

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>003 A4.08</u>	<u> </u>
	Importance Rating	<u>3.2</u>	<u> </u>

Ability to manually operate and/or monitor in the control room: RCP cooling water supplies

Proposed Question: Common 1

Given the following information:

- Unit 1 is at full power.
- RCP Thermal Barrier Cooler CCW Return Isolation Valve 1-HV-4709 has failed closed.

Which ONE (1) of the following describes the effect on RCS temperatures, if any, as a result of this failure?

Reactor Coolant Pump...

- A. bearing temperatures will be unaffected.
- B. lower seal bearing temperature will rise on all RCPs.
- C. upper motor bearing temperatures will rise on all RCPs.
- D. lower motor bearing temperatures will rise on all RCPs.

Proposed Answer: A

Explanation (Optional):

- A. Correct. TBHX and other CCW flowpaths have a different return line, so other RCP cooling will not be affected. Additionally, seal injection flow is providing seal cooling.
- B. Incorrect. Different coolant flow path from same source –CCW.
- C. Incorrect. Different CCW coolant flow path.
- D. Incorrect. Seal leakoff will remain the same as seal injection flow has not changed. The TBHX purpose is to provide backup seal cooling to seal injection, so this will be unaffected.

Technical Reference(s) SYS.CC1, Figure 4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CC1.OB02 (As available)

Question Source: Bank # _____
Modified Bank # _____ (See parent in Comments)
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 7

Comments:
A.

Examination Outline Cross-reference:	Level	RO	SRO
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	Group #	1	_____
	K/A #	004 K1.02	_____
	Importance Rating	3.5	_____

Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: PZR and RCS temperature and pressure relationships

Proposed Question: Common 2

Given the following information:

- Unit 1 is solid.
- RCS temperature is 135°F.
- PK-131, LTDN HX OUT PRESS CTRL is in AUTO.
- RCS pressure is 100 psig.
- Pressurizer heaters are energized.
- The crew is drawing a steam bubble in the Pressurizer.

Which ONE (1) of the following describes how RCS pressure will be controlled as the Pressurizer heats up to saturation?

- A. PCV-131, LTDN HX OUT PRESS CTRL valve will open further.
- B. Additional 1-8149 A (B, C), LTDN ORIFICE ISOL VLVS are opened.
- C. The setpoint of PK-131, LTDN HX OUT PRESS CTRL, is adjusted to maintain the valve at its current position.
- D. FK-121, CCP FLO CTRL, is adjusted to match Charging to Letdown flow.

Proposed Answer: A

Explanation (Optional):

- A. Correct. With RCS temperature stable at greater than 130°F, the drawing of a steam bubble in the pressurizer is commenced. Pressurizer heaters are energized as necessary to establish a steady pressurizer heatup rate of less than 60°F per hour. The expansion of water in the pressurizer as water temperature increases will tend to raise RCS pressure. The opening of the letdown heat exchanger outlet pressure control valve holds pressure constant by removing excess water from the system.
- B. Incorrect. Letdown will be increased once the bubble is formed and pressurizer level is decreased.
- C. Incorrect. The setpoint is set to maintain system pressure and is not adjusted.
- D. Incorrect. Letdown and charging flow are not adjusted at this time.

Technical Reference(s) SYS.CS1, page 68 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CS1.OB12 (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 5, 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	005 A2.02	
	Importance Rating	3.5	

Ability to (a) predict the impacts of the following malfunctions or operations on the RHRs, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Pressure transient protection during cold shutdown

Proposed Question: Common 3

Given the following information:

- Unit 1 is solid, in MODE 4.
- RHR Train A is in the Shutdown Cooling Mode.
- The crew is preparing to alternate RHR trains in accordance with SOP-102A, Residual Heat Removal System.

Which ONE (1) of the following identifies:

- a.) The concern regarding the RHR or RCS?
 - b.) What action should be taken prior to starting RHR Pump 1-02?
- A. Excessive RHR system flow may occur.
The RHR Pump 1-01 should be stopped.
 - B. An RCS pressure transient may occur.
Secure CCW flow to Train B RHR Heat Exchanger 1-02.
 - C. An RCS pressure transient may occur.
Place 1-PK-131, LTDN HX OUT PRESS CNTRL in MANUAL.
 - D. Excessive RHR system flow may occur.
RHR flowrate should be reduced.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. The off-going pump is stopped after the on-coming pump is running.
- B. Incorrect. Plausible because of the solid plant condition, however, securing CCW flow to the HX prevents pump cooling on mini-flow which is undesirable.
- C. Correct. Per SOP-102A, Starting or stopping an RHR pump when the RCS is water solid will cause a pressure excursion in the RCS. Pressure should be controlled by using 1-PK-131 in "MANUAL".
- D. Incorrect. Flowrate is not adjusted when the pump is started.

Technical Reference(s) SOP-102A, Section 5.6, pg. 42 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.RH1.OB18 (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 5, 10

Comments:

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	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>005 K3.07</u>	<u> </u>
	Importance Rating	<u>3.2</u>	<u> </u>

Knowledge of the effect that a loss or malfunction of the RHRS has on the following: Refueling operations

Proposed Question: Common 4

With a Core offload is in progress in accordance with RFO-102, Refueling Operation.

Which ONE (1) of the following will prevent the water above the core from boiling if a running RHR pump trips?

- A. Maintaining greater than 23 feet of water above the Reactor vessel flange.
- B. Requiring both trains of RHR to be OPERABLE during refueling.
- C. Waiting to begin core offload for at least 100 hours after shutdown.
- D. Placing both trains of RHR in service prior to the start of refueling.

Proposed Answer: A

Explanation (Optional):

- A. Correct. Per RFO-102, the basis for requiring one RHR loop >23 feet is to prevent the water above the core from boiling in the event of a loss of RHR cooling.
- B. Incorrect. This is a requirement if level is less than 23 feet.
- C. Incorrect. This is a SFP limitation.
- D. Incorrect. This is not a limitation.

Technical Reference(s) RFO-102, page 10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.RH1.OB18 (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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	006 A2.03	
	Importance Rating	3.3	

Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: System leakage

Proposed Question: Common 5

Given the following information:

- Unit 1 is at full power.
- Check valve leakage causes level and pressure alarms on ALB-4C for Accumulator 1.
- Accumulator 1 level is 65%.
- Accumulator 1 pressure is 680 psig.

Which ONE (1) of the following is:

- a.) The probable cause for both alarms?
 - b.) The appropriate actions that should be taken by the crew?
- A. High pressure is the probable cause for both alarms. Lower pressure first and then adjust level.
- B. High level is the probable cause for both alarms. Lower level first and then adjust pressure.
- C. High level is the probable cause for both alarms. Lower level until both alarms clear.
- D. High pressure is the probable cause for both alarms. Lower pressure until both alarms clear.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Level is adjusted first.
- B. Correct. Level is adjusted prior to pressure with levels done individually per SOP-202.
- C. Incorrect. Procedure adjusts until back in normal band. Pressure is addressed separately.
- D. Incorrect. Level is adjusted first and only until within band. Then pressure is adjusted. If level were decreased until both alarms cleared, the level could be low.

Technical Reference(s) SOP-202A, pages 4 and 20 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.SI1.OB28 (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 5, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	1	_____
	K/A #	007 A1.03	_____
	Importance Rating	2.6	_____

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Monitoring quench tank temperature

Proposed Question: Common 6

Unit 1 is at full power with the following Pressurizer Relief Tank parameters:

- Level is 74%.
- Pressure is 4 psig.
- Temperature is 125°F.

Which ONE (1) of the following actions should be taken because of the current Pressurizer Relief Tank conditions?

Pressurizer Relief Tank ...

- A. temperature should be lowered.
- B. level should be raised.
- C. pressure should be lowered.
- D. level should be lowered.

Proposed Answer: A

Explanation (Optional):

- A. Correct. Setpoint is 113°F.
- B. Incorrect. Level band is 64 to 88%.
- C. Incorrect. Pressure high is 8 psig.
- D. Incorrect. Level band is 64 to 88%.

Technical Reference(s) ALB-5B-2.3, 3.3, & 4.3 (Attach if not previously provided)
SOP-109A, Step 4.1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.RC1.OB02 (As available)

Question Source: Bank # X
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 10

Comments:
INPO Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>007 K1.05</u>	
	Importance Rating	<u>2.5</u>	_____

Ability to manually operate and/or monitor in the control room: Relationships between PZR level and changing levels of the PRT and bleed holdup tank

Proposed Question: Common 7

Unit 1 is at full power when DC power is lost to the solenoid valve for 1-8160, Letdown Containment Isolation Valve causing it to fail closed.

Which ONE (1) of the following describes the effect on Pressurizer, VCT and PRT level?

- A. Pressurizer and VCT level will decrease; PRT level will increase.
- B. VCT level will decrease; Pressurizer level will remain on program; PRT level will increase.
- C. Pressurizer level will increase; VCT level will decrease; PRT level will not change.
- D. Pressurizer level will remain on program; VCT level will remain the same; PRT level will increase.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Pressurizer level will remain the same (on program).
- B. Correct. Closing 1-8160 will cause the letdown relief valve 1-8117 to lift to the PRT causing level to increase. The capacity of the valve is enough to pass all letdown flow; therefore, pressurizer will remain on program. With letdown isolated, VCT level will decrease.
- C. Incorrect. PRT level will increase.
- D. Incorrect. VCT level will decrease.

Technical Reference(s) SYS.CS1, page 24 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CS1.OB10 (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 5, 7

Comments:

Bleed holdup tank interpreted to mean VCT.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	008 K1.05	
	Importance Rating	3.0	

Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: Sources of makeup water.

Proposed Question: Common 8

Given the following information:

- Unit 1 is at full power.
- All controls are in AUTO.
- No equipment is out of service.
- Unit 1 CCW Surge Tank is being filled using Reactor Makeup Water Pump 1-01.

When VCT level decreases to 46%, which ONE (1) of the following could occur?

- A. Inadvertent RCS dilution.
- B. Inadvertent RCS boration.
- C. VCT level continues to lower.
- D. CCW surge tank level starts to lower.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. The SOP caution states inadvertent boration could occur.
- B. Correct. The makeup to the VCT will not have sufficient pure water and may be filled with borated water. This could result in RCS boration.
- C. Incorrect. Plausible because pressure may be insufficient when filling two tanks.
- D. Incorrect. Plausible because pressure may be insufficient when filling two tanks.

Technical Reference(s) SOP-502A, Section 5.2.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CC1.OB02 (As available)

Question Source: Bank # SYS.CC1.OB02-10
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 6, 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>010 A1.08</u>	<u> </u>
	Importance Rating	<u>2.7</u>	<u> </u>

Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: Pressure detection systems

Proposed Question: Common 9

Given the following conditions:

- Unit 1 is in MODE 4.
- RCS temperature is 250°F.
- RCS Wide Range Pressure Transmitter 1-PT-405 is out of service and the associated train of LTOP is removed from service.
- RCS pressure transmitter 1-PT-403 fails LOW.

Which ONE (1) of the following statements describes the consequence of the 1-PT-403 failure?

- A. 1-PCV-456, PRZR PORV will open and depressurize the RCS.
- B. 1-PCV-455A, PRZR PORV will open and depressurize the RCS.
- C. All RCS Low Temperature Overpressure Protection via the PORVs will be lost.
- D. RCS Low Temperature Overpressure Protection will still be provided by 1-PCV-455A, PRZR PORV.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. With PT-403 failed low, PCV-456 will not function.
- B. Incorrect. PT-405 for Train A PCV-455A, which is out of service.
- C. Correct. LTOP uses auctioneered low WR RCS temperature, PT-405 for Train A and PT-403 for Train B. When PT-403 fails, no PORVs will automatically open.
- D. Incorrect. PCV-455A is not available due to PT-405 out of service.

Technical Reference(s) SYS.PP2, Pages 10 and 11 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.PP2.OB10 (As available)

Question Source: Bank # SYS.PP2.OB10-17
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 5, 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>010 A1.08</u>	<u> </u>
	Importance Rating	<u>3.2</u>	<u> </u>

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR PCS controls including: Spray nozzle DT

Proposed Question: Common 10

Which ONE (1) of the following includes the values and parameters used by the operator to ensure the temperature difference between the Pressurizer and the spray fluid is within the specified limit when initiating Normal Pressurizer spray?

The ΔT limit is between RCS leg and PRZR vapor space temperature.

- A. 320°F; cold
- B. 625°F; hot
- C. 625°F; cold
- D. 320°F; hot

Proposed Answer: A

Explanation (Optional):

- A. Correct. Tap for spray is off the cold leg; ΔT limit for normal spray is 320°F.
- B. Incorrect. Tap is off the cold leg and ΔT limit for auxiliary spray is 625°F.
- C. Incorrect. ΔT limit for auxiliary spray is 625°F.
- D. Incorrect. Tap is off the cold leg.

Technical Reference(s) IPO-001A, page 11 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: IPO.XO5.OB01 (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 7, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
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	Group #	<u>1</u>	_____
	K/A #	<u>012 A3.05</u>	_____
	Importance Rating	<u>3.6</u>	_____

Ability to monitor automatic operation of the RPS, including: Single and multiple channel trip indicators

Proposed Question: Common 11

A plant heatup is in progress. RCS pressure is being raised and indicates as follows:

- PT-455 – 1970 psig
- PT-456 – 1950 psig
- PT-457 – 1950 psig
- PT-458 – 1970 psig

Which ONE (1) of the following should be the light status of 1-TSLB-9, PRZR PRESS SI PERM and PCIP-2.6, PRZR PRESS SI BLK PERM P-11?

- A. 2 of 4 bistable lights lit and PCIP light will be lit.
- B. 2 of 4 bistable lights lit and PCIP light will be out.
- C. 1 of 3 bistable lights lit and PCIP light will be lit.
- D. 1 of 3 bistable lights lit and PCIP light will be out.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. The input is 2/3; PT-458 is not used.
- B. Incorrect. The input is 2/3; PT-458 is not used.
- C. Correct. P-11 PCIP is lit when RCS pressure as sensed by 2/3 channels (PT-455, 456 and 457) are less than 1960 psig. One channel is greater than 1960 – its TSLB will be lit.
- D. Incorrect. PCIP will be lit.

Technical Reference(s) SYS.PP1, page 19 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.PP1.OB07 (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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
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	Group #	<u>1</u>	<u> </u>
	K/A #	<u>013 K2.01</u>	<u> </u>
	Importance Rating	<u>3.6</u>	<u> </u>

Knowledge of bus power supplies to the following: ESFAS/safeguards equipment control

Proposed Question: Common 12

Which ONE (1) of the following describes the effect that a loss of 1EC1 has on the Diesel Generators (DG)?

- A. Train A DG will NOT start following a Safety Injection.
- B. Train B DG will NOT start following a loss of power to 1EA2.
- C. If Train A DG is running in the Normal Mode, an 86-2 Lockout will actuate causing the DG to trip.
- D. If Train B DG is running in the Normal Mode, an 86-2 Lockout will actuate causing the DG to trip.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Sequenced Safeguards signal will not be disabled with loss of 1EC1.
- B. Incorrect. 1EC1 lockout will not affect B EDG. LOOP signal (undervoltage) will be from Bus 1EA2.
- C. Correct.
- D. Incorrect. Plausible if the loss of power was on 1EC2.

Technical Reference(s) ABN-603, Step 3.1.e (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.ES4.OB07 (As available)

Question Source: Bank # SYS.ES4.OB07-03
 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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	013 A2.06	
	Importance Rating	3.7	

Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based Ability on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations; Inadvertent ESFAS actuation

Proposed Question: Common 13

Given the following conditions:

- A Main Steam Line Break outside Containment occurs.
- The Reactor Operator trips the Reactor, actuates Safety Injection, and inadvertently turns a single Containment Spray Actuation switch to ACTUATE.

Which ONE (1) of the following describes the effect on continued RCP operation?

- A. A loss of CCW cooling to the RCPs occurs; the operator should immediately trip all RCPs.
- B. Two Containment Spray pumps are providing Containment Spray flow; the RCPs may continue to run
- C. Four Containment Spray pumps are providing Containment Spray flow; the operator should immediately trip all RCPs.
- D. There is no Containment Spray flow and CCW isolation has not occurred; the RCPs may continue to run.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Phase B requires both switches.
- B. Incorrect. Requires both switches and would start all 4 pumps.
- C. Incorrect. Requires both switches.
- D. Correct. Spray and Phase B requires 2 of 2 switches at 1 of 2 locations.

Technical Reference(s) SYS.ES1, page 90 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CT1.OB09 (As available)

Question Source: Bank # _____
 Modified Bank # SYS.CT1.OB09-07 (See parent in Comments)
 New _____

Question History: Last NRC Exam _____

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

10 CFR Part 55 Content: 55.41 7

Comments:

A Main Steam Line Break Accident outside Containment occurs. The Reactor Operator trips the Reactor, actuates Safety Injection, and inadvertently turns a single Containment Spray Actuation switch. Which of the following correctly describes the automatic actions that will take place? (Answer: A)

- A. All four Containment Spray Pumps will start, Containment Ventilation Isolation will occur, Phase B Containment Isolation will NOT occur, and NO spray flow will occur.
- B. All four Containment Spray Pumps will start, Containment Ventilation Isolation and Phase B Containment Isolation will occur, and a single train of spray flow commences.
- C. Only two Containment Spray Pumps start, a single train of Containment Ventilation Isolation occurs, and Phase B Isolation and spray flow occurs.
- D. Only two Containment Spray Pumps start, Containment Ventilation Isolation occurs, and a single train of Phase B Isolation and spray flow occurs.

