate does not understand that for the current plant conditions, the flow rate provided is not excessive. If the candidate believes that the flow rate is high that reducing flow rate would correct the cavitation problem.
- B. **Correct.**
- C. **Incorrect:** See explanation above. **Plausible** if the candidate believes that the flow rate is high for current plant conditions. If so, it is reasonable to believe that the pumps are in a runout condition and that reducing flow rate would correct the runout condition.
- D. **Incorrect:** See explanation above. **Plausible** if the candidate believes that the flow rate is high for current plant conditions. If so, it is reasonable to believe that the pumps are in a runout condition and that stopping the pumps to protect them from damage.

Technical Reference(s)	AP/1/A/5500/19, Loss of ND or ND System Leakage, rev. 19, pages 3-6	(Attach if not previously provided)
	_____	(Including version or revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-AP-19, Obj 1 and 2 (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 43.5

Comments:

Loss of RHR System
 Ability to determine and interpret the following as they apply to ABNORMAL PLANT EVOLUTION:
 Pump Cavitation

KA is matched because the candidate must understand the indications of pump cavitation and must understand the mitigating strategy for pump cavitation contained in AP-19.

This question is comprehension level because the candidate must make a determination that the pump is cavitating based on the report from the AO since most of the given parameters suggest that conditions conducive to cavitation do not exist.

This question is raised to the SRO only level by the fact that the candidate can not answer the question by systems knowledge, immediate actions, or entry conditions alone. The candidate must have knowledge of the mitigating strategy in the procedure to answer the question.

Examination Outline Cross-reference:	Level	RO	SRO
			X
	Tier #	_____	2
DRAFT	Group #	_____	1
	K/A #	078A2.01	_____
	Importance Rating	_____	2.9

Instrument Air

Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

Air dryer and filter malfunctions

Proposed Question: SRO 97

1 Pt Given the following:

- The VI system on Unit 1 has become heavily contaminated with oil due to a maintenance problem
- The VI Air Dryer packages rapidly clog

Based on the conditions listed above, which ONE (1) of the following describes the impact on VI system operation AND the actions directed by AP-22 (Loss if VI) to mitigate the consequences of the malfunction?

- VI header pressure will decrease until 1VI-1812 (VI Air Dryer Bypass Filter Isol) automatically opens at 85 PSIG resulting in a VI header pressure increase. As a backup to the automatic action, AP-22 directs the operators to bypass the air dryers locally at 82 PSIG.
- VI header pressure will decrease until 1VI-1812 (VI Air Dryer Bypass Filter Isol) automatically opens at 90 PSIG resulting in a VI header pressure increase. As a backup to the automatic action, AP-22 directs the operators to bypass the air dryers locally at 85 PSIG.
- VI header pressure will decrease until 1VI-820 (VI to VS Supply) automatically closes at 85 PSIG resulting in a VI header pressure increase. As a backup to the automatic action, AP-22 directs the operators to manually close 1VI-820 at 82 PSIG.
- VI header pressure will decrease until 1VI-820 (VI to VS Supply) automatically closes at 90 PSIG resulting in a VI header pressure increase. As a backup to the automatic action, AP-22 directs the

operators to manually close 1VI-820 at 85 PSIG.

Proposed Answer: **A**

Explanation (Optional):

With the air dryers clogged, reducing the air load on the system by VI-820 closing will reduce the rate of the VI header pressure decrease. However, since VI-820 is downstream of the air dryers the only automatic action which may be successful in restoring VI header pressure is bypassing the air dryers. With the manual bypass flowpath isolated (1VI-93 closed), the automatic bypass must open to restore header pressure.

1VI-1812 automatically opens when VI header pressure decreases to 85 psig. AP-22 directs the Operators to bypass the air dryers locally using Enclosure 5 if VI header pressure decreases to less than 82 psig. Enclosure 5 has the Operator check that 1VI-1812 is open and has the operator open the manual bypasses (should normally be open) 1VI-93 and 1VI-94 (in series).

- A. **Correct.**
- B. **Incorrect:** See explanation above. 1VI-1812 automatically opens at 85 psig and the procedure actions are directed when VI header pressure decreases to 82 psig. **Plausible** because there are automatic actions which occur when VI header pressure decreases to 90 psig (1VI-820 closes) and 1VI-1812 automatically opens at 85 psig.
- C. **Incorrect:** See explanation above. **Plausible** because 1VI-820 will slow the rate of pressure decrease and there are automatic actions which occur at 85 psig (1VI-1812 opens).
- D. **Incorrect:** See explanation above. 1VI-820 closing will not restore VI header pressure. **Plausible** because 1VI-820 will slow the rate of pressure decrease and 1VI-820 does automatically close when VI header pressure decreases to 90 psig.