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	K/A #	<u>022 K1.02</u>	<u> </u>
	Importance Rating	<u>3.7</u>	<u> </u>

Knowledge of the physical connections and/or cause-effect relationships between the CCS and the following systems: SEC/remote monitoring systems

Proposed Question: Common 14

Control for a Containment Air Cooling and Recirculation fan has been transferred to the Remote Shutdown Panel.

Which ONE (1) of the following describes how the fan will respond to a Safety Injection or Blackout Sequencer signal?

- A. The fan will trip on a Safety Injection. The fan will not start on a Blackout Sequencer signal.
- B. The fan will not trip on a Safety Injection. The fan will start on a Blackout Sequencer signal.
- C. The fan will trip on a Safety Injection. The fan will start on a Blackout Sequencer Signal.
- D. The fan will not trip on a Safety Injection. The fan will not start on a Blackout Sequencer signal.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. BOS start is defeated.
- B. Incorrect. SI trip is defeated.
- C. Incorrect. This is the normal response if control is from the Control Room.
- D. Correct. If control is from the RSP, auto trip (SI) and start (BOS) is defeated.

Technical Reference(s) SYS.CL1 page 12 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CL1.OB07 (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 _____

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Comments:

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	K/A #	<u>022 A1.01</u>	<u> </u>
	Importance Rating	<u>3.6</u>	<u> </u>

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Containment temperature

Proposed Question: Common 15

Given the following conditions:

- Unit 1 is in MODE 1 with a normal Containment Cooling alignment.
- 1-TI-5400A, Containment Average Temperature indication is 103°F and rising.

Which ONE (1) of the following conditions is **most effective** at reducing Containment temperature $\leq 100^\circ\text{F}$?

- Start the non-operating Control Rod Drive Mechanism Fan Cooler.
- Start the non-operating Containment Recirculation Fan.
- Open the Chilled Water Return Valve for the non-operating Containment Recirculation Fan.
- Alternate Containment Recirculation Fans maintaining 3 fans running at all times.

Proposed Answer: B

Explanation (Optional):

- Incorrect. Plausible, however, this is a contingency only when < 3 Containment Recirculation Fans are available.
- Correct. Starting the non-operating fan is desired when maintaining air temp $\leq 100^\circ\text{F}$.
- Incorrect. This would be effective if the breaker were in disconnect which cause the fans associated damper to open, thereby allowing some reverse air flow with chill water aligned.
- Incorrect. Plausible as this condition is effective at mixing of noble gases from stagnant areas within Containment.

Technical Reference(s) ALB 3A-1.1, Steps 11 and 12. (Attach if not previously provided)
SOP-801A, Note 4.2

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CL1.OB14 (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 9, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>026 A4.01</u>	<u> </u>
	Importance Rating	<u>4.5</u>	<u> </u>

Ability to manually operate and/or monitor in the control room: CSS controls

Proposed Question: Common 16

Which ONE (1) of the following Containment Spray System valve(s) must be repositioned by an operator to realign the system from the Injection Mode to the Recirculation Mode?

(Assume Containment Spray Pumps have remained running during this evolution.)

- A. Containment Spray Pump Recirc Valves (HV-4772-1 / 2-2 / 3-1 / 3-2).
- B. Chemical Addition Tank Discharge Valves (HV-4752 / HV-4753).
- C. Containment Spray Heat Exchanger Outlet Valves (HV-4776 / HV-4777).
- D. RWST to Containment Spray Pump Suction Valves (HV-4758 / HV-4759).

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. These valves are controlled by a flow bistable off of the pump discharge flow transmitter.
- B. Incorrect. These valves close automatically.
- C. Incorrect. These valves open when Containment Spray actuates.
- D. Correct. These valves are closed after the Sump to Containment Spray valves are opened.

Technical Reference(s) EOS-1.3A, page 8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CT1.OB02 (As available)

Question Source: Bank # SYS.CT1.OB02-06
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 7, 9

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>026 K4.04</u>	<u> </u>
	Importance Rating	<u>3.7</u>	<u> </u>

Knowledge of CSS design feature(s) and/or interlock(s) which provide for the following: Reduction of temperature and pressure in containment after a LOCA by condensing steam, to reduce radiological hazard, and protect equipment from corrosion damage (spray)

Proposed Question: Common 17

Unit 1 is transferring to Cold Leg Recirculation.

Which ONE (1) of the following is the reason why the Containment Spray pumps are run until RWST level is less than 24%?

- A. To further lower Containment temperature by continuing to use colder RWST water.
- B. To inject as much RWST as possible to ensure sufficient Containment Sump inventory.
- C. To continue to remove iodine from the Containment atmosphere for as long as possible.
- D. Ensure sufficient Boric Acid and NaOH mixing to maintain the pH of the Containment Sump within the analyzed range.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Containment temperature will continue to decrease after swapover.
- B. Incorrect. This is the basis for the swapover setpoint.
- C. Incorrect. Spray continues after swapover.
- D. Correct. CPSES requires that spray be continued from the RWST until RWST level is less than 24% to ensure sufficient Boric Acid and NaOH mixing to maintain the pH of the water within the Containment Sump within the analyzed range.

Technical Reference(s) EOS-1.3A, Attachment 3, Step 4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: EO1.XG3.OB404 (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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>039 K1.05</u>	<u> </u>
	Importance Rating	<u>2.5</u>	<u> </u>

Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: T/G

Proposed Question: Common 18

Given the following conditions:

- A power increase is in progress on Unit 2.
- Reactor Power is 57%.
- A failure of the 2A Moisture Separator Reheater (MSR) Drain Tank Level Control System results in the following digital alarms:
 - 2RB01L901 XV05, MSR A SHELL LEVEL HIGH
 - 2RB01L801 XV06, MSR A SHELL LEVEL HIGH

Which ONE (1) of the following describes the actions that occur due to this failure?

Steam to the MSR is isolated...

- A. and the MSR Shell Drain Tank Normal Level Control Valve fails closed.
- B. and the MSR Shell Drain Tank Alternate Level Control Valve receives a CLOSE signal.
- C. and only the Main Turbine trips.
- D. and the Main Turbine and Reactor both trip.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Normal level control would be open on high level in the drain tank.
- B. Incorrect. Alternate level control would be open on high level in the drain tank.
- C. Incorrect. Turbine trip is initiated, but reactor will also trip above P-9 (50%).
- D. Correct. Given the power level and the high MSR level.

Technical Reference(s) ALM-4000B, page 44 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.MR1.OB12 (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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>059 A1.03</u>	<u> </u>
	Importance Rating	<u>2.7</u>	<u> </u>

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MFW controls including: Power level restrictions for operation of MFW pumps and valves.

Proposed Question: Common 19

Unit 2 is at 56% power with all control systems in AUTOMATIC.

Which ONE (1) of the following describes the plant response to a trip of one of the running Main Feedwater Pumps (MFWP)?

As level in the Steam Generators begin to lower...

- A. the Main Feedwater Regulating Valves open and the feedwater header pressure lowers causing the speed of the operating MFWP to rise.
- B. the Main Feedwater Regulating Valves open, the speed of operating MFWP rises, and the Main Feedwater Preheater Bypass Valves open to maintain SG level.
- C. the speed of the operating MFWP rises but will not maintain SG level. All AFW Pumps start when the SGs reach the Low-Low level setpoint.
- D. the feedwater header pressure lowers, causing the speed of the operating MFWP to rise until it trips on overspeed. All AFW Pumps start when the SGs reach the Low-Low level setpoint.

Proposed Answer: A

Explanation (Optional):

- A. Correct. Decreasing level causes the feed reg valves to open. As flow increases to the steam generators, MFWP speed increases.
- B. Incorrect. System upset is not enough to cause the bypass valve to open.
- C. Incorrect. Trip of one MFWP at less than 60% power is within the capacity of one MFWP.
- D. Incorrect. Trip of one MFWP at less than 60% power is within the capacity of one MFWP.

Technical Reference(s) ABN-302, Step 2.1.b (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.MF1.OB12 (As available)

Question Source: Bank # X
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 5, 7

Comments:
DC Cook Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>061 K6.02</u>	<u> </u>
	Importance Rating	<u>2.6</u>	<u> </u>

Knowledge of the effect of a loss or malfunction of the following will have on AFW components: Pumps

Proposed Question: Common 20

Given the following conditions:

- Unit 1 is in MODE 3 with the Motor Driven Auxiliary Feedwater Pump (MDAFW) Pump 1-02 maintaining Steam Generator levels.
- A small feedline break occurs just upstream of the manual isolation valve for PV-2454A, MDAFWP 2 SG 3 FLO CTRL Valve.
- The MDAFW Pump 1-02 is stopped and both PV-2454A, MDAFWP 2 SG 3 FLO CTRL Valves and PV-2454B, MDAFWP 2 SG 4 FLO CTRL are closed.

With MDAFW Pump 1-02 now unavailable, which ONE (1) of the following describes the Steam Generators that may be fed from MDAFW Pump 1-01?

- A. Steam Generator 1 only.
- B. Steam Generator 2 only.
- C. Steam Generator 1 and 2 only.
- D. Steam Generator 1 and 2 and Steam Generator 4 through the cross ties.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Flow path to Steam Generator 2 still available.
- B. Incorrect. Flow path to Steam Generator 1 still available.
- C. Correct. Due to the leak location, the cross ties cannot be opened. Only the Steam Generators normally fed from MDAFW Pump 1-01, can be fed.
- D. Incorrect. Cannot open the cross ties due to the leak location.

Technical Reference(s) SYS.AF1.FG01 (Figure 1) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.AF1.OB11 (As available)

Question Source: Bank # X
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 4, 7

Comments:
Callaway Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>061 K4.02</u>	<u> </u>
	Importance Rating	<u>4.5</u>	<u> </u>

Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following: AFW automatic start upon loss of MFW pump, S/G level, blackout, or safety injection

Proposed Question: Common 21

Which ONE (1) of the following sets of conditions lists all the automatic start signals to the Turbine Driven Auxiliary Feedwater Pump?

- A. 2 of 4 Low-Low Steam Generator levels in 2 of 4 Steam Generators
 Blackout Sequence (BOS) O/L
 Safety Injection
- B. 2 of 4 Low-Low Steam Generator levels in 1 of 4 Steam Generators
 Blackout Sequence (BOS) O/L
 AMSAC signal
- C. 2 of 4 Low-Low Steam Generator levels in 2 of 4 Steam Generators
 Blackout Sequence (BOS) O/L
 AMSAC signal
- D. Trip of both Main Feedwater Pumps
 Blackout Sequence (BOS) O/L
 Safety Injection

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Correct coincidence but wrong signals.
- B. Incorrect. Wrong coincidence for number of SGs.
- C. Correct.
- D. Incorrect. Wrong signals referenced.

Technical Reference(s) M1-2206, Sheet 02A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.AF1.OB08 (As available)

Question Source: Bank # SYS.AF1.OB08-07
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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>062 G2.1.14</u>	<u> </u>
	Importance Rating	<u>2.5</u>	<u> </u>

Conduct of Operations: Knowledge of system status criteria which require notification of plant personnel.

Proposed Question: Common 22

Which ONE (1) of the following describes a change in the AC Electrical Distribution lineup that requires notification of plant personnel via the Plant Gaitronics System?

- A. Align 480/277 VAC (West Bus) Distribution Panel ACP-2 in the 345 KV Relay House.
- B. Energize 1MT1 and 1MT2 Main Transformers in a Backfeed configuration.
- C. Start Inverter IV1EC1/3 unloaded for maintenance.
- D. Place an additional cooler group in service on Main Transformer 1MT1.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Plausible due to equipment energization, however, no change in electrical system lineup occurs.
- B. Correct. Backfeeding creates field amp spiking and negative sequence current alarms on the operating unit and is considered a change in an electrical distribution line-up.
- C. Incorrect. Plausible due to equipment energization, however, no change in electrical system lineup occurs.
- D. Incorrect. Plausible due to starting additional equipment, however, no change in electrical system lineup occurs.

Technical Reference(s) ODA-102, Step 6.25.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.MG1.OB42 (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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>063 G2.4.10</u>	<u> </u>
	Importance Rating	<u>3.0</u>	<u> </u>

Emergency Procedures/Plan knowledge of annunciators response procedures.

Proposed Question: Common 23

Which ONE (1) of the following would be the most probable cause of a 1-ALB-10B-1.9, 125 VDC SWITCH PNL 1ED3 TRBL alarm **with** an associated 1-SSII-1 TRAIN A, 125 VDC alarm?

- A. Battery charger in equalize.
- B. Undervoltage condition or blown fuse.
- C. Bus 1ED3 ground condition.
- D. Battery charger malfunction.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Plausible as this is a Probable Cause for alarm 10B-1.9.
- B. Correct. This is the correct condition for the combination of alarms received.
- C. Incorrect. Plausible as this is a Probable Cause for alarm 10B-1.9.
- D. Incorrect. Plausible as this is a Probable Cause for alarm 10B-1.9.

Technical Reference(s) ALM-0102A; 1-ALB-10B-1.9 (Attach if not previously provided)
 ALM-1901A; SSII Train AA-2.7

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.DC1.OB16 (As available)

Question Source: Bank # SYS.DC1.OB16-06
 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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>064 K6.07</u>	<u> </u>
	Importance Rating	<u>2.7</u>	<u> </u>

Knowledge of the effect of a loss or malfunction of the following will have on ED/G system: Air receivers.

Proposed Question: Common 24

Which ONE (1) of the following describes the effect of allowing the Diesel Starting Air Receivers to drop to 145 psig?

- A. Starting air pressure is too low to roll the engine.
- B. Only a Safety Injection signal or a Blackout signal will start the engine.
- C. Only a Safety Injection signal or Manual Normal Start initiation will start the engine.
- D. Only a Manual Normal Start initiation will be accepted by the engine start circuit.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. With air pressure < 150 psig only a Normal Manual Start will attempt to start the DG.
- B. Incorrect. Plausible as this condition existed before the circuitry was changed.
- C. Incorrect. Plausible as this condition existed before the circuitry was changed.
- D. Correct.

Technical Reference(s) SYS.ED1, page 98 (Attach if not previously provided)
 SOP-609, page 13

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.ED1.OB07 (As available)

Question Source: Bank # SYS.ED1.OB07-02
 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 7

Comments:

Ability to (a) predict the impacts of the following malfunctions or operations on the PRM system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Detector failure

Proposed Question: Common 25

Given the following:

- A Gaseous Decay Tank release is in progress.
- An OPERATE FAILURE – CHANNEL OPERATE FAILURE Digital Radiation Monitor System alarm is received for the Plant Vent Stack WRGM Channel RE-5570A during the release.

Which ONE (1) of the following describes the alarm indication and action required?

- A. Blue alarm; Verify X-HCV-0014, GWPS DISCH PLT EXH PLNM ISOL VLV automatically closes.
- B. Blue alarm; Auto function of X-HCV-0014, GWPS DISCH PLT EXH PLNM ISOL VLV is disabled and the valve must be manually closed.
- C. Red alarm; Verify X-HCV-0014, GWPS DISCH PLT EXH PLNM ISOL VLV automatically closes.
- D. Red alarm; Auto function of X-HCV-0014, GWPS DISCH PLT EXH PLNM ISOL VLV is disabled and the valve must be manually closed.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Indication is used for automatic closure.
- C. Incorrect. Alarm color indicated is for high radiation level.
- D. Incorrect. Alarm color indicated is for high radiation level.

Technical Reference(s) ALM-3200, Attachment 3 (Attach if not previously provided)
SOP-706, Attachment 1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.GH1.OB02 (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 11, 13

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>076 G2.4.20</u>	<u> </u>
	Importance Rating	<u>3.3</u>	<u> </u>

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

Proposed Question: Common 26

Given the following conditions:

- Station Service Water Pump (SSWP) 1-01 has tripped.
- The crew is performing actions of ABN-501, Station Service Water System Malfunction.
- The Shift Manager determines that Component Cooling Water Pump 1-01 is to remain in service.
- SSWP 1-01 handswitch is in PULL-OUT.

Which ONE (1) of the following describes the condition of SSWP 1-01 once repairs are completed?

SSWP 1-01...

- A. will not start until CCW Pump 1-02 is stopped.
- B. will start ONLY when the handswitch is placed in START position.
- C. will start as the handswitch passes through the AUTO position.
- D. will not start until CCW Pump 1-01 is stopped.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Plausible because there is cross Train action associated with SSW.
- B. Incorrect. Pump would start as soon as switch was out of PULL-OUT.
- C. Correct.
- D. Incorrect. With the CCW Pump running, the SSWP has an auto start signal.

Technical Reference(s) ABN-501, Steps 2.3.4 & 3.2.a (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.SW1.OB09 (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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>078 K3.02</u>	<u> </u>
	Importance Rating	<u>3.4</u>	<u> </u>

Knowledge of the effect that a loss or malfunction of the IAS will have on the following: Systems having pneumatic valves and controls

Proposed Question: Common 27

Given the following:

- The Turbine Driven Auxiliary Feedwater Pump is operating.
- Unit 1 has lost Instrument Air pressure.

Which ONE (1) of the following states how the loss of Instrument Air pressure affects the TDAFW Pump?

- A. Steam supply valves fail closed.
- B. The TDAFW Pump trips.
- C. Speed lowers to minimum.
- D. Speed rises to maximum.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Plausible, however, the steam supply valves fail open.
- B. Incorrect. Plausible if thought that the TDAFW will overspeed, however, the governor continues to function.
- C. Incorrect. Plausible if thought that the speed governor fails to minimum on Loss of IA.
- D. Correct. The speed governor fails to maximum on a loss of IA.

Technical Reference(s) ABN-301, Attachment 2, _____ (Attach if not previously provided)
 Pages 25
 SYS.AF1, Page 27 & 29

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.AF1.OB14 (As available)

Question Source: Bank # SYS.AF1.OB14-03
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 5, 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>103 G2.1.32</u>	<u> </u>
	Importance Rating	<u>3.4</u>	<u> </u>

Conduct of Operations: Ability to explain and apply all system limits and precautions.

Proposed Question: Common 28

Which ONE (1) of the following is the reason why a Containment Closure Checklist is required each shift per IPO-010A/B, Reactor Coolant System Reduced Inventory Operations?

Containment Closure must be...

- A. established prior to disconnecting Core Exit Thermocouples.
- B. established prior to initiating fuel movement.
- C. capable of being achieved if RHR cooling is lost.
- D. capable of being achieved prior to removing the Reactor Vessel Head.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Plausible because this action is performed, however, loss of RHR cooling is the concern.
- B. Incorrect. Plausible, however, loss of RHR cooling is the concern.
- C. Correct. The intent is to ensure that closure can be achieved within applicable time limits.
- D. Incorrect. Plausible, however, loss of RHR cooling is concern.

Technical Reference(s) IPO-010A, Attachment 1 (Attach if not previously provided)
 Section 2 Note
 Pages 107 & 108

Proposed references to be provided to applicants during examination: NONE

Learning Objective: IPO.XO0.OB01 (As available)

Question Source: Bank # IPO.XO0.OB01-02
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 9

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>015 A3.03</u>	<u> </u>
	Importance Rating	<u>3.9</u>	<u> </u>

Ability to monitor automatic operation of the NIS, including: Verification of proper functioning/operability

Proposed Question: Common 29

Given the following:

- A Reactor Startup is in progress on Unit 1.
- Intermediate Range Channels N-35 and N-36 indications are just beginning to come off the bottom scale.

If the NI channels are operating properly, which ONE (1) of the following describes the approximate indication on Source Range Channels N-31 and N-32?

- A. 5×10^2 CPS
- B. 5×10^3 CPS
- C. 5×10^4 CPS
- D. 5×10^5 CPS

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. 10^{-12} amps correspond to approximately 5×10^2 CPS which is not on-scale.
- B. Correct. 10^{-11} amps correspond to approximately 5×10^3 CPS. Source Range High Flux Trip is at 1×10^3 CPS. P-6 is 10^{-10} amps.
- C. Incorrect. 10^{-10} amps correspond to approximately 5×10^4 CPS.
- D. Incorrect. 10^{-9} amps correspond to approximately 5×10^5 CPS.

Technical Reference(s) IPO-002A, Step 5.2.21 (Attach if not previously provided)
SYS.EC1, Figure 1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.EC1.OB06 (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 2, 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>027 K2.01</u>	<u> </u>
	Importance Rating	<u>3.1</u>	<u> </u>

Knowledge of bus power supplies to the following: Fans

Proposed Question: Common 30

Which ONE (1) of the following describes the power supplies to the Containment Pre-Access Filtration System fans?

- A. Non-safeguards 480 VAC MCCs; MCCs are unaffected by either a Blackout or a Safety Injection.
- B. Non-safeguards 480 VAC MCCs; MCCs are load shed by a Blackout, but are unaffected by a Safety Injection.
- C. Safeguards 480 VAC MCCs; MCCs are unaffected by a Blackout, but are load shed by a Safety Injection.
- D. Safeguards 480 VAC MCCs; MCCs are load shed by either a Blackout or a Safety Injection.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Plausible since these fans are typically only run prior to Containment entry which normally occurs in MODE 5 and ESF actuations are for the most part blocked in MODE 5, but they are powered by Safeguards MCCs which load shed on a blackout or safety injection signal.
- B. Incorrect. Plausible since these fans are powered by safeguards MCCs and are load shed on a blackout, but they are also load shed on a safety injection.
- C. Incorrect. Plausible since these fans are powered by safeguards MCCs and are load shed on a safety injection, but they are also load shed on a blackout.
- D. Correct. Train A fan is powered from MCC 1EB1-2 and Train B from MCC 1EB2-2. Both of these MCCs are load shed by either a blackout signal or a safety injection signal.

Technical Reference(s) EOP-0.0A, Attachment 8, (Attach if not previously provided)
 pages 2 & 7

 SOP-801A-VAC-C05,
 Pages 1 & 2

 ABN-602, Attachment 1
 Pages 60 & 61

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CL1.OB05 (As available)

Question Source: Bank # SYS.CL1.OB05-01
 Modified Bank # _____ (Note changes or attach parent)
 New _____

Question History: Last NRC Exam CPSES 2005

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

10 CFR Part 55 Content: 55.41 7, 9

Comments:

Modified Distractor B to Non-Safeguards MCC.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>033 K4.03</u>	<u> </u>
	Importance Rating	<u>2.6</u>	<u> </u>

Knowledge of design feature(s) and/or interlock(s) which provide for the following: Anti-siphon devices.

Proposed Question: Common 31

Given the following conditions:

- Spent Fuel Pool (SFP) Cooling Water Pump X-02 and Heat Exchanger X-02 are aligned to and cooling the X-01 SFP.
- Level is lowering in the X-01 SFP due to a pipe rupture down stream of SFP Cooling Water Pump X-02.

Which ONE (1) of the following describes the design feature(s) that maintains adequate water level in the X-01 SFP?

- A. SFP Cooling Water Pump X-02 will trip on a low level in X-01 Spent Fuel Pool.
- B. SFP Cooling Water Pump X-02 suction piping anti-siphon feature will cause a loss of suction to X-02 Cooling Water Pump.
- C. SFP Cooling Water Pump X-02 discharge piping anti-siphon holes limit flow out of X-01 Spent Fuel Pool.
- D. SFP Cooling Water Pump X-02 will lose suction and the X-01 SFP discharge piping anti-siphon hole will be uncovered.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Plausible because the pump will trip on low level in its associated SFP.
- B. Incorrect. Partially correct, however, based on the location of the leak once the pump loses suction water will continue to drain out the SFP until the anti-siphon hole is uncovered on the discharge piping.
- C. Incorrect. Partially correct, however, based on the location of the leak the pump must lose suction otherwise the discharge pressure will continue to cause water level to drop.
- D. Correct. The pump must first lose suction, with no discharge pressure the SFP water will backflow through the discharge piping until the anti-siphon hole is uncovered.

Technical Reference(s) SYS.SF1, Pages 18 and 30 (Attach if not previously provided)
SYS.SF1, Figure 1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS-SF1-OB6 (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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>035 K6.01</u>	<u> </u>
	Importance Rating	<u>3.2</u>	<u> </u>

Knowledge of the effect of a loss or malfunction on the following will have on the S/GS: MSIVs

Proposed Question: Common 32

Given the following conditions:

- Unit 1 is at 21% power with all systems in normal alignments.
- The Main Generator is synchronized to the grid.
- Main Steam Isolation Valve 1-01 closed on a spurious signal.

Assuming the reactor does NOT trip, which ONE (1) of the following correctly describes the INITIAL response of RCS Delta T and SG pressure in the affected loop?

Loop Delta T...

- A. rises and SG steam pressure rises.
- B. rises and SG steam pressure lowers.
- C. lowers and SG steam pressure rises.
- D. lowers and SG steam pressure lowers.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Loop ΔT goes to near zero.
- B. Incorrect. Both parameters are opposite.
- C. Correct. Correct. In the affected loop, RCS ΔT lowers to zero and SG steam pressure rises because heat removal is minimal.
- D. Incorrect. Steam pressure will rise.

Technical Reference(s) MCO.TA9, Page 11 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.MR1.OB15 (As available)

Question Source: Bank # X
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 3, 5

Comments:
BVPS Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>041 K1.05</u>	<u> </u>
	Importance Rating	<u>3.5</u>	<u> </u>

Knowledge of the Physical connections and/or cause-effect relationships between the SDS and the following systems: RCS
Proposed Question: Common 33

Given the following:

- Unit 2 is at 8% power during a mid-cycle reactor startup.
- Steam Dumps are aligned in the Pressure Control Mode of operation.

If the steam dump controller setpoint is reduced by 20 psig, which ONE (1) of the following describes the effect on the unit?

- A. Steam Dump Valves open; RCS temperature rises; Reactor power lowers.
- B. Steam Dump Valves close; RCS temperature rises; Reactor power lowers.
- C. Steam Dump Valves open; RCS temperature lowers; Reactor power rises.
- D. Steam Dump Valves close; RCS temperature lowers; Reactor power rises.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Reactor temp lowers and power rises.
- B. Incorrect. Reactor temp lowers, power rises and the dump valves will open.
- C. Correct. Reducing the pressure setpoint will cause more steam flow since the dumps will open which will cool the RCS.
- D. Incorrect. The dump valves will open.

Technical Reference(s) SYS.SD1, Pgs. 13, 17 to 19 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.SD1.OB12 (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 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>045 2.4.49</u>	<u> </u>
	Importance Rating	<u>4.0</u>	<u> </u>

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

Proposed Question: Common 34

Given the following:

- A reactor trip has occurred on Unit 1.
- All HP Turbine Stop Valves indicate open after attempting a manual turbine trip.

Which ONE (1) of the following is the NEXT action required?

- A. Dispatch an operator to locally trip the Turbine.
- B. Manually runback the Turbine using Load Control.
- C. Close MSIV and Bypass Valves.
- D. Place all EHC Pumps in Pull-Out.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Plausible action, however, time does not meet need to limit steam demand.
- B. Incorrect. Plausible action, however, runback time does not meet need to limit steam demand.
- C. Incorrect. This action is required after the EHC Pumps are stopped and the Turbine is not tripped.
- D. Correct. This is the RNO action outlined in EOP-0.0.

Technical Reference(s) EOP-0.0A, Step 2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: E00.XG2.OB11 (As available)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	_____
	Group #	2	_____
	K/A #	055 2.4.50	
	Importance Rating	3.3	_____

Emergency Procedures / Plan Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.

Proposed Question: Common 35

Given the following:

- The unit is at 100% power.
- The following alarm is received:
 - ALB-9A, 1.12, CNDSR ANY VAC PMP TRIP

The white light indication on the control switch for Condenser Vacuum Pump 1 is lit.

Which ONE (1) of the following caused the trip and what actions are required to clear the white light?

- A. Overcurrent Trip Switch; place control switch in OFF or reset locally at the breaker.
- B. Overcurrent Trip Switch; can only be reset at the breaker.
- C. Motor Overload; place control switch in OFF or reset locally at the breaker.
- D. Motor Overload; can only be reset at the breaker.

Proposed Answer: A

Explanation (Optional):

- A. Correct. As outlined in the alarm procedure NOTE.
- B. Incorrect. This action is only partially correct as the reset can also be performed from the Control Room.
- C. Incorrect. This trip not associated with this pump.
- D. Incorrect. This trip not associated with this pump.

Technical Reference(s) ALB-9A-1.12 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CV1.OB12 (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 4

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>071 A4.14</u>	<u> </u>
	Importance Rating	<u>2.8</u>	<u> </u>

Ability to manually operate and/or monitor in the control room: WGDS status alarms

Proposed Question: Common 36

Given the following conditions:

- Control Room annunciator 1-ALB-6B-3.7, GWPS PNL TRBL is in alarm.
- The Radwaste PEO reports that Waste Gas Panel annunciator 3.2, WASTE GAS COMP HIGH TEMP is in alarm.

Which ONE (1) of the following describes the probable cause of the Waste Gas Panel alarm?

Low flow to the Waste Gas Compressor seal water heat exchanger.

- A. Component Cooling Water
- B. Reactor Makeup Water
- C. Station Service Water
- D. Demineralized Water

Proposed Answer: A

Explanation (Optional):

- A. Correct. Low flow of < 50 gpm is the source of the alarm.
- B. Incorrect. Plausible as RMUW is used throughout Radwaste.
- C. Incorrect. Plausible because SSW cools CCW.
- D. Incorrect. Plausible as DW is used throughout Radwaste.

Technical Reference(s) ALM-0401-3.2, page 49 (Attach if not previously provided)
1-ALB-6B-3.7, page 52

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.GH1.OB12 (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 13

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>072 K5.02</u>	<u> </u>
	Importance Rating	<u>2.5</u>	<u> </u>

Knowledge of the operational implications of the following concepts as they apply to the ARM system: Radiation intensity changes with source distance

Proposed Question: Common 37

Given the following:

- Radiography is in progress in the Auxiliary Building.
- The local Area Radiation Monitor (ARM) is reading 10 mRem/hr above background when the source is EXPOSED.
- The exposed source is located 50 feet from the monitor.

The source is then moved half the distance to the ARM and is exposed from 25 feet away.

Which ONE (1) of the following describes the current radiation monitor reading?

- A. 20 mr/hr above background
- B. 30 mr/hr above background
- C. 40 mr/hr above background
- D. 50 mr/hr above background

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Plausible if candidate thinks the radiation level is doubled.
- B. Incorrect. Plausible because it represents an increase.
- C. Correct. Point source question. Move half the distance, the radiation level is 4 times.
- D. Incorrect. Plausible because it represents an increase.

Technical Reference(s) GFE.RR4, Pages 28 & 29 (Attach if not previously provided)
 GFE.RR4.TA046 (TP)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: GFE.RR4.OB111 (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 12

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>086 K5.03</u>	<u> </u>
	Importance Rating	<u>3.1</u>	<u> </u>

Knowledge of the operational implication of the following concepts as they apply to the Fire Protection System: Effect of water spray on electrical components

Proposed Question: Common 38

Given the following conditions:

- Unit 1 is at 45% power.
- A Main Transformer sudden pressure relay actuates due to a fire.

Which ONE (1) of the following describes the plant response?

- The Reactor and Main Turbine will trip. The Main Generator must deenergize before the Fire Protection Deluge Valves will open.
- The Main Turbine will trip. When the thermal detectors sense a fire within the Main Transformer the Fire Protection Deluge Valves immediately open.
- The Reactor and Main Turbine will trip. When the thermal detectors sense a fire within the Main Transformer the Fire Protection Deluge Valves immediately open.
- The Main Turbine will trip. The Main Generator must deenergize before the Fire Protection Deluge Valves will open.

Proposed Answer: D

Explanation (Optional):

- Incorrect. Power level causes a Turbine trip only.
- Incorrect. The Generator must trip to enable the Fire Protection Deluge Valves.
- Incorrect. Power level causes a Turbine trip only. The Generator must trip to enable the Fire Protection Deluge Valves.
- Correct.

Technical Reference(s) 1-ALB-10A-1.2, (Attach if not previously provided)
Pages 13, 14 & 16

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.FP1.OB307 (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 7, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	007 EA2.06	_____
	Importance Rating	4.3	_____

Ability to determine or interpret the following as they apply to a reactor trip: Occurrence of a reactor trip.

Proposed Question: Common 39

Given the following conditions:

- A manual Reactor Trip is attempted from CB-07 and CB-10.
- Reactor Trip Breaker "A" indicates green.
- Reactor Trip Breaker "B" indicates red.
- Reactor power indicates 3% and decreasing.
- All DRPI indication is lost.

Which ONE (1) of the following describes the condition of the reactor and the appropriate action?

- A. The Reactor is tripped. Continue in EOP-0.0A, Reactor Trip or Safety Injection.
- B. The Reactor is tripped. Actuate Safety Injection to meet Shutdown Margin criteria.
- C. The Reactor is **not** tripped. Transition to FRS-0.1A, Response to Nuclear Power Generation/ATWT.
- D. The Reactor is **not** tripped. Reattempt to manually trip the reactor and manually initiate Turbine trip.

Proposed Answer: A

Explanation (Optional):

- A. Correct. One Reactor Trip Breaker opened and flux is lowering, therefore, the Reactor is tripped.
- B. Incorrect. Reactor is tripped, however, action not consistent with the EOP.
- C. Incorrect. Action not consistent with the EOP-0.0A RNO.
- D. Incorrect. Action not consistent with the EOP-0.0A RNO.

Technical Reference(s) EOP-0.0A, Step 1 & Bases (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: EO0.XG2.OB12 (As available)

Question Source: Bank # X
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 1, 10

Comments:
Robinson Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	008 AA1.03	
	Importance Rating	2.8	_____

Ability to operate and / or monitor the following as they apply to the Pressurizer Vapor Space Accident: Turbine bypass in manual control to maintain header pressure

Proposed Question: Common 40

Given the following:

- Reactor trip and safety injection have occurred.
- The crew is performing actions of EOP-0.0A, Reactor Trip or Safety Injection.
- RCS pressure is 1150 psig.
- PRZR level indicates 100%.
- Containment pressure is 8 psig.
- RCS temperature is 565°F and rising slowly.

Which ONE (1) of the following actions is required to control RCS temperature?

- A. Adjust the steam dump controller setpoint in automatic to maintain current RCS temperature.
- B. Manually operate the steam dumps in the Steam Pressure mode to increase heat removal.
- C. Adjust the SG atmospheric setpoints in automatic to maintain current RCS temperature.
- D. Manually operate the SG atmospheric relief valves to increase heat removal.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Plausible, however, steam dumps are not available based on Containment pressure. MSLI has occurred.
- B. Incorrect. Plausible, however, steam dumps are not available based on Containment pressure. MSLI has occurred.
- C. Incorrect. Plausible, however, maintaining current temperature is incorrect. Should be maintained at 557°F
- D. Correct.

Technical Reference(s) EOP-0.0A, Step 9 RNO (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: EO0.XG2.OB16 (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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	009 G2.1.27	_____
	Importance Rating	2.8	_____

Conduct of Operations: Knowledge of system purpose and or function.

Proposed Question: Common 41

Given the following:

- LOCA has occurred.
- RCS pressure is 1650 psig and lowering slowly.

Which ONE (1) of the following describes the status of operating ECCS equipment?