Technical
Reference(s)

AP/1/A/5500/22, LOSS OF VI, rev. 28 page 3 (Attach if not previously provided)
 Lesson Plan OP-MC-SS-VI, Instrument Air, Station Air, Breathing Air rev. 32 (Including version or revision #)
 page 193 (Figure 7.27- VI System Composite)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-AP-22, Obj 2 and 4 (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 43.5

Comments:

Instrument Air

Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

Air dryer and filter malfunctions

KA is matched because the candidate must understand the operation of the system to diagnose which automatic action will be successful in restoring VI header pressure and must also be familiar with the procedure mitigating strategy to determine which procedure actions are appropriate as directed by AP-22.

This question is comprehension level because the candidate must understand which of two possible automatic actions that could occur would be effective at allow VI header pressure to be restore.

This is an SRO Only question linked to 10CFR55.43(b)(5), Procedures. This question can NOT be answered with system knowledge alone. It can NOT be answered by knowing procedure immediate actions or entry conditions. To correctly answer the question the candidate must have knowledge of specific procedural steps.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

1

Group #

1

K/A #

027AA2.03

Importance Rating

3.4

Pressurizer Pressure Control System Malfunction: Ability to determine and interpret the following as they apply to
ABNORMAL PLANT EVOLUTION:

Effects of RCS pressure changes on key components in plant.

Proposed Question: SRO 98

1 Pt

Given the following initial conditions:

- Unit 2 was operating at 100% RTP
- Pressurizer Pressure Control switch is in the '1-2' position

Subsequently, the following conditions are observed:

- NC pressure increases
- Pressurizer PORVs 2NC-32B and 2NC-36B open at 2335 PSIG
- Pressure modulates between 2315 PSIG and 2335 PSIG

Which ONE (1) the following instrument failures would cause the conditions observed above and what is the correct operator action per AP-11 (Pressurizer Pressure Anomalies) and the basis for that action?

- PZR pressure channel I fails LOW
Swap controlling channels to remove the faulty channel from the master controller circuitry.
- PZR pressure channel I fails HIGH
Swap controlling channels to restore pressurizer pressure as quickly as possible.
- PZR pressure channel I fails LOW
Place Pressurizer Pressure Master in Manual at 50% demand to remove the controller wind-up prior to swapping channels.
- PZR pressure channel I fails HIGH
Place Pressurizer Pressure Master in Manual at 50% demand to prevent damage to the PORVs from lifting due to pressure cycles.

Proposed Answer: **C**

Explanation (Optional):

When Pressurizer Pressure Channel I fails low, all heaters will be fully on causing NC system pressure to increase. Pressure increases until PORVs 32 and 36 open at 2335 psig causing pressure to decrease. Pressure will cycle between 2335 and 2315 psig as the Pressurizer PORVs cycle.

- A. **Incorrect:** See explanation above. **Plausible** if the candidate diagnoses the correct channel but misdiagnoses the direction of the failure. Also, the basis is correct for that particular failure.
- B. **Incorrect:** See explanation above. **Plausible** if the candidate misdiagnoses the incorrect channel and direction of failure.
- C. **Correct.**
- D. **Incorrect:** See explanation above. **Plausible** if the candidate diagnoses the correct direction of the failure but mistakenly identifies the wrong controlling channel. Also, the basis statement is technically correct. However, it is not the actual basis for performing the action.

Technical Reference(s)	Lesson Plan OP-MC-PS-IPE, rev. 27, page 35	(Attach if not previously provided)
	<u>AP/1/A/5500/11, Pressurizer Pressure Anomolies, rev. 10, pages 2 and 8</u>	(Including version or revision #)

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-PS-IPE, Obj. 12 (As available)

Question Source: Bank # PSIPEN013
 Modified Bank # _____ (Note changes or attach parent)
 New _____

Question History: Last NRC Exam

Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	<u>X</u>
10 CFR Part 55 Content:	55.41	
	55.43	<u>43.5</u>

Comments:

Pressurizer Pressure Control System Malfunction: Ability to determine and interpret the following as they apply to ABNORMAL PLANT EVOLUTION:
Effects of RCS pressure changes on key components in plant.

KA is matched because the candidate must comprehend how various Pressurizer pressure malfunctions affect the plant and the mitigating strategy and basis for steps taken to correct the malfunction.

This question is analysis level because the candidate must evaluate multiple indications to determine which channel failed and the direction of the failure.