- A. CCP SI Flow is stable.
SI Pump Discharge Flow is rising.
SI Accumulator level is stable.
RHR Injection Flow is rising.
- B. CCP SI Flow is stable.
SI Pump Discharge Flow is zero.
SI Accumulator level is lowering.
RHR Injection Flow is zero.
- C. CCP SI Flow is rising.
SI Pump Discharge Flow is zero.
SI Accumulator level is stable.
RHR Injection Flow is zero.
- D. CCP SI Flow is rising.
SI Pump Discharge Flow is rising.
SI Accumulator level is lowering.
RHR Injection Flow is rising.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. With pressure above shutoff head of SIPs and RHR, the only piece of equipment pumping water is the CCP.
- B. Incorrect. With pressure above shutoff head of SIPs and RHR, the only piece of equipment pumping water is the CCP. CL Accumulators will not discharge until 600 psig
- C. Correct.
- D. Incorrect. With pressure above shutoff head of SIPs and RHR, the only piece of equipment pumping water is the CCP. SIP discharge at 1350-1550 psig

Technical Reference(s) SYS.SI1, pgs. 10, 13, 16 & 20 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.SI1.OB03 (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 8

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	011 G2.1.2	_____
	Importance Rating	3.0	_____

Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.

Proposed Question: Common 42

Given the following Unit 2 conditions:

- SI actuated due to a LOCA.
- BOTH CCPs are TRIPPED.
- RCS pressure is 25 psig.
- RCS Subcooling is 0°F
- Containment pressure is 23 psig.
- All other equipment is running per design.
- The crew is performing actions of EOP-0.0B, Reactor Trip or Safety Injection.

Which ONE (1) of the following describes the required action and reason for the action with respect to the RCPs?

- A. Stop all RCPs to minimize fluid mass loss out of the break.
- B. Stop all RCPs to prevent mechanical damage to the pump and motor.
- C. Leave all RCPs running to provide forced cooling flow of the RCS.
- D. Leave all RCPs running to prevent phase separation of RCS liquid.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. SBLOCA, NC mass loss is the concern. LBLOCA with High-3, spray will damage RCPs.
- B. Correct. RCPs would be tripped for this reason because CCW is isolated and Phase B and Spray is flowing at High-3 psig Containment pressure.
- C. Incorrect. Would NOT leave running. RCS Subcooling is lost.
- D. Incorrect. Would NOT leave running. Phase separation may occur in SBLOCAs after RCPs are tripped, leading to core uncover.

Technical Reference(s) EOP-0.0A, Step 7 RNO & Bases (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: EO0.XG2.OB13 (As available)

Question Source: Bank # X
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 10

Comments:
Callaway Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>1</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>015 AK2.10</u>	<u> </u>
	Importance Rating	<u>2.8</u>	<u> </u>

Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following: RCP indicators and controls

Proposed Question: Common 43

Unit 1 is at 85% power.

The following alarm was received at 0400:

- 1-ALB-5B-1.5, RCP 1 VIBR HI

The following trend of RCP 1 vibration is available:

<u>Time</u>	<u>Shaft</u>	<u>Frame</u>
0400	15.0 mils	2.70 mils
0430	15.2 mils	2.72 mils
0500	15.5 mils	2.73 mils
0530	16.9 mils	2.79 mils
0600	17.7 mils	2.88 mils

Which ONE (1) of the following states the **earliest** time that RCP trip criteria were exceeded?

- A. 0430
- B. 0500
- C. 0530
- D. 0600

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Plausible if shaft and frame rates are misread and only one is determined to be required.
- B. Incorrect. Plausible if frame and shaft rates are inverted and only one is determined to be required.
- C. Correct. First time that shaft was higher than 1 mil/hr and frame was 0.2 mil per hour on rate.
- D. Incorrect. Plausible if shaft rate is thought to be 2 mil/hr.

Technical Reference(s) ABN-101, Step 6.3.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.RC1.OB17 (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 7, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	022 AK1.03	_____
	Importance Rating	3.0	_____

Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Makeup: Relationship between charging flow and PZR level

Proposed Question: Common 44

Given the following:

- Unit 1 is at 48% power.
- 1-8106, Charging Pump to RCS Isolation Valve, fails closed due to a control switch circuit malfunction and **cannot** be reopened.
- Letdown has been isolated.

Which ONE (1) of the following describes the response of Pressurizer level to this event?

Pressurizer level will....

- Stabilize when letdown is isolated.
- Lower at a rate consistent with seal leakoff flow.
- Rise at a rate consistent with seal injection flow.
- Rise at a rate consistent with seal injection minus seal leakoff flow.

Proposed Answer: D

Explanation (Optional):

- Incorrect. Seal Injection is upstream of the isolation valves and seal leakoff is not isolated on this event, so the PZR is NOT bottled up.
- Incorrect. Plausible because seal leakoff is not isolated.
- Incorrect. Plausible because seal injection flow is available with this failure.
- Correct. Seal Injection will provide makeup. Seal leakoff will be the only source of letdown for this event prior to any other actions.

Technical Reference(s) SOP-103A, Page 84 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CS1.OB11 (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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	025 AK1.01	_____
	Importance Rating	3.9	_____

Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation

Proposed Question: Common 45

Given the following conditions:

- Unit 1 is in MODE 5.
- The Unit was shut down 10 days ago.
- Reduced Inventory Operations are in progress with Reactor vessel level at 53" above the core plate.
- RCS temperature is 120°F.
- A loss of all RHR cooling occurs.

Which ONE (1) of the following describes (1) the most limiting time available for Containment Closure, and (2) time until RCS reaches saturation temperature?

(Reference material provided.)

- A. 60 minutes; 12 minutes
- B. 75 minutes; 12 minutes
- C. 60 minutes; 15 minutes
- D. 75 minutes; 15 minutes

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Plausible if the wrong curve is used for time to saturation.
- B. Incorrect. Plausible if the wrong curve is used for available time for closure.
- C. Correct. 60 minutes prior to reaching unacceptable range; approximately 15 minutes prior to saturation temperature.
- D. Incorrect. Plausible if the wrong curves are used for available time for closure and time to saturation.

Technical Reference(s) ABN-104, Attachment 5 & 19 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: ABN-104, Attachment 5
ABN-104, Attachment 19

Learning Objective: SYS.RH1.OB21 (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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	026 AA2.04	_____
	Importance Rating	2.5	_____

Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The normal values and upper limits for the temperatures of the components cooled by CCW

Proposed Question: Common 46

Given the following:

- The crew is performing ABN-502, CCW System Malfunction.
- High temperature alarms are received on all 4 RCPs.
- All 4 RCP Thermal Barrier Return temperatures indicate 185°F and rising at 5°F per minute.
- Lower Seal Bearing temperature indicates 200°F and rising at 5°F per minute.

Which ONE (1) of the following describes the status of RCP thermal barrier cooling, and the action required for this condition?

- A. 1-HS-4709, Thermal Barrier Cooler CCW Return Isolation Valve, is closed. RCP temperatures exceed the operating limits and must be immediately tripped.
- B. 1-HS-4709, Thermal Barrier Cooler CCW Return Isolation Valve, is closed. RCPs must be tripped within 5 minutes due to high temperature.
- C. 1-HS-4709, Thermal Barrier Cooler CCW Return Isolation Valve, is open. RCP temperatures exceed the operating limits and must be immediately tripped.
- D. 1-HS-4709, Thermal Barrier Cooler CCW Return Isolation Valve, is open. RCPs must be tripped within 5 minutes due to high temperature.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. TBHX return isolates when > 182.5°F. Lower seal bearing temp > 225°F is trip criteria.
- B. Correct.
- C. Incorrect. TBHX return would have closed when > 182.5°F. Lower seal bearing temp > 225°F is trip criteria.
- D. Incorrect. TBHX return would have closed when > 182.5°F. Plausible if it is not recognized when the TBHX return isolates.

Technical Reference(s) ABN-101, Pages 35, 36 & 46 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CC1.OB21 (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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	027 2.1.27	_____
	Importance Rating	2.8	_____

Conduct of Operations: Knowledge of system purpose and or function.

Proposed Question: Common 47

Given the following:

- During operation at 100% power, the controlling Pressurizer Pressure Channel (PT-455A) fails high.
- All controls are in AUTO.
- RCS pressure is 2235 psig.

Assuming no operator action, which ONE (1) of the below would be the PROGRESSION of events in the Primary System (including Pressurizer Pressure Control System response), following the instrument failure?

1. LOOP 1 Spray valve (PCV-455B) OPENS
2. BOTH Spray valves OPEN (PCV-455B and 455C)
3. PORV PCV-455A OPENS
4. BOTH PORVs OPEN (PCV-455A and 456)
5. PORV CLOSES (PCV-455A)
6. BOTH PORVs CLOSE (PCV-455A and 456)
7. ALL PRZR heaters energize
8. Reactor TRIP on HI PRZR Pressure
9. Reactor TRIP on LO PRZR Pressure

A. 1,3,5,7,8

B. 1,4,6,9

C. 2,4,6,7,8

D. 2,3,5,9

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Spray valves set at same setpoint. Reactor trip on high PRZR Pressure plausible because pressure channel fails high.
- B. Incorrect. Plausible because one valve fails open based on one pressure channel failing. One PORV comes from PZR Master controller.
- C. Incorrect. Reactor trip on high PRZR Pressure plausible because pressure channel fails high. One PORV comes from PZR Master controller.
- D. Correct. Test item intended to measure **function** of the PRZR Pressure control system during a controller failure, as required by the KA topic.

Technical Reference(s) SYS.PP1, page 27 (Attach if not previously provided)Proposed references to be provided to applicants during examination: NONELearning Objective: SYS.PP1.OB04 (As available)

Question Source: Bank # SYS.PP1.OB04-70

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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	029 EK2.06	_____
	Importance Rating	2.9	_____

Knowledge of the interrelations between the and the following an ATWS: Breakers, relays, and disconnects.

Proposed Question: Common 48

Given the following conditions:

- Reactor Trip Breaker testing is in progress on Train "A".
- Reactor Trip Breaker "A" is open.
- Reactor Trip Bypass Breaker "A" is closed.
- A transient occurs requiring a reactor trip.
- The RO attempts to manually trip the reactor but the reactor does NOT trip.

Which ONE (1) of the following describes a failure that has contributed to the reactor trip failure?

- A. Reactor Trip Breaker "B" Undervoltage Trip coil failed to energize.
- B. Reactor Trip Breaker "B" Shunt Trip coil failed to deenergize.
- C. Reactor Trip Bypass Breaker "A" Shunt Trip coil failed to energize.
- D. Reactor Trip Bypass Breaker "A" Undervoltage Trip coil failed to deenergize.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. RTB "B" trip coils are normally energized. Deenergizes on trip signal.
- B. Incorrect. Shunt trip energizes to trip the RTB.
- C. Incorrect. BYB "A" not equipped with a shunt trip.
- D. Correct.

Technical Reference(s) SYS.ES1, Page 35 & Fig. 12 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.ES2.OB05 (As available)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>1</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>055 EK3.02</u>	<u> </u>
	Importance Rating	<u>4.3</u>	<u> </u>

Knowledge of the reasons for the following responses as they apply to the Station Blackout: Actions contained in EOP for loss of offsite and onsite power.

Proposed Question: Common 49

Which ONE (1) of the following describes the reasons for depressurizing the Steam Generators to 250 psig in accordance with ECA-0.0, Loss of All AC Power?

- A. Initiate SI Accumulator injection and minimize RCP seal leakage.
- B. Establish Natural Circulation conditions and initiate SI Accumulator injection.
- C. Establish Natural Circulation conditions and minimize secondary heat sink requirements if AFW inventory is limited.
- D. Minimize secondary heat sink requirements if AFW inventory is limited, and minimize RCP seal leakage.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. RCS depressurization will assist natural circulation, but is not reason for depressurization to 250 psig.
- C. Incorrect. Natural Circ will be set up as a byproduct of rapid depressurization; rapid cooldown and depressurization due to limited AFW is an action that could be taken in E-3 series procedures.
- D. Incorrect. In other E-3 series procedures, rapid secondary depressurizations may be performed when there is limited makeup availability.

Technical Reference(s) ECA-0.0A, Step 18 & Bases (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SL1.XGE.OB05 (As available)

Question Source: Bank # ECA.XG1.OB401-05
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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	056 AA1.05	
	Importance Rating	3.8	_____

Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: Initiation (manual) of safety injection process.

Proposed Question: Common 50

Given the following conditions:

- A loss of Off-Site Power has occurred.
- Bus 1EA1 is de-energized.
- The crew is performing EOS-0.1A, Reactor Trip Response.
- RCS temperature is 561°F and stable.
- RCS pressure is 1920 psig and trending down slowly.
- PRZR level cannot be maintained > 13%.

Which ONE (1) of the following actions is required in accordance with EOS-0.1A, Reactor Trip Response?

- A. Increase Condenser Steam Dump to maintain Tavg at 557°F.
- B. Attempt to restore 1EA1 in accordance with ABN-602, Response to a 6900V/480V System Malfunction.
- C. Manually actuate Safety Injection and return to EOP-0.0A, Reactor Trip or Safety Injection.
- D. Isolate Letdown and verify natural circulation in accordance with EOS-0.1A, Reactor Trip Response, Attachment 3.

Proposed Answer: **C**

Explanation (Optional):

- A. Incorrect. Steam Dump will not be available without Circ Water Pumps. Tavg is where it should be for the conditions.
- B. Incorrect. Would have been performed in EOP-0.0A, but priority is SI.
- C. Correct. Continuous action page requires initiation of SI when PRZR level cannot be maintained greater than 13% (This value used to be 6%, changed in August 2006).
- D. Incorrect. Would verify Natural Circulation if SI was not required per foldout.

Technical Reference(s) EOS-0.1A, Attachment 1.A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: ERG.XD5.OB03 (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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	057 AA1.04	_____
	Importance Rating	3.5	_____

Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: RWST and VCT valves

Proposed Question: Common 51

Given the following:

- Unit 1 is at 100% power.
- All systems are in their normal alignments.
- The following alarm is received:
 - 1-ALB-10B-1.16, 118V CHAN 1 INV TRBL
- The crew determines that the associated Protection Bus is de-energized.

Which ONE (1) of the following describes the effect on the CVCS Makeup system?

- A. AUTO Reactor Coolant Makeup Control to the VCT is disabled ONLY.
- B. AUTO and MANUAL Reactor Coolant Makeup Control to the VCT is disabled.
- C. 1-LCV-112D and 112E, RWST TO CHRG PMP SUCT VLVs open.
1-LCV-112B and 112C, VCT TO CHRG PMP SUCT VLVs close.
- D. 1-LCV-112D and 112E, RWST TO CHRG PMP SUCT VLVs open.
1-LCV-112B and 112C, VCT TO CHRG PMP SUCT VLVs open.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Plausible, however, loss of PC1 effects AUTO Makeup only. Actual valve control is not disabled
- C. Incorrect. Plausible, however, loss of PC1 effects AUTO Makeup only. Actual valve control is not disabled, and swapover circuitry is unaffected
- D. Incorrect. Plausible, however, loss of PC1 effects AUTO Makeup only. Swapover circuitry is unaffected

Technical Reference(s) ABN-603, Step 2.2.b (Attach if not previously provided)
1-ALB-10B-1.16, Step 1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.AC3.OB13 (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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	058 AA1.02	
	Importance Rating	3.1	_____

Ability to operate and / or monitor the following as they apply to the Loss of DC Power: Static inverter dc input breaker, frequency meter, ac output breaker, and ground fault detector

Proposed Question: Common 52

Given the following conditions:

- ALB-10B, 1.13, 125 VDC SWITCH PNL 1ED1 TRBL, is alarming.
- All other alarms are clear.
- A-BT1ED1, BATT BT1ED1 CURRENT, is indicating minus (–) 10 amps.
- V-1ED1, 125 VDC SWITCH PNL 1ED1 VOLT, is indicating 130 volts.
- When the GROUND TEST switch at Panel 1ED1 is placed in “TEST”, both the NEGATIVE-GND and POSITIVE-GND white lights are lit.
- The POSITIVE-GND white light is brighter than the NEGATIVE-GND white light.

Which ONE (1) of the following is the cause of the trouble alarm on 125 VDC Panel 1ED1, and the component supplying power to Panel 1ED1?

A ground condition on the...

- A. positive terminal; battery.
- B. positive terminal; battery charger.
- C. negative terminal; battery.
- D. negative terminal; battery charger.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. With a negative current flow on the battery, the charger is connected to the bus
- B. Incorrect. Correct if the negative ground light was brighter.
- C. Incorrect. With a negative current flow on the battery, the charger is connected to the bus.
- D. Correct. With a negative current flow on the battery, the charger is connected to the bus. The light that burns dimly will be the grounded side.

Technical Reference(s) 1-ALB-10B-1.13, Step 3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.DC1.OB06 (As available)

Question Source: Bank # _____
 Modified Bank # SYS.DC1.OB06-01 (See parent in Comments)
 New _____

Question History: Last NRC Exam _____

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

10 CFR Part 55 Content: 55.41 8

Comments:

Given the following conditions:

- ALB-10B, 1.13, 125V SWITCH PNL 1ED1 TRBL, is alarming.
- All other alarms are clear.
- A-BT1ED1, BATT BT1ED1 CURRENT, is indicating (–) 10 amps.
- V-1ED1, 125 VDC SWITCH PNL 1ED1 VOLT, is indicating 130 volts.
- A Plant Equipment Operator (PEO) reports that 125 VDC BATTERY CHARGER BC1ED1-1 is aligned in the “Float” mode with a DC VOLTS indication of 134 volts.
- The PEO also reports that when the GROUND TEST switch at Panel 1ED1 is placed in “Test”, both the NEGATIVE-GND and POSITIVE-GND white lights are lit, with the NEGATIVE-GND white light slightly brighter than the POSITIVE-GND white light.

Which of the following is the cause of the trouble alarm on 125 VDC Panel 1ED1? (Answer: D)

- A. An undervoltage condition on the panel.
- B. An overvoltage condition from the battery charger.
- C. A ground condition on the negative terminal of the panel.
- D. A ground condition on the positive terminal of the panel.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	062 G2.4.50	_____
	Importance Rating	3.3	_____

Emergency Procedures / Plan Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.

Proposed Question: Common 53

Given the following:

- Unit 1 is in MODE 5.
- Train A Component Cooling Water Pump (CCWP) and Station Service Water Pump (SSWP) are in service.
- Train B CCWP and SSWP are secured.
- The following alarms are received in the Control Room:
 - ALB 1-1.7, SSW TRN A/B HDR PRESS LO
 - ALB 1-1.8, SSWP 1/2 OVRLOAD/TRIP
- The BOP determines that SSWP 1-01 has tripped.
- NO other automatic action has occurred.

Which ONE (1) of the following describes the required action(s) and the reason why the action(s) is (are) necessary?

- A. Start a Train B SSWP ONLY because it should have started when the breaker for SSWP 1-01 tripped.
- B. Start a Train B SSWP and CCWP because they should have started when SSWP 1-01 breaker tripped.
- C. Start a Train B SSWP ONLY because it should have started on low SSW header pressure.
- D. Start a Train B SSWP and CCWP because they should have started on low SSW header pressure.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Plausible, however, both SSW and CCW pumps auto start and pump auto starts on low SSW header pressure.
- B. Incorrect. Plausible, however, pump auto starts on low SSW header pressure.
- C. Incorrect. Plausible, however, both SSW and CCW pumps auto start.
- D. Correct. A low SSW header pressure starts the standby SSW and CCW Pumps.

Technical Reference(s) 1-ALB-1-1.7 & 1.8 auto actions (Attach if not previously provided)
ABN-501, Step 2.3.2-3

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.SW1.OB11 (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 4, 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	065 AA2.08	
	Importance Rating	2.9	

Ability to determine and interpret the following as they apply to the Loss of Instrument Air: Failure modes of air-operated equipment

Proposed Question: Common 54

Assuming NO operator actions, which ONE (1) of the following describes the effect of a loss of instrument air on Volume Control Tank (VCT) level?

VCT level...

- A. decreases due to maximum Charging and Letdown Isolation Valves closing.
- B. decreases due to maximum Charging and Letdown being diverted to the Hold Up Tank.
- C. increases due to minimum Charging and the Letdown Pressure Control Valve failing open.
- D. increases due to minimum Charging and the Letdown Orifice Isolation Valves failing open.

Proposed Answer: A

Explanation (Optional):

- A. Correct. Charging Flow Control fails open, Letdown Isolation Valves fail closed.
- B. Incorrect. Letdown Diversion Valve fails to the VCT.
- C. Incorrect. Charging and Letdown Pressure Control Valves fail open.
- D. Incorrect. Charging Flow Control fails open, Letdown Isolation Valves fail closed.

Technical Reference(s) ABN-301, Attachment 1 (Attach if not previously provided)
Pages 5 & 6

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CS1.OB10 (As available)

Question Source: Bank # SYS.CS1.OB10-28
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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	E05 EA2.1	
	Importance Rating	3.4	_____

Knowledge of the reasons for the following responses as they apply to the (Loss of Secondary Heat Sink) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

Proposed Question: Common 55

Given the following Unit 1 conditions:

- A Reactor Trip and Safety Injection have occurred.
- The crew has performed the actions of EOP-0.0A, Reactor Trip or Safety Injection.
- AFW flow cannot be established.
- All SG NR levels are off-scale low.
- All SG WR levels are at approximately 60%.
- The crew has entered FRH-0.1A, Response to Loss of Secondary Heat Sink.
- RCS Pressure is 1175 psig and stable.
- Intact SG pressures are 975 psig and trending down slowly.

Which ONE (1) of the following describes the plant conditions and action required?

Steam Generators are...

- A. Required for RCS heat removal. Continue in FRH-0.1A; trip RCPs and initiate Bleed and Feed.
- B. Required for RCS heat removal. Continue in FRH-0.1A; leave RCPs running and attempt to restore AFW pumps.
- C. NOT required for RCS heat removal. Transition to EOP-1.0A, Loss of Reactor or Secondary Coolant, and ensure correct diagnosis of the event prior to continuing.
- D. NOT required for RCS heat removal. Transition to E-2.0A, Faulted SG Isolation, to initiate Main Steam Line Isolation due to the SG pressure reduction.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Bleed/Feed criteria is not met.
- B. Correct. RCS pressure is higher than intact SG pressure.
- C. Incorrect. LOCA occurring but RCS pressure still requires a heat sink.
- D. Incorrect. Transition made to E-1 prior to any other diagnosis for E-2 conditions. Also, SG pressure not low enough to cause such a low RCS pressure.

Technical Reference(s) FRH-0.1A, Steps 1 & 3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: FRH.XH1.OB401 (As available)

Question Source: Bank # X
 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 10

Comments:
Harris Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	E12 EA2.1	_____
	Importance Rating	3.2	_____

Ability to determine and interpret the following as they apply to (Uncontrolled Depressurization of all Steam Generators) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

Proposed Question: Common 56

Given the following Unit 1 conditions:

- ECA-2.1A, Uncontrolled Depressurization of All Steam Generators, is being performed.
- The crew has reduced AFW flow to all Steam Generators (SG) to 100 gpm per SG as they continue attempts to isolate the SGs.

Which ONE (1) of the following describes the expected plant response to the AFW flow reduction and what actions are to be taken as SG pressures decrease?

- A. RCS hot leg temperatures will eventually begin to increase due to reduction in SG inventory and the crew will then raise AFW flow while continuing in ECA-2.1A, Uncontrolled Depressurization of All Steam Generators.
- B. RCS hot leg temperatures will eventually begin to increase due to reduction of SG inventory and the crew will then transition to FRH-0.1A, Response to Loss of Secondary Heat Sink.
- C. The SGs will eventually become completely depressurized due to inadequate secondary heat sink and the crew will then transition to EOP-2.0A, Faulted Steam Generator Isolation.
- D. The SGs will eventually become completely depressurized due to inadequate secondary heat sink and the crew will then transition to FRH-0.1A, Response to Loss of Secondary Heat Sink.

Proposed Answer: A

Explanation (Optional):

- A. Correct. When AFW flow is reduced, eventually hot leg temperatures will rise when SG inventory is depleted. The purpose of minimizing AFW flow is to minimize RC System cooldown and inventory loss. FRH-0.1A conditions are not met because the AFW flow reduction was controlled by the crew.
- B. Incorrect. ECA-2.1 must be performed to completion unless a SG is isolated or tubes rupture.
- C. Incorrect. The SGs depressurize as long as they are faulted, but transition to EOP-2.0A is only performed when 1 SG repressurizes.
- D. Incorrect. ECA-2.1 must be performed to completion unless a SG is isolated or tubes rupture.

Technical Reference(s) ECA-2.1A, Step 2 (Attach if not previously provided)Proposed references to be provided to applicants during examination: NONELearning Objective: EO2.XG4.OB408 (As available)

Question Source: Bank # X

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 10

Comments:

VC Summer Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>1</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>024 G2.4.6</u>	<u> </u>
	Importance Rating	<u> </u>	<u> </u>

Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.

Proposed Question: Common 57

Which ONE (1) of the following describes the preferred method of boration on Unit 2 in accordance with ABN-107, Emergency Boration?

- A. Emergency Borate Valve 2-8104
- B. Manual Boration Valve 2CS-8439
- C. Charging Pump Suction to RWST, 2-LCV-112D or 112E
- D. Normal Boration Valves 2-FCV-110A and 110B

Proposed Answer: A

Explanation (Optional):

- A. Correct. This is the preferred method per the procedure.
- B. Incorrect. May be used as a contingency if 2-8104 will not open
- C. Incorrect. Used as a contingency if boration from the BAT cannot be performed.
- D. Incorrect. Used as a contingency if boration from BAT cannot be performed

Technical Reference(s) ABN-107, Page 4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CS2.OB02 (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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>1</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>028 AK2.02</u>	<u> </u>
	Importance Rating	<u>2.6</u>	<u> </u>

Knowledge of the interrelations between the Pressurizer Level Control Malfunctions and the following: Sensors and detectors
Proposed Question: Common 58

Given the following:

- Unit 1 is operating under steady-state conditions at 100% power with all control systems in their normal/automatic lineup.
- PRZR level transmitter 1-LT-459 fails low.
- PRZR level transmitter 1-LT-461 is immediately selected for control.

Which ONE (1) of the following describes the plant conditions 3 to 5 minutes after 1-LT-461 is selected for control, assuming no other operator action?

- A. Charging flow increasing, letdown flow constant, and Group C heaters energized
- B. Charging flow increasing, letdown flow constant, and Group C heaters de-energized
- C. Charging flow decreasing, letdown flow isolated, and Group C heaters de-energized
- D. Charging flow decreasing, letdown flow isolated, and Group C heaters energized

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Low failure will isolate letdown and heaters. Actual level will rise due to increased charging.
- B. Incorrect. Low failure will isolate letdown and heaters. Actual level will rise due to increased charging.
- C. Correct. Actual level will be above program and with alternate channel selected, it will sense deviation high, and cause charging to decrease. Group C heaters must be manually reset by placing control switch to ON.
- D. Incorrect. Group C heaters must be manually reset by placing control switch to ON.

Technical Reference(s) ABN-706, Step 2.2.a (Attach if not previously provided)

RLS.IC3

Proposed references to be provided to applicants during examination: NONELearning Objective: SI4.PP1.OB08 (As available)Question Source: Bank # SI4.MU9.OB03-02
Modified Bank # _____ (Note changes or attach parent)
New _____Question History: Last NRC Exam CPSES 2005Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X10 CFR Part 55 Content: 55.41 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>1</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>032 AK2.01</u>	<u> </u>
	Importance Rating	<u>2.7</u>	<u> </u>

Knowledge of the interrelations between the Loss of Source Range Nuclear Instrumentation and the following: Power supplies, including proper switch positions

Proposed Question: Common 59

Given the following conditions:

- Reactor startup is in progress.
- IR power indicates 5×10^{-11} amps on both channels.
- Source Range High Flux trip has NOT been blocked.

For the two switch positions shown below, which ONE (1) of the following describes the Reactor Protection System response to a blown instrument power fuse on Source Range Channel N-31?

SR Level Trip Switch: NORMAL

SR Level Trip Switch: BYPASS

- | | | |
|----|-----------------|-----------------|
| A. | No Reactor Trip | No Reactor Trip |
| B. | Reactor Trip | No Reactor Trip |
| C. | No Reactor Trip | Reactor Trip |
| D. | Reactor Trip | Reactor Trip |

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Reactor trip occurs with switch in NORMAL.
- B. Correct. Removing SR instrument power fuses will result in a Reactor trip with switch in NORMAL, unless the trip switch is in BYPASS.
- C. Incorrect. Reactor trip occurs with switch in NORMAL.
- D. Incorrect. Reactor trip does not occur with the trip switch is in BYPASS.

Technical Reference(s) ABN-701, Page 4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.EC1.OB025 (As available)

Question Source: Bank # X
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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	2	_____
	K/A #	051 AA2.02	_____
	Importance Rating	3.9	_____

Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: Conditions requiring reactor and/or turbine trip

Proposed Question: Common 60

Given the following:

- Main Condenser vacuum has been degrading on Unit 1.
- The crew has entered ABN-304, Main Condenser and Circulating Water System Malfunction.
- Condenser vacuum indicates 23.5 inches Hg and degrading by 0.25 inches Hg per minute.
- The crew is reducing load at approximately 2% per minute.
- Power is currently at 40%.

Assuming the current trends continue, which ONE (1) of the following describes the action that must be taken, and the LATEST time the action must be taken, in accordance with ABN-304?

- A. Trip the turbine immediately.
- B. Trip the reactor immediately.
- C. Trip the turbine within 10 minutes.
- D. Trip the reactor within 10 minutes.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Not required based on conditions. Trip criteria not yet exceeded, and power high enough that reactor would have to be tripped also
- B. Incorrect. Not required based on conditions. Trip criteria not yet exceeded
- C. Incorrect. Power will be too high to just trip the turbine.
- D. Correct. Vacuum < 21 inches Hg, power will still be greater than 10%, trip the Reactor.

Technical Reference(s) ABN-304, Step 3.3.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CV1.OB21 (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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	2	_____
	K/A #	068 AK3.10	_____
	Importance Rating	3.9	_____

Knowledge of the reasons for the following responses as they apply to the Control Room Evacuation: Maintenance of PZR level, using pumps and heaters

Proposed Question: Common 61

Given the following conditions:

- Unit 1 is at no-load Tave when the Control Room (CR) is evacuated.
- ABN-803A, Response to a Fire in the Control Room or Cable Spreading Room is in progress.
- PRZR level is being maintained between 25% and 50% at the Hot Shutdown Panel (HSP).

Which ONE (1) of the following describes the reason for observing that adequate PRZR level exists?

With the PRZR HTR CTRL XFER switch in the...

- A. CR position, the interlock between PRZR heaters OFF and low PRZR level is bypassed.
- B. CR position, the interlock between all PRZR heaters ON and high PRZR pressure is bypassed.
- C. HSP position, the interlock between all PRZR heaters ON and high PRZR pressure is bypassed.
- D. HSP position, the interlock between PRZR heaters OFF and low PRZR level is bypassed.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. In this condition the interlock is active.
- B. Incorrect. In this condition the interlock is active, however, only Bank C heaters are affected.
- C. Incorrect. Only Bank A and B Heaters are energized from the Hot Shutdown Panel.
- D. Correct.

Technical Reference(s) ABN-803A, Step 1 & 21 Caution (Attach if not previously provided)

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 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>1</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>E06 EK3.4</u>	<u> </u>
	Importance Rating	<u>3.5</u>	<u> </u>

Knowledge of the reasons for the following responses as they apply to the (Degraded Core Cooling) RO or SRO function as a within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.

Proposed Question: Common 62

Unit 1 has entered FRC-0.2A, Response to Degraded Core Cooling. All intact steam generators are depressurized at the maximum rate to 150 psig and at least two RCS hot leg temperatures are less than 380°F using the steam dumps.

Which ONE of the following describes the effect on the RCS if the cooldown is not stopped at these values?

- A. Excessive RCS cooldown causing a PTS concern.
- B. RWST inventory for SI re-flood of the RCS is lost.
- C. RHR injection into the RCS cold legs is inhibited.
- D. Injection of accumulator nitrogen into the RCS.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Plausible as a max rate cooldown is being performed, but PTS is not a concern at this temperature and pressure
- B. Incorrect. Plausible as re-flood is desired but continued depressurization will not cause a loss of RWST inventory at this time.
- C. Incorrect. Plausible as nitrogen injection would impede circulation but injection is not affected at this time.
- D. Correct. Per bases of FRC-0.2A, step 11, the selected pressure and temperature are expected to be above the pressure of the nitrogen remaining in the accumulators.

Technical Reference(s) FRC-0.2A, Step 11 & Bases (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SM3.XH3.OB105 (As available)

Question Source: Bank # SM3.XH3.OB105-14
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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>1</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>E08 EK2.2</u>	<u> </u>
	Importance Rating	<u>3.6</u>	<u> </u>

Knowledge of the interrelations between the (Pressurized Thermal Shock) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Proposed Question: Common 63

Which ONE (1) of the following actions would be **most effective** in responding to a Pressurized Thermal Shock condition in accordance with FRP-0.1A, Response to Pressurized Thermal Shock?

- A. From the MCB, close the block valve for a single stuck open PRZR PORV.
- B. From the MCB, isolate a single stuck open steam dump valve.
- C. Direct an operator to locally isolate a single stuck open FWIV.
- D. Direct an operator to locally isolate a single stuck open SG ARV.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Plausible action per the EOP, however, this condition would allow pressure to rise which could exacerbate the PTS condition.
- B. Incorrect. Plausible as all the Steam Dump Valves can be isolated from the MCB, however, no single SDV can be closed.
- C. Incorrect. Not as effective as isolating a Steam Dump Valve.
- D. Correct. This action would minimize the cooldown.

Technical Reference(s) FRP-0.1A, Step 2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: FRP.XH4.OB404 (As available)

Question Source: Bank # XFRP.XH4.OB404-03
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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>1</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>E14 EK1.2</u>	<u> </u>
	Importance Rating	<u>3.2</u>	<u> </u>

Knowledge of the operational implications of the following concepts as they apply to the (High Containment Pressure) Normal, abnormal and emergency operating procedures associated with (High Containment Pressure)

Proposed Question: Common 64

FRZ-0.1, Response to High Containment Pressure, directs that if ECA-1.1, Loss of Emergency Coolant Recirculation, is in effect, then operate Containment Spray Pumps in accordance with ECA-1.1.

Which ONE (1) of the following describes the basis for operating Containment Spray Pumps per ECA-1.1 while performing FRZ-0.1?

- A. To conserve water level in the Refueling Water Storage Tank.
- B. To raise level in the Containment Recirculation Sump to allow for RHR Pump operation.
- C. To prevent automatic Containment Spray Pump realignment to the Containment Recirculation Sump.
- D. To ensure SI pumps have sufficient NPSH while aligned to the Containment Recirculation Sump.

Proposed Answer: A

Explanation (Optional):

- A. Correct. FRZ-0.1 Step 4 says operate IAW ECA-1.1, because RWST may be depleted and must be maintained for cooling without recirc.
- B. Incorrect. Operating Spray Pumps IAW ECA-1.1 does not restore Sump level. Sump level may not be lost, there may be a valve alignment problem.
- C. Incorrect. Swapover may have already occurred, would not be prevented under the conditions given.
- D. Incorrect. SI may not have any suction, since ECA-1.1 was in progress previous to FRZ-0.1.