This is an SRO Only question linked to 10CFR55.43(b)(5), Procedures. This question can NOT be answered with systems knowledge alone. It can NOT be answered by knowing immediate actions or procedure entry conditions. To correctly answer this question the candidate must have knowledge of a specific procedural step and the basis for performing that step.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

Tier #

1

Group #

1

K/A #

062AG2.1.31

Importance Rating

4.3

Loss of Nuclear Service Water:

Generic : Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.

Proposed Question: SRO 99

1 Pt

Unit 1 is operating at 100% RTP with Train B components in service.

Given the following conditions and indications:

- 1RN-40A (Train A to Non-Ess Hdr Isol) Open
- 1RN-252B (RB Non Ess Supply Outside Isol) Closed
- 1RN-253A (RB Non Ess Supply Inside Isol) Open
- 0RN-302B (RV Supply from LLI) Closed
- 1RN-64A (AB Non-Ess Return Isol) Closed
- RN Indicated flow and discharge pressures are normal

Which ONE (1) of the following conditions correctly describes the cause of this condition and what would be the correct response of the operating crew?

- A. Spurious Safety Injection (Ss) on "B" Train:
Initiate a Train "A" Safety Injection to ensure complete valve alignment, go to E-0 (Reactor Trip or Safety Injection).
- B. Spurious Phase "B" (Sp) Actuation on "B" Train:
Initiate the "A" Train Phase B Isolation to ensure complete valve alignment go to AP-20 (Loss of RN)
- C. Spurious Safety Injection (Ss) on "B" Train:
Crew should NOT initiate Train "A" Safety Injection, go to E-0 (Reactor Trip or Safety Injection)
- D. Spurious Phase "B" (Sp) Actuation on "B" Train:
Crew should NOT initiate Train "A" Phase "B", go to AP-20 (Loss of RN)

Proposed Answer: **D**

Explanation (Optional):

The Nuclear Service Water indication given in the stem are indicative of single train (B) Phase B isolation. 1RN-252B would isolate the RB Non-essential header creating a challenge to continued plant operation due to loss of stator cooling. 0RN-302B would isolate the suction to the RV (Containment Cooling) pump which would not be good for the pumps but would not represent an immediate challenge to plant operation. The other valves listed are in their correct positions for normal operations but would be closed if a Spurious SI had occurred and would be the basis for determining distracters A and B are incorrect. Also RN flows would be high and pressure low if a SI had occurred.

An inadvertent single train Phase B isolation would not result in a Reactor trip nor would there be an immediate need to initiate one. The crew would have approximately 18 minutes without taking any action before the NC Pumps stator temperatures reach trip value. There are other plant effects but the loss of RN to containment represents to most immediate challenge and AP-20 (Loss of RN) would restore this alignment and preclude the need to trip the reactor.

- A. **Incorrect:** See explanation above. **Plausible** because the candidate could misinterpret the valve positions given, 1RN-64A only closes on an SI but is normally maintained closed at power. Also the response given is correct had the event been an SI. It is the expectation for a single train actuation for the crew to manually initiate the other train.
- B. **Incorrect:** See explanation above. The crew actions are not correct. Per OMP 4-3, Phase B should not be initiated earlier than required and would only serve to complicate the recovery. **Plausible** because the RN valve positions are correct for the cause given but the actions are wrong. The candidate may assume that for a single train phase B, the remaining train would be manually initiated. This would be consistent for a SI response.
- C. **Incorrect:** See explanation above. Wrong event, wrong action. **Plausible** See explanation above. the candidate could misdiagnose the event and believe that actuation of the second train of SI would only complicate the recovery.
- D. **Correct.**

Technical
Reference(s)

Lesson Plan OP-MC-PSS-
RN, Nuclear Service Water
System (Rev 42) Pg 33 &
35

(Attach if not previously
provided)

OMP 4-3, Use of Abnormal
and Emergency
Procedures (Rev 29)
Section 7.5 (Pg 8)

(Including version or revision
#)

Proposed references to be provided to applicants during
examination:

None

Learning Objective:

OP-MC-PSS-RN Obj: 10

(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:

Loss of Nuclear Service Water:

Generic : Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.

KA is matched because the candidate must evaluate a give set of control room indications determine if they are consistant with the line up for a specific isolation signal. The lineup given represents a Loss of Nuclear Service Water to the Reactor Building.

The Analysis Cog level is justified because the candidate is expected to evaluate multiple plant indications and determine the initiating event that would have resulted in the given alignment.

This Question is linked to 10CFR55.43 (b)(5) "Procedures". Justification for SRO level is that system knowledge alone is not enough to determine the correct answer. The question requires the candidate to assess plant conditions and recall specific actions required which are not simply entry conditions or immediate actions and requires an evaluation of overall plant conditions to determine the correct actions and procedure to implement.