Technical Reference(s) FRZ-0.1A, Step 4.d RNO (Attach if not previously provided)

FRZ-0.1A, Bases

Proposed references to be provided to applicants during examination: NONELearning Objective: FRZ.XH5.OB404 (As available)Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X10 CFR Part 55 Content: 55.41 10
_____Comments:
Wolf Creek Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	2	_____
	K/A #	E16 EA1.2	_____
	Importance Rating	2.9	_____

Ability to operate and / or monitor the following as they apply to the (High Containment Radiation) Operating behavior characteristics of the facility.

Proposed Question: Common 65

Given the following:

- An event has occurred on Unit 2 requiring entry to EOP-0.0B, Reactor Trip or Safety Injection.
- The crew is preparing to transition out of EOP-0.0B.
- The following CSF Status Tree indications are available:
 - Subcriticality Green
 - Core Cooling Green
 - Heat Sink Green
 - Integrity Green
 - Containment Yellow
 - Inventory Yellow

Based upon the indications, which ONE (1) of the following describes the event that has occurred?

- A. LOCA
- B. Main Steam Break
- C. Feedwater Rupture
- D. Steam Generator Tube Rupture

Proposed Answer: A

Explanation (Optional):

- A. Correct. The only way to get a Yellow Path on Containment is with high radiation. A LOCA is the only event of the choices that could develop radiation levels that high.
- B. Incorrect. Unable to achieve a Yellow Path on Containment with this accident.
- C. Incorrect. Unable to achieve a Yellow Path on Containment with this accident.
- D. Incorrect. Unable to achieve a Yellow Path on Containment with this accident.

Technical Reference(s) FRZ-0.3B, CSF Status Tree (Attach if not previously provided)
FRI-0.3B, CSF Status Tree

Proposed references to be provided to applicants during examination: NONELearning Objective: FRZ.XH5.OB408 (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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	_____
	Group #	1	_____
	K/A #	G2.1.9	_____
	Importance Rating	2.5	_____

Ability to direct personnel activities inside the control room.

Proposed Question: Common 66

Given the following conditions:

- A Work Control PEO is scheduled to begin Replacement License Training in one (1) month and has returned to shift.
- With Unit 2 at EOL, BTRS demineralizers will be placed in service during the shift to dilute the RCS.
- The PEO requests to perform the dilution for training.

Would this PEO be allowed to perform the evolution and why?

- A. Yes, if authorized by the Shift Manager and has attended the pre-job brief.
- B. No, the PEO has not completed the required on-the-job training.
- C. Yes, if approval is granted by the Shift Operations Manager.
- D. No, the PEO is not currently enrolled in a license class.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Plausible because the Shift Manager can authorize "control board manipulations."
- B. Incorrect. This evolution is permissible only if a person is enrolled in the Replacement License Program and has successfully completed classroom instruction.
- C. Incorrect. Plausible as this is the only individual that can authorize permission for a Reactor startup. Requires Shift Operations Manager level, not just the Shift Manager.
- D. Correct. This evolution is permissible only if a person is enrolled in the Replacement License Program and has successfully completed classroom instruction.

Technical Reference(s) ODA-102, Step 6.24 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: ADM.XA1.OB06 (As available)

Question Source: Bank # _____
Modified Bank # ADM.XA1.OB06-04 (See parent in Comments)
New _____

Question History: Last NRC Exam _____

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

10 CFR Part 55 Content: 55.41 10

Comments: Modifications or word removal are italicized and underlined.

A non-licensed operator *successfully completed the Generic Fundamentals Examination*, and has returned to shift until license training on plant systems starts next month. With Unit 2 at EOL, BTRS demineralizers will be placed in service during the shift to dilute the RCS. The trainee requests to perform the dilution for training, *and the Shift Manager agrees, provided the trainee participates in the briefing*. Should the trainee be allowed to perform this evolution? (Answer: D)

- A. Yes. *The trainee has been enrolled in the Replacement License Program per TRA-203.*
- B. No. *The use of a trainee for this evolution has not been approved by the Shift Operations Manager.*
- C. Yes. The *Shift Manager* has granted permission for the trainee to participate.
- D. No. The trainee *has not completed necessary classroom instruction*.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>3</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>G2.1.10</u>	<u> </u>
	Importance Rating	<u>2.7</u>	<u> </u>

Knowledge of conditions and limitations in the facility license.

Proposed Question: Common 67

Unit 1 is in MODE 3.

Which ONE (1) of the following describes the MAXIMUM RCS pressure allowed by Technical Specifications?

- A. 2720 psig
- B. 2735 psig
- C. 2750 psig
- D. 2765 psig

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. 15 psi from actual, credible because applicant may confuse psia/psig.
- B. Correct. Tech Spec 2.1.2.
- C. Incorrect. 15 psi from actual, credible because applicant may confuse psia/psig.
- D. Incorrect. 30 psi from actual, and 15 psi from the actual psia value. Credible because applicant may confuse psia/psig.

Technical Reference(s) Tech Spec 2.1.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.RC2.OB12 (As available)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>3</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>G2.2.3</u>	<u> </u>
	Importance Rating	<u>3.1</u>	<u> </u>

(multi-unit) Knowledge of the design, procedural, and operational differences between units.

Proposed Question: Common 68

Given the following conditions:

- A failure of the Main Feed Water Pump speed control has occurred with the plant at 60% power.
- Steam header pressure is currently 900 psig.

Which ONE (1) of the following identifies the feed header pressure the operator should attempt to control for both Unit 1 and Unit 2?

Unit 1 should be maintained at _____ psig and Unit 2 at _____ psig.

- A. 1002; 1009
- B. 1009; 1002
- C. 1025; 1031
- D. 1031; 1025

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Plausible since these would be the correct pressures to maintain if the differential program were ramped from 0% - 100%, but the program is ramped from 20% - 100%.
- B. Incorrect. Plausible since these would be the correct pressures to maintain if the differential program were ramped from 0% - 100% and the Units were reversed, but the program is ramped from 20% - 100%.
- C. Correct. Unit 1 differential pressure program is 80 psid – 170 psid from 20% to 100% power, while Unit 2 is 80 psid – 182 psid. At 60% power, differential pressure should be 125 psid for Unit 1 and 131 psid for Unit 2, resulting in a feed pressure of 1025 psig and 1031 psig, respectively.
- D. Incorrect. Plausible since these are the correct pressures to maintain, but the Units are reversed.

Technical Reference(s) Unit Differences Document (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.MF1.OB31 (As available)

Question Source: Bank # SYS.MF1.OB31-01

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam CPSES 2005

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>3</u>	<u> </u>
	Group #	<u>2</u>	<u> </u>
	K/A #	<u>G2.2.25</u>	<u> </u>
	Importance Rating	<u>2.5</u>	<u> </u>

Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.

Proposed Question: Common 69

Which ONE (1) of the following is the Technical Specification basis for the Overpower N16 (OPN16) Reactor Trip?

- A. Excessive KW/FT caused by reactivity excursions.
- B. Excessive KW/FT caused by a dropped rod.
- C. Protects against DNB for power and pressure considerations.
- D. Protects against DNB for pressure and axial power distribution considerations.

Proposed Answer: A

Explanation (Optional):

- A. Correct. Tech Spec bases identifies KW/FT due to excursions such as steam line break.
- B. Incorrect. Plausible, however, localized peaking may be insufficient to generate trip signal.
- C. Incorrect. This would be associated with the Overtemperature N16 trip.
- D. Incorrect. This would be associated with the Overtemperature N16 trip.

Technical Reference(s) Tech Spec Basis 3.3.1 (Attach if not previously provided)
Page B 3.3.14

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.ES1.OB04 (As available)

Question Source: Bank # SYS.ES1.OB04-02
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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	_____
	Group #	3	_____
	K/A #	G2.3.10	_____
	Importance Rating	2.9	_____

Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

Proposed Question: Common 70

Which ONE (1) of the following identifiers is used to alert the operator of an Emergency Response Guideline (ERG) step that, when performed, could create a radiation hazard?

The procedure step is annotated with a (an)...

- A. [R]
- B. [CV]
- C. (HRA)
- D. (*)

Proposed Answer: A

Explanation (Optional):

- A. Correct. ERG steps that are performed in an area where radiation hazards are positively identified or which, when performed, create a radiation hazard are annotated as shown.
- B. Incorrect. This annotation is used for Concurrent Verification (CV).
- C. Incorrect. This annotation is used for a High Radiation Area (HRA), but is not stated in the ERG Rules of Usage.
- D. Incorrect. This is the designator for a Continuous Action Step.

Technical Reference(s) ODA-407, Step 5, 6.2.K, 6.3.B (Attach if not previously provided)
EOP-1.0A, Bases Step 11

Proposed references to be provided to applicants during examination: NONE

Learning Objective: ERG.XD2.OB02 (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 12

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	_____
	Group #	3	_____
	K/A #	G2.3.4	_____
	Importance Rating	2.5	_____

Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

Proposed Question: Common 71

A 20 year old CPSES employee has 1750 mRem of TEDE exposure for 2007.

Which ONE (1) of the following describes the MAXIMUM additional amount of TEDE exposure they may receive without additional CPSES authorization (i.e., Plant Manager approval), and what is the MAXIMUM additional amount of TEDE exposure he may receive prior to exceeding 10CFR20 (NRC) exposure limits?

- A. 2250 mRem; 3250 mRem
- B. 2250 mRem; 8250 mRem
- C. 1250 mRem; 3250 mRem
- D. 1250 mRem; 8250 mRem

Proposed Answer: A

Explanation (Optional):

- A. Correct. Admin limits 4000 mRem per year; 10CFR20 limit is 5 Rem per year.
- B. Incorrect. Plausible if individual thought that the 5(N-18) rule was still applicable.
- C. Incorrect. Admin limit is 4000 mRem per year.
- D. Incorrect. Plausible if individual thought that the 5(N-18) rule was still applicable with Admin limit is 4000 mRem per year.

Technical Reference(s) STA-655, Attachment 8.A (Attach if not previously provided)
STA-655, Step 5.1.1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: RWT.RD01 & RD03 (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 12

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>3</u>	<u> </u>
	Group #	<u>4</u>	<u> </u>
	K/A #	<u>2.4.24</u>	<u> </u>
	Importance Rating	<u>3.3</u>	<u> </u>

Knowledge of loss of cooling water procedures.

Proposed Question: Common 72

If a Seal Water Heat Exchanger Tube leak exists, which ONE (1) of the following describes the indication available and which of the following procedures would be used?

- A. CCW Surge Tank level rising; ABN-101, Excessive Reactor Coolant Leakage
- B. CCW Surge Tank level lowering; ABN-502, CCW System Malfunction
- C. Pressurizer level rising; ABN-105, CVCS Malfunctions
- D. Pressurizer level lowering; ABN-101, Excessive Reactor Coolant Leakage.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Plausible, however, fails to account for the higher pressure in CCW.
- B. Correct.
- C. Incorrect. Plausible, however, fails to account for system relationships.
- D. Incorrect. Plausible, however, fails to account for system relationships.

Technical Reference(s) ABN-502, Step 3.1 (Attach if not previously provided)
 SYS.CC1, Page 38

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CC1.OB21 (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 7,10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>3</u>	<u> </u>
	Group #	<u>4</u>	<u> </u>
	K/A #	<u>G2.4.14</u>	<u> </u>
	Importance Rating	<u>3.0</u>	<u> </u>

Knowledge of general guidelines for EOP flowchart use.

Proposed Question: Common 73

The crew is responding to a RED condition on Heat Sink per FRH-0.1, Response to Loss Of Secondary Heat Sink, when the STA reports the following:

- Subcriticality ORANGE
- Core Cooling YELLOW
- Heat Sink YELLOW
- Integrity GREEN
- Containment RED
- Inventory YELLOW

Which ONE (1) of the following actions is required?

- A. Complete FRH-0.1, then transition to FRS-0.2, Response to Loss of Core Shutdown.
- B. Complete FRH-0.1, then transition to FRZ-0.1, Response to High Containment Pressure.
- C. Immediately transition to FRS-0.2, Response to Loss of Core Shutdown.
- D. Immediately transition to FRZ-0.1, Response to High Containment Pressure.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. RED conditions always come before ORANGE, even if the Safety Function itself is a lower priority.
- B. Correct.
- C. Incorrect. Complete RED condition first, then transition to highest color, highest priority safety function.
- D. Incorrect. RED conditions always come before ORANGE, even if the Safety Function itself is a lower priority

Technical Reference(s) ODA-407, Attachment 8A (Attach if not previously provided)
ODA-407, Pages 4 & 5

Proposed references to be provided to applicants during examination: NONE

Learning Objective: ADM.XA3.OB07 (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 10

Comments:
Salem Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	_____
	Group #	4	_____
	K/A #	G2.4.10	_____
	Importance Rating	3.0	_____

Knowledge of annunciator response procedures.

Proposed Question: Common 74

In accordance with OWI-109, Operations Human Factors Controls, which ONE (1) of the following annunciator color codes would **normally be associated** with a need for immediate operator attention to verify automatic actions have occurred or to initiate corrective actions to protect equipment?

- A. White
- B. Yellow
- C. Orange
- D. Red

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Standard annunciator alarm.
- B. Incorrect. May result in additional alarms at same or close by panels.
- C. Correct. Requires immediate operator attention to verify auto actions have occurred.
- D. Incorrect. Plausible but this is the not the normally associated color.

Technical Reference(s) OWI-109, Step 6.2.B (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PRC.XI1.OB06 (As available)

Question Source: Bank # PRC.XI1.OB105-02
 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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	_____
	Group #	4	_____
	K/A #	G2.4.43	_____
	Importance Rating	2.8	_____

Knowledge of emergency communications systems and techniques.

Proposed Question: Common 75

Which ONE (1) of the following plant notification methods is used during a medical emergency involving a contaminated and injured mechanic?

- A. Sound the Site Radiation alarm for ~10 seconds.
Press the ALL PAGE button on the Gaitronics and make the announcement.
Sound the Site Radiation alarm again for ~10 seconds.
Repeat the announcement.
- B. Sound the Site Yelp alarm for ~10 seconds.
Press the ALL PAGE button on the Gaitronics and make the announcement.
Sound the Site Yelp alarm again for ~10 seconds.
Repeat the announcement.
- C. Sound the Site Radiation alarm for ~10 seconds.
Press the ALL PAGE button on the Gaitronics and make the announcement.
Repeat the announcement.
- D. Sound the Site Yelp alarm for ~10 seconds.
Press the ALL PAGE button on the Gaitronics and make the announcement.
Sound the Site Yelp alarm for ~10 seconds.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Plausible because a contaminated injured person could be construed as a Site Radiation emergency.
- B. Correct.
- C. Incorrect. These actions do not meet the "shall perform" statement of the OPS Instruction.
- D. Incorrect. These actions do not meet the "shall perform" statement of the OPS Instruction in addition to the misconception of the contaminated injured person.

Technical Reference(s) Ops Desktop Instruction #002 (Attach if not previously provided)
Step A

Proposed references to be provided to applicants during examination: NONE

Learning Objective: ADM.XA1.OB21 (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 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>1</u>
	Group #	_____	<u>1</u>
	K/A #	<u>015 AA2.11</u>	_____
	Importance Rating	_____	<u>3.8</u>

Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): When to jog RCPs during ICC.

Proposed Question: SRO 76

Given the following:

- A LOCA has occurred. All actions required by ERGs have been performed by the crew.
- Due to equipment failures, the following conditions exist:
 - RCS pressure is 900 psig and lowering.
 - RCS temperature is 1205°F and rising.
 - RVLIS indication is off-scale low (All RVLIS lights are DARK).

Which ONE (1) of the following is the correct procedure to be entered, and describes proper operation of RCPs while performing the procedure?

- A. FRC-0.1A, Inadequate Core Cooling; RCPs will be running and allowed to run in an attempt to provide core cooling.
- B. FRC-0.1A, Inadequate Core Cooling; RCPs have been stopped but may be started if secondary depressurization is ineffective in establishing core cooling.
- C. FRC-0.2A, Degraded Core Cooling; RCPs will be running and allowed to run in an attempt to provide core cooling.
- D. FRC-0.2A, Degraded Core Cooling; RCPs have been stopped but may be started if secondary depressurization is ineffective in establishing core cooling.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. RCPs will be stopped because of loss of subcooling and would have been stopped in EOP-0.0A.
- B. Correct.
- C. Incorrect. Wrong procedure entry and RCPs will be stopped because of loss of subcooling and would have been stopped in EOP-0.0A.
- D. Incorrect. Wrong procedure entry.

Technical Reference(s) FRC-0.1A, Flowchart (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: MCO.MI2.OB05 (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 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>1</u>
	Group #	_____	<u>1</u>
	K/A #	<u>022 G2.4.4</u>	
	Importance Rating	_____	<u>4.3</u>

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

Proposed Question: SRO 77

Given the following conditions:

- Unit 1 is at 100% power with all systems in normal alignments.
- 1-LI-459A, 1-LI-460A and 1-LI-461 Pressurizer level indications are trending UP.
- 1-LI-112A and 1-LI-185 VCT level indications are trending DOWN.
- RCS temperature and pressure are stable.

Which ONE (1) of the following describes the event in progress and action required?

- A. Charging line leak outside containment. Isolate the leak in accordance with ABN-103, Excessive Reactor Coolant Leakage.
- B. Letdown line leak outside containment. Isolate the leak in accordance with ABN-103, Excessive Reactor Coolant Leakage.
- C. Pressurizer level controlling channel has failed high. Select an alternate channel in accordance with ABN-706, Pressurizer Level Instrument Malfunction.
- D. Charging flow control valve failure. Establish Manual control of Charging flow in accordance with ABN-105, Chemical and Volume Control System Malfunction.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. VCT Level would not be trending down.
- B. Incorrect. VCT level would be trending up.
- C. Incorrect. Pressurizer level would be trending down for OPERABLE channel and VCT level would be trending up.
- D. Correct.

Technical Reference(s) ABN-105, Step 4.1 & 4.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CS2.OB14 (As available)

Question Source: Bank # X
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 5

Comments:
Callaway Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>1</u>
	Group #	_____	<u>1</u>
	K/A #	<u>027 AA2.06</u>	
	Importance Rating	_____	<u>3.9</u>

Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Conditions requiring plant shutdown.

Proposed Question: SRO 78

Given the following:

- Unit 2 is at 80% power.
- Four (4) hours ago, PRZR PORV 2-PCV-455A actuator failed.
- The PORV partially lifted and could not be repositioned.
- The associated block valve was closed to terminate the event.
- All Technical Specification ACTIONS were addressed.
- Engineering reports that common cause analysis of the PRZR PORVs indicates that 2-PCV-456 has the same actuator design flaw.
- The Shift Manager determines that 2-PCV-456 will be placed in the same operational status as 2-PCV-455A.

Which ONE (1) of the following describes the required Technical Specification ACTION associated with this event?

- A. Close and maintain power to 2-PCV-456 block valve within 1 hour. Be in HOT STANDBY within 6 hours.
- B. Close and remove power from 2-PCV-456 block valve within 1 hour. Be in HOT STANDBY within 6 hours.
- C. Close and maintain power to 2-PCV-456 block valve within 1 hour. Restore 1 PORV to OPERABLE status within 4 hours or be in HOT STANDBY within 6 hours.
- D. Close and remove power from 2-PCV-456 block valve within 1 hour. Restore 1 PORV to OPERABLE status within 4 hours or be in HOT STANDBY within 6 hours.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Remove power because the PORVs are considered to be incapable of being manually cycled.
- B. Correct. Remove power because the PORVs are considered to be incapable of being manually cycled. 2 PORVs inop and not capable of being cycled, shutdown within 6 hours.
- C. Incorrect. Remove power because the PORVs are considered to be incapable of being manually cycled and there are no 4 hour ACTIONS.
- D. Incorrect. Incorrect Tech Spec action. There are no 4 hour ACTIONS.

Technical Reference(s) TS 3.4.11, Action E (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.PP1.OB12 (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 2, 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>1</u>
	Group #	_____	<u>1</u>
	K/A #	<u>055 EA2.02</u>	_____
	Importance Rating	_____	<u>4.6</u>

Ability to determine or interpret the following as they apply to a Station Blackout: RCS core cooling through natural circulation cooling to S/G cooling.

Proposed Question: SRO 79

Unit 1 was operating at 98% power when a station blackout occurred.

Twenty minutes later, the following plant conditions exist:

- RCS pressure is 2235 psig and slowly increasing.
- RCS Loop T_{HOT} is 602°F in all 4 loops and stable.
- RCS Loop T_{COLD} is 565°F in all 4 loops and stable.
- Core exit TCs indicate approximately 610°F and rising slowly.
- Steam Generator pressures are approximately 1100 psig and stable.
- 1EA1 and 1EA2 Bus voltage is zero (0).

Which ONE (1) of the following describes the current plant conditions and action that will be directed?

(Steam Tables are provided.)

- A. Natural Circulation does not exist. Heat removal may be established by opening the condenser steam dumps in accordance with EOS-0.1A, Reactor Trip Response.
- B. Heat removal is being maintained by condenser steam dumps. Verify that Natural Circulation exists in accordance with ECA-0.0A, Loss of All AC Power.
- C. Natural Circulation does not exist. Heat removal may be established by opening the atmospheric relief valves in accordance with ECA-0.0A, Loss of All AC Power.
- D. Heat removal is being maintained by atmospheric relief valves. Verify that Natural Circulation exists in accordance with EOS-0.1A, Reactor Trip Response.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Condenser is not available. Plant condition is correct.
- B. Incorrect. Condenser is not available.
- C. Correct. With temperatures stable and Tcold above Tsat for SG pressure, and ΔT less than full load, Natural Circulation exists if CETs are stable or lowering. Because a Blackout has occurred, Circ Water Pumps are unavailable, making the Condenser unavailable.
- D. Incorrect. Wrong procedure entry. Conditions require ECA-0.0A.

Technical Reference(s) ECA-0.0A, Step 18 (Attach if not previously provided)
 EOS-0.01A, Attachment 3

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: EGA.XG6.OB602 (As available)

Question Source: Bank # X
 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 5

Comments:
 WTSI Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>1</u>
	Group #	_____	<u>1</u>
	K/A #	<u>057 G2.1.33</u>	
	Importance Rating	_____	<u>4.0</u>

Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.

Proposed Question: SRO 80

Given the following conditions:

- The Unit is in MODE 6.
- Core Alterations are in progress.
- 1-ALB-10B, 1.16, 118V CHAN I INV TRBL alarm is locked in.
- 1-LI-930, RWST level indicates zero (0) %.
- 1-NI-31, Source Range instrument is indicating zero (0) cpm.
- 1-PI-0405, RCS pressure indicates zero (0) psig.

In accordance with Technical Specifications, which ONE (1) of the following describes the ACTION required with respect to Core Alterations?

- A. Immediately suspend Core Alterations and any evolution that would dilute RCS boron concentration to below Technical Specification requirements.
- B. Core Alterations or evolutions that would dilute RCS boron concentration may continue if the Source Range Audio Count Rate is selected to an OPERABLE channel.
- C. Core Alterations may continue. Any evolution that would dilute RCS boron concentration to below Technical Specification requirements is prohibited.
- D. Immediately suspend Core Alterations. Ensure at least 1 Source Range NI is OPERABLE prior to performing any evolution that would dilute RCS boron concentration.

Proposed Answer: A

Explanation (Optional):

- A. Correct. TS 3.9.3 requires 2 operable Source Range Monitors for core alterations and any evolution that would reduce boron concentration.
- B. Incorrect. Because although the audio count rate would be selected to an operable channel, core alterations must be stopped.
- C. Incorrect. Because core alts must cease, although the second half of the item is correct.
- D. Incorrect. Although the first half is correct, two SR NIs must be operable for dilution.

Technical Reference(s) Tech Spec 3.9.3 (Attach if not previously provided)
SYS.AC3, Page 30 to 34

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.AC3.OB14 (As available)

Question Source: Bank # X
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 5

Comments:
WTSI Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	1
	K/A #	E05 G2.4.49	
	Importance Rating	_____	4.0

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

Proposed Question: SRO 81

Given the following conditions:

- Reactor trip has occurred due to loss of condenser vacuum.
- The crew has just transitioned to FRH-0.1A, Response to Loss of Secondary Heat Sink on a RED condition for the Heat Sink CSF Status Tree.
 - RCS pressure is 2300 psig and rising slowly.
 - SG pressures are 900 psig in all SGs and slowly trending down.
 - SG 1-01, 1-02, and 1-04 wide range levels are 25% and slowly trending down.
 - SG 1-03 wide range level is 28% and slowly trending down.

Which ONE (1) of the following actions is required?

- A. Initiate secondary depressurization to establish Condensate flow in accordance with FRH-0.1A.
- B. Trip all RCPs and initiate Bleed and Feed in accordance with FRH-0.1A.
- C. Re-establish Main Feedwater flow through the main or bypass feedwater regulating valves in accordance with FRH-0.1A.
- D. Initiate Safety Injection and return to EOP-0.0A in order to mitigate the SG pressure loss in EOP-2.0A, Faulted SG Isolation.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. This would be an action potentially required if Bleed and Feed criteria were not met.
- B. Correct. SG levels are below the setpoint for initiation.
- C. Incorrect. Setpoint for bleed and feed is 27% on 3 of 4 SGs. Would attempt if vacuum was not lost and criteria was not met.
- D. Incorrect. This would be appropriate if SI criteria was met, but SG pressure reduction is due to loss of heat sink.

Technical Reference(s) FRH-0.1A, Step 3 & Flowchart (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: FRH.XH3.OB604 (As available)

Question Source: Bank # X
 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 5

Comments:
 WTSI Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	028 AA2.10	
	Importance Rating		3.4

Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: Whether the automatic mode for PZR level control is functioning improperly, necessity of shift to manual modes

Proposed Question: SRO 82

Given the following:

- Unit 1 is operating at 100% power.
- PRZR Pressure Control is selected to Channel 1 (1-PI-455A).
- PRZR Level control is selected to Channel 1 (1-LI-459A).
- The common instrument line for PRZR Pressure Channel 1 and PRZR Level Channel 1 develops a leak.

Which ONE (1) of the following describes the effect on the Unit and the procedure selection required?

- A. PRZR Heaters will energize; Charging flow must be manually controlled in accordance with ABN-706, Pressurizer Level Instrumentation Malfunction.
- B. Pressurizer Spray Valves will open; Letdown will isolate. Letdown will be restored in accordance with ABN-105, CVCS Malfunctions.
- C. PRZR Heaters will energize; Letdown will isolate. Letdown will be restored in accordance with ABN-105, CVCS Malfunctions.
- D. Pressurizer Spray Valves will open; Charging flow must be manually controlled in accordance with ABN-706, Pressurizer Level Instrumentation Malfunction.

Proposed Answer: A

Explanation (Optional):

- A. Correct. Heaters energize because indicated pressure will go down. Level will be affected because Channel 1 is controlling.
- B. Incorrect. Spray valves will not open because controlling pressure will fail low.
- C. Incorrect. Letdown will not isolate because this failure will cause indicated level from the controlling channel to be high
- D. Incorrect. Spray valves would not open because controlling pressure would fail low

Technical Reference(s) ABN-705, Steps 2.1 and 2.2.b (Attach if not previously provided)
 ABN-706, Steps 2.1 and 2.2.a

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.PP1.OB18 (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 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>1</u>
	Group #	_____	<u>2</u>
	K/A #	<u>037 G2.2.22</u>	_____
	Importance Rating	_____	<u>4.1</u>

Equipment Control Knowledge of limiting conditions for operations and safety limits.

Proposed Question: SRO 83

Unit 1 Reactor power is 75%.

RCS leak rate data is as follows:

- Total RCS leakage rate is 9.1 gpm.
 - Leakage to PRT is 7.0 gpm.
 - Leakage to the Reactor Coolant Drain Tank is 1.3 gpm.
 - Total primary to secondary leakage is 0.36 gpm.
-
- SG 1 – 0.09 gpm
 - SG 2 – 0.19 gpm
 - SG 3 – 0.07 gpm
 - SG 4 – 0.01 gpm

What, if any, are the required Technical Specification ACTION(s) based on the above conditions?

- A. Reduce power to $\leq 50\%$ in next hour & be in MODE 3 in the following 2 hours.
- B. Reduce leakage to within limits in next 4 hours.
- C. Be in MODE 3 in the next 6 hours.
- D. No action is required.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. These are the ABN-106, High Secondary Activity requirements, not Tech Specs.
- B. Incorrect. Action is for identified and unidentified.
- C. Correct. Action for excessive primary-secondary leak.
- D. Incorrect. Leakage limits are exceeded, therefore ACTION is required.

Technical Reference(s) Tech Spec 3.4.13 & Bases (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.RC1.OB18 (As available)

Question Source: Bank # X
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 2

Comments:
WTSI Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>1</u>
	Group #	_____	<u>2</u>
	K/A #	<u>076 AA2.05</u>	
	Importance Rating	_____	<u>2.5</u>

Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: CVCS letdown flow rate indication
Proposed Question: SRO 84

Given the following:

- Unit 1 is at 65% power following a load rejection.
- 1-RE-0406, Gross Failed Fuel Monitor, indication has been rising for the past 2 hours, and is now in alarm.

Which ONE (1) of the following describes the procedure entry and action required?

- A. Enter ABN-102, High Reactor Coolant Activity, and isolate Letdown.
- B. Enter ABN-102, High Reactor Coolant Activity, and raise Letdown flow to 120-140 gpm.
- C. Respond to rising indication on 1-RE-0406 per ALM-3200, Alarm Procedure DRMS, and bypass mixed bed demineralizer per SOP-103A, Chemical and Volume Control System.
- D. Respond to rising indication on 1-RE-0406 per ALM-3200, Alarm Procedure DRMS, and alternate mixed bed demineralizers per SOP-103A, Chemical and Volume Control System.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Letdown is increased for RCS cleanup.
- B. Correct. Directed by ABN-102
- C. Incorrect. This action not directed.
- D. Incorrect. This action not directed.

Technical Reference(s) ABN-102, Steps 2.1 and 2.3.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CS1.OB20 (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 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>1</u>
	Group #	_____	<u>2</u>
	K/A #	<u>E15 G2.1.14</u>	
	Importance Rating	_____	<u>3.3</u>

Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel.

Proposed Question: SRO 85

Given the following conditions:

- A LOCA has occurred on Unit 1.
- The crew has completed EOP-0.0A, Reactor Trip or Safety Injection, to the point of transition to another procedure.
- The following conditions exist in Containment:
 - Containment Pressure 16 psig and rising slowly.
 - Containment Sump Level 816 feet and rising slowly.
 - Containment Radiation 27 Rem/Hr and stable.

Which ONE (1) of the following describes the condition that exists, the procedure transition that will be made per ERG Rules of Usage, and the strategy for recovery?

- A. ORANGE condition on Containment Pressure ONLY. Enter FRZ-0.1A, Response to Containment High Pressure and ensure Containment Isolation and Heat Removal functions are satisfied.
- B. ORANGE condition on Containment Sump Level ONLY. Enter FRZ-0.2A, Response to Containment Flooding and attempt to locate and isolate the source of the leak; notify plant staff to obtain recommended action for disposition of the waste.
- C. YELLOW condition on Containment Radiation ONLY. Enter FRZ-0.3A, Response to Containment High Radiation Level at your own discretion to ensure plant systems are aligned or proceed to the appropriate Optimal Recovery Procedure.
- D. RED condition on Containment Pressure ONLY. Enter FRZ-0.1A, Response to Containment High Pressure and ensure Containment Isolation and Heat Removal functions are satisfied.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>2</u>
	Group #	_____	<u>1</u>
	K/A #	<u>003 A2.01</u>	_____
	Importance Rating	_____	<u>3.9</u>

Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Problems with RCP seals, especially rates of seal leak-off

Proposed Question: SRO 86

Unit 1 is at 50% power with the following alarms and indications:

- 1-ALB-5A, 1.2, ANY RCP SEAL 1 LKOFF FLO HI is in alarm.
- 1-ALB-5A, 3.2, ANY RCP SEAL 2 LKOFF FLO HI is in alarm.
- 1-FR-0157, RCP 1-01 SEAL LEAKOFF / SEAL WATER INJECTION FLOW RECORDER, RCP 1 SEAL LKOFF FLO (WR) is indicating off-scale high.
- 1-FR-0156, RCP 1-02 SEAL LEAKOFF / SEAL WATER INJECTION FLOW RECORDER, RCP 2 SEAL LKOFF FLO (WR) is reading 2.11 gpm.
- 1-FR-0155, RCP 1-03 SEAL LEAKOFF / SEAL WATER INJECTION FLOW RECORDER, RCP 3 SEAL LKOFF FLO (WR) is reading 2.04 gpm.
- 1-FR-0154, RCP 1-04 SEAL LEAKOFF / SEAL WATER INJECTION FLOW RECORDER, RCP 4 SEAL LKOFF FLO (WR) is reading 2.08 gpm.
- RCP 1-01 LOW SEAL WTR BEARING TEMP (T0417A) is indicating 202°F, YELLOW and rising.
- RCP 1-02 LOW SEAL WTR BEARING TEMP (T0437A) is indicating 169°F, GREEN and stable.
- RCP 1-03 LOW SEAL WTR BEARING TEMP (T0457A) is indicating 171°F, GREEN and stable.
- RCP 1-04 LOW SEAL WTR BEARING TEMP (T0477A) is indicating 168°F, GREEN and stable.

Which ONE (1) of the following describes the impact on the Unit and the procedure use required?

- A. Seal #1 is degrading. Enter ABN-101, Reactor Coolant Pump Trip/Malfunction, and initiate an orderly shutdown to MODE 3 within 8 hours.
- B. Seal #1 has failed. Enter ABN-101, Reactor Coolant Pump Trip/Malfunction. Trip the Reactor, trip RCP 1-01, go to EOP-0.0A, Reactor Trip or Safety Injection, and isolate seal leakoff within 3-5 minutes.
- C. Seal #2 is degrading. Enter ABN-101, Reactor Coolant Pump Trip/Malfunction, and initiate an orderly shutdown to MODE 3 within 8 hours.
- D. Seal #2 has failed. Enter ABN-101, Reactor Coolant Pump Trip/Malfunction. Trip the reactor, trip RCP 1-01, go to EOP-0.0A, Reactor Trip or Safety Injection, and isolate seal leakoff within 3-5 minutes.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Correct diagnosis but condition requires a Reactor trip with high seal leakoff flows and bearing temps rising.
- B. Correct.
- C. Incorrect. #2 seal failure would indicate lower #1 seal leakoff and standpipe level alarms. Action would be correct.
- D. Incorrect. #2 seal failure would be unlikely to require a reactor trip unless RCP temps were increasing.

Technical Reference(s) ABN-101, Steps 4.1 and 4.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.RC1.OB17 (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 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>2</u>
	Group #	_____	<u>1</u>
	K/A #	<u>004 G2.4.6</u>	_____
	Importance Rating	_____	<u>4.0</u>

Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.

Proposed Question: SRO 87

Given the following conditions:

- A Steam Line Break has occurred.
- The crew is establishing normal charging in accordance with EOS-1.1A, Safety Injection Termination.
- The faulted SG has stopped depressurizing.
- While attempting to control PRZR level with normal charging, PRZR level continues to lower.