Examination Outline Cross-
reference:**DRAFT**

Level

RO

SRO

X

X

Tier #

1

Group #

1

K/A #

007EG2.4.35

Importance Rating

4.0

Reactor Trip – Stabilization – Recovery:

Generic : Knowledge of local auxiliary operator tasks during emergency and the resultant operational effects

Proposed Question: SRO 100

1 Pt

Both Units are operating at 100% RTP.

A Switchyard relay malfunction results in the following conditions:

- A complete Loss of Offsite Power occurred on Unit 1
- Both DGs started and loaded as designed
- 1A D/G subsequently Trips on overspeed
- When the CRS reaches Step 17 of ES 0.1 (Reactor Trip Response), the decision is made to implement AP-07 (Loss of Electrical Power)

Which ONE (1) of the following correctly describes the Time Critical local operator actions associated with AP-07?

- A. Implement Enc. 7 (DC Bus Alignment) to realign Battery Charger EVCA to Unit 2 within one hour to prevent the loss of Battery EVCA.
- B. Implement Enc. 7 (DC Bus Alignment) to realign Battery EVCA to Battery Charger EVCS within one hour to prevent the loss of Battery EVCA.
- C. Implement Generic Enc. 13 (VC and VA System Operation) to restart the Train A VC/YC Chiller within 37.5 minutes to provide cooling to the C/R.
- D. Implement Generic Enc. 13 (VC and VA System Operation) to swap Train A VC/YC Chiller power and water to Unit 2 and restart chiller within 1 hour and 15 min to provide cooling to the C/R.

Proposed Answer: **A**

Explanation (Optional):

In the scenario described, Battery Charger EVCA would be off due to the tripped D/G 1A. Step 17 directs the implementation of AP-07 Enc. 7 which provides direction for local actions to align EVCA Battery Charger to U-2 and restart the charger. This is required to be complete within one hour to prevent loss of the battery which is designed to provide power for one hour.

- A. **Correct.**
- B. **Incorrect:** See explanation above. Battery charger EVCS would only be utilized if it was aligned to the battery prior to the event. This would only be true if Battery Charger was out of service which is not indicated in the initial conditions. **Plausible** because it is the correct Enclosure, time frame and action if EVCS was in service. EVCS charger can be powered from either unit and be aligned any vital battery so without familiarity with this enclosure this would seem a local course of action.
- C. **Incorrect:** See explanation above. The Train A VC/YC Chiller is normally powered from U-1 "A" Train Vital bus which is deenergized due to the failed 1A D/G. **Plausible** because it is the correct enclosure, correct action and Time requirement if the A VC/YC was available. This chiller can be powered from U-2 but is normally aligned to U-1.
- D. **Incorrect:** See explanation above. Train A VC/YC power and water only need to be swapped if a station blackout has occurred and that both D/G's on one unit fail. **Plausible** because Step 17 of AP-17 directs implementation of this Enclosure within 30 min and should the event be consistent with the need to perform this action, the enclosure and time requirements are correct.

Technical Reference(s)	AP-07, Loss of Electrical Power Bkgd (Rev 6) Pgs 14 & 15	(Attach if not previously provided)
	AP/1/A/5000/07, Loss of Electrical Power (Rev 27A), page 9	(Including version or revision #)
	EP/1/A/5000/G-1, Generic Enclosure 1 (Rev 24)	

Proposed references to be provided to applicants during examination: None

Learning Objective: OP-MC-AP-07 Obj: 2 (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:

Reactor Trip – Stabilization – Recovery:

Generic : Knowledge of local auxiliary operator tasks during emergency and the resultant operational effects

K/A is matched the question is addressing actions required to recover from a reactor trip due to a LOOP associated with Unit 1 as directed by ES 0.1 and AP-7. In order to successfully answer the question the candidate is required to have a detailed knowledge of local Time Critical operator actions directed by these procedures along with the associated operational implications of not performing those actions within the given time constraints.

The analysis cog level is justified because the candidate must evaluate a given plant scenario, determine equipment availability and using procedural knowledge, determine the required course of action.

This Question is linked to 10CFR55.43 (b)(5) Procedures. Justification for SRO level is that system knowledge alone is not enough to determine the correct answer. The question requires the candidate to assess plant conditions and recall specific actions required which are not simply entry conditions or immediate actions and requires an understanding of the specific procedural requirements associated with two different enclosures and the associated basis for those actions.

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References

Table of Contents

The following references are provided:

- Copy of the Steam Tables
- RP/0/A/5700/000
- U-1 Data Book Curve 7.38
- U-1 Data Book Curve 1.10b