Which ONE (1) of the following describes the action required?

- A. Reinitiate Safety Injection and transition to EOP-1.0A, Loss of Reactor or Secondary Coolant.
- B. Reinitiate Safety Injection and transition to EOP-0.0A, Reactor Trip or Safety Injection.
- C. Realign the CCP Injection flowpath and transition to EOS-1.2A, Post LOCA Cooldown and Depressurization.
- D. Realign the CCP Injection flowpath and remain in EOS-1.1A, SI Termination.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Once SI is reset, the correct action is to manually operate equipment. In this case, SI is reset prior to establishing charging flow.
- B. Incorrect. Would be correct if events occurred in ES-0.1. ES-1.1 requires manual operation and transition to correct procedure for LOCA.
- C. Correct. Step 11 RNO. SIPs not stopped yet. Letdown not established yet. Crew was either in wrong procedure or another event occurred. Equipment alignment at this point would require transition to EOS-1.2A for more appropriate recovery.
- D. Incorrect. ES-1.1 will not provide the action required for the event that has developed.

Technical Reference(s) EOS-1.1A, Step 11 RNO (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: EO1.XG3.OB602 (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 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>2</u>
	Group #	_____	<u>1</u>
	K/A #	<u>007 G2.4.4</u>	
	Importance Rating	_____	<u>4.3</u>

Emergency Procedures / Plan Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures

Proposed Question: SRO 88

Given the following conditions:

- A Reactor Trip and Safety Injection actuation have occurred on Unit 1.
- The crew is performing actions contained in EOP-0.0A, Reactor Trip or Safety Injection.
- RCS pressure is 1850 psig and stable.
- SG pressures are 1000 psig and stable.
- SG levels are being controlled by AFW.
- Containment pressure is 0.8 psig and stable.
- PRT pressure is 24 psig and stable.
- PRT temperature is 200°F and stable.
- PRT level is 71%.

Which ONE (1) of the following describes the action and procedure use required for these conditions?

- A. Determine cause of PRT conditions and continue in EOP-0.0A until transition to EOS-1.1A, SI Termination.
- B. Transition to EOP-1.0A, Loss of Reactor or Secondary Coolant, due to RCS pressure abnormally low with PRT conditions abnormal.
- C. Transition to ECA-1.2A, LOCA Outside Containment, due to RCS pressure abnormally low with Containment parameters normal.
- D. Transition to EOS-1.2A, Post LOCA Cooldown and Depressurization, to restore Charging and Letdown and secure ECCS pumps.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Transition would also be based on CNMT parameters.
- C. Incorrect. Transition would be based on Aux Bldg Radiation levels.
- D. Incorrect. Transition would be from E-1, but actions are correct.

Technical Reference(s) EOP-0.0A, Steps 14 and 15 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: EO0.XG2.OB10 (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 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>2</u>
	Group #	_____	<u>1</u>
	K/A #	<u>039 2.1.14</u>	_____
	Importance Rating	_____	<u>3.3</u>

Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel.

Proposed Question: SRO 89

Given the following:

- A Steam Line Break has occurred.
- The Reactor has tripped. Safety Injection is actuated.
- The crew is preparing to exit EOP-0.0A, Reactor Trip or Safety Injection.
- 1-PI-514A, MSL1 PRESS CHAN I is indicating 580 psig and lowering.
- 1-PI-524A, MSL2 PRESS CHAN I is indicating 585 psig and lowering.
- 1-PI-534A, MSL3 PRESS CHAN I is indicating 581 psig and lowering.
- 1-PI-544A, MSL4 PRESS CHAN I is indicating 579 psig and lowering.
- 1-PK-2325, SG 1 ATMOS RLF VLV CTRL has the amber MAN and green OUTPUT lights lit with zero (0) % output indicated.
- 1-PK-2326, SG 2 ATMOS RLF VLV CTRL has the amber MAN and green OUTPUT lights lit with zero (0) % output indicated.
- 1-PK-2327, SG 3 ATMOS RLF VLV CTRL has the amber MAN and green OUTPUT lights lit with zero (0) % output indicated.
- 1-PK-2328, SG 4 ATMOS RLF VLV CTRL has the amber MAN and green OUTPUT lights lit with zero (0) % output indicated.
- 1-ZL-2325, SG 1 ATMOS RLF VLV indicates RED light lit, GREEN light dark.
- 1-ZL-2326, SG 2 ATMOS RLF VLV indicates RED light lit, GREEN light dark.
- 1-ZL-2327, SG 3 ATMOS RLF VLV indicates RED light lit, GREEN light dark.
- 1-ZL-2328, SG 4 ATMOS RLF VLV indicates RED light lit, GREEN light dark.

Assuming all automatic actions occurred, which ONE (1) of the following describes the FIRST action that will stop the SG depressurization for this condition and the procedure that directs the action?

- A. Close the MSIVs and MSIV Bypass Valves per EOP-2.0A, Faulted SG Isolation.
- B. Dispatch a PEO to locally close SG Atmospheric block valves per EOP-2.0A, Faulted SG Isolation.
- C. Close the MSIVs and MSIV Bypass Valves per ECA-2.1A, Uncontrolled Depressurization of All Steam Generators.
- D. Dispatch a PEO to locally close SG Atmospheric block valves per ECA-2.1A, Uncontrolled Depressurization of All Steam Generators.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Atmospheric Dump valves are open and upstream of MSIVs.
- B. Incorrect. PEO will not be dispatched until ECA-2.1. E-2 has the crew check if any SG is intact. If not, go directly to ECA-2.1.
- C. Incorrect. MSIV closure will not prevent blowdown of SGs with ADVs open.
- D. Correct. Closing MSIVs will not stop the cooldown because Atmospherics are upstream.

Technical Reference(s) ECA-2.1A, Step 1 RNO (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: EO2.XG4.OB604 (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 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>2</u>
	Group #	_____	<u>1</u>
	K/A #	<u>103 A2.02</u>	_____
	Importance Rating	_____	<u>3.2</u>

Ability to (a) predict the impacts of the following malfunctions or operations on the containment system-and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations Necessary plant conditions for work in containment

Proposed Question: SRO 90

Given the following on Unit 1:

- During refueling operations, a spent fuel assembly is dropped in Containment several feet from the core opening.
- Containment ventilation was automatically isolated and Containment was evacuated.

Containment isolation was due to high radiation level (red alarm) on _____ and the _____ must be placed in operation to lower activity levels without releasing airborne contaminants to the environment.

- A. CAG-197, CNTMT AIR PIG GAS (1-RE-5503);
 Containment Pre-Access Ventilation System
- B. RFC-110, LRAM W REFUEL CAV 860 (1-RE-6251);
 Containment Pre-Access Ventilation System
- C. CAG-197, CNTMT AIR PIG GAS (1-RE-5503);
 Containment Purge System
- D. RFC-110, LRAM W REFUEL CAV 860 (1-RE-6251);
 Containment Purge System

Proposed Answer: A

Explanation (Optional):

- A. Correct. ABN-908 directs use of Containment Pre-Access Ventilation. Both the Purge and Pre-Access Systems are operated under the same SOP, therefore, the procedure number and name was intentionally omitted.
- B. Incorrect. RFC-110 will not auto isolate.
- C. Incorrect. ABN-908 directs use of Containment Pre-Access Ventilation.
- D. Incorrect. RFC-110 will not auto isolate.

Technical Reference(s) ABN-908, Step 2.1 & 2.3.5 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: RFO.XH5.OB501 (As available)

Question Source: Bank # RFO.XH5.OB501-01
 Modified Bank # _____ (Note changes or attach parent)
 New _____

Question History: Last NRC Exam CPSES 2005

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

10 CFR Part 55 Content: 55.41 _____
 55.43 5, 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>2</u>
	Group #	_____	<u>2</u>
	K/A #	<u>028 G2.1.14</u>	
	Importance Rating	_____	<u>3.3</u>

Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel.

Proposed Question: SRO 91

Given the following conditions:

- A LOCA has occurred on Unit 2.
- The crew is performing actions of EOP-1.0B, Loss of Reactor or Secondary Coolant, after transition from FRC-0.2B, Response to Degraded Core Cooling.
- Containment Hydrogen concentration is 2.8% and rising slowly.
- The crew is considering use of the Electric Hydrogen Recombiners.

Which ONE (1) of the following describes the requirement for operation of the Hydrogen Recombiners for this condition?

- A. Recombiners are required to maintain Containment hydrogen concentration below design basis. Place at least ONE (1) recombiner in service in accordance with OP-206A, Electric Hydrogen Recombiner System.
- B. Recombiners are required to maintain Containment hydrogen concentration below design basis. Notify plant Engineering to determine if it is safe to place a recombiner in service at the current containment hydrogen concentration. Continue in EOP-1.0B
- C. Recombiners are NOT required to maintain Containment hydrogen concentration below design basis. Use of a recombiner is prohibited at the current containment hydrogen concentration level. Continue in EOP-1.0B.
- D. Recombiners are NOT required to maintain Containment hydrogen concentration below design basis. Notify plant Engineering to determine if it is safe to place a recombiner in service at the current containment hydrogen concentration, while continuing in EOP-1.0B.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>2</u>
	Group #	_____	<u>2</u>
	K/A #	<u>075 G2.1.2</u>	_____
	Importance Rating	_____	<u>4.0</u>

Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.

Proposed Question: SRO 92

Given the following conditions:

- A Plant Startup is in progress.
- Reactor power is 20%.
- The Main Generator is connected to the grid.
- The following alarms are received:
 - ALB-9A, 8.11, ANY CWP OVRLOAD/TRIP
 - ALB-9A, 1.11, CWS LOC PNL TRBL
- The Balance of Plant Operator determines that amber lights are lit on all four (4) Circulating Water Pump control switches.
- The Unit Supervisor enters ABN-304, Main Condenser and Circulating Water System Malfunction.

Which ONE (1) of the following is required for this condition?

- A. Trip the turbine and enter ABN-403, Turbine Trip Response; Discontinue use of ABN-304.
- B. Trip the reactor and enter EOP-0.0A, Reactor Trip or Safety Injection; Ensure others continue in ABN-304 as time allows.
- C. Trip the turbine and enter ABN-403, Turbine Trip Response; Continue in ABN-304 as time allows.
- D. Trip the reactor and enter EOP-0.0A, Reactor Trip or Safety Injection; Discontinue use of ABN-304.

Proposed Answer: **B**

Explanation (Optional):

- A. Incorrect. Others will continue use of ABN-304 per step 1 RNO.
- B. Correct. Others will continue use of ABN-304 per step 1 RNO.
- C. Incorrect. EOP-0.0A entry is required.
- D. Incorrect. Reactor trip not required at this power level, others will continue use of ABN-304 per Step 1 RNO.

Technical Reference(s) ABN-304, Steps 2.1 and 2.3.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CW1.OB11 (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 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	041 A2.02	
	Importance Rating		3.6

Ability to (a) predict the impacts of the following malfunctions or operations on the SDS; and (b) based on those predictions use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Steam valve stuck open

Proposed Question: SRO 93

Given the following conditions:

- Unit 2 is stable at 80% power.
- A failure in the Steam Dump control circuitry causes the Bank One Steam Dumps to open.
- The operator immediately takes the Train A and B Steam Dump Interlock Select Switch to OFF-RESET to close the valves.
- One of the Steam Dump Valves fails to close.

Which ONE (1) of the following describes the approximate power level that the plant will reach, and what action(s) will mitigate the event?

Power will rise to...

- A. ~86% and stabilize; Main Turbine load should be reduced to lower power per IPO-003B, Power Operations.
- B. ~92% and stabilize; an emergency boration should be commenced to reduce power per ABN-107, Emergency Boration.
- C. ~86% and stabilize; an emergency boration should be commenced to reduce power per ABN-107, Emergency Boration.
- D. ~92% and stabilize; Main Turbine load should be reduced to lower power per IPO-003B, Power Operations.

Proposed Answer: A

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>3</u>
	Group #	_____	<u>1</u>
	K/A #	<u>G2.1.32</u>	_____
	Importance Rating	_____	<u>3.8</u>

Ability to explain and apply all system limits and precautions.

Proposed Question: SRO 94

Which ONE (1) of the following describes Heat Flux Hot Channel Factor (FQ(Z)), and which ONE (1) of the following is the most limiting accident for determining maximum FQ(Z) values?

- A. Peak fuel pellet power; Large Break LOCA
- B. Average fuel rod power; Large Break LOCA
- C. Peak fuel pellet power; Loss of Forced Circulation
- D. Average fuel rod power; Loss of Forced Circulation

Proposed Answer: A

Explanation (Optional):

- A. Correct. Per TS bases maintaining FQ(Z) within limits "is to preclude core power distributions that could lead to violation of the following fuel design criterion: During a large break LOCA, the peak cladding temperature must not exceed 2200°F and during an ejected rod accident, the energy deposition to the fuel must not exceed 280 cal/gm."
- B. Incorrect. FQ(Z) is peak as opposed to average fuel rod power
- C. Incorrect. Applicable accident is a LBLOCA.
- D. Incorrect. FQ(Z) is peak as opposed to average fuel rod power.

Technical Reference(s) TS 3.2.1 Bases (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: MCO.TA4.OB006 (As available)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>3</u>
	Group #	_____	<u>1</u>
	K/A #	<u>G2.1.11</u>	_____
	Importance Rating	_____	<u>3.8</u>

Knowledge of less than one hour technical specification action statements for systems.

Proposed Question: SRO 95

Given the following:

- During a Reactor startup with Control Bank D at 20 steps and the Reactor subcritical, the DRPI ROD DEV annunciator is received.
- The Reactor Operator observes that Control Bank B Rod F2 indicates 210 steps while Control Bank B Group 1 Step Counter indicates 228 steps.
- No other alarms are received and all other parameters indicate normal.

Based on this information the crew should...

- A. consider the rod misaligned and verify SDM to be within the limits of the COLR within one (1) hour.
- B. NOT consider the rod misaligned and continue rod withdrawal to reach Critical conditions then realign the rod.
- C. consider DRPI *inoperable* and compare DRPI and Step Counter positions at least once per 12 hours.
- D. consider DRPI *inoperable* and immediately open all Reactor Trip Breakers.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Rod would be considered misaligned if > 12 steps with demand.
- C. Incorrect. DRPI not OPERABLE yet, would need more information.
- D. Incorrect. DRPI not OPERABLE, would perform this action if it was lost.

Technical Reference(s) TS 3.1.4, ACTION B (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.CR1.OB15 (As available)

Question Source: Bank # SYS.CR1.OB15-16**
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam CPSES 2002

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

10 CFR Part 55 Content: 55.41 _____
55.43 2

Comments:

** Distractors A (answer) & D were significantly modified; however, conditions in the Stem were not altered.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>3</u>
	Group #	_____	<u>2</u>
	K/A #	<u>G2.2.31</u>	
	Importance Rating	_____	<u>2.9</u>

Knowledge of procedures and limitations involved in initial core loading.

Proposed Question: SRO 96

Which ONE (1) of the following describes the operation of the Source Range High Flux at Shutdown alarm during a core reload following a full offload, in accordance with RFO-102, Refueling Operations?

- A. Normally set at 300 CPS. May NOT be blocked while performing Core Alterations.
- B. Normally set at 300 CPS. May be blocked during Core Alterations ONLY if SR counts are continuously monitored and ICRR is performed.
- C. Normally set at 100 CPS above the measured countrate. May NOT be blocked while performing Core Alterations.
- D. Normally set at 100 CPS above the measured countrate. May be blocked during Core Alterations ONLY if SR counts are continuously monitored and ICRR is performed.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Correct setpoint and blocking time should be minimized, but the alarm may be blocked.
- B. Correct.
- C. Incorrect. Plausible because 100 cps above background is a nominally used value. Blocking time should be minimized, but the alarm may be blocked.
- D. Incorrect. Incorrect setpoint but plausible because 100 cps above background is a nominally used value.

Technical Reference(s) RFO-102, Step 5.2.3.F and 5.5.5 (Attach if not previously provided)
ALM-0064A, 2.1 Note

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.EC1.OB07 (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 6

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>3</u>
	Group #	_____	<u>2</u>
	K/A #	<u>G2.2.11</u>	_____
	Importance Rating	_____	<u>3.4</u>

Knowledge of the process for controlling temporary changes.

Proposed Question: SRO 97

In accordance with STA-602, Temporary Modifications, who is responsible for performing walkdowns of active Temporary Modifications, and how often is the walkdown performed?

- A. Work Control Operations Supervisor; monthly
- B. System Engineer; monthly
- C. Temporary Modification Coordinator; quarterly
- D. Shift Manager; quarterly

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Plausible since this individual maintains and files copies of Temporary Modifications including clearances. Action performed on a quarterly basis.
- B. Incorrect. Plausible since this individual reviews and concurs with Temporary Modification requests. Also coordinates, plans, designs, installs, tests and restores from Temporary Modifications. Action performed on a quarterly basis.
- C. Correct. In accordance with STA-602, Step 6.9.2.
- D. Incorrect. Plausible since this individual maintains active and installed Temporary Modification files. Reviews and approves installation of Temporary Modifications.

Technical Reference(s) STA-602, Step 4.1 & 6.9.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: ADM.XA1.OB14 (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 3

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>3</u>
	Group #	_____	<u>3</u>
	K/A #	<u>G2.3.3</u>	_____
	Importance Rating	_____	<u>2.9</u>

Knowledge of SRO responsibilities for auxiliary systems that are outside the control room (e.g., waste disposal and handling systems).

Proposed Question: SRO 98

Given the following conditions:

- Both Units are operating at 100% power with a discharge of Plant Effluent Tank, PET X-01 in progress to Outfall 004 (formerly Outfall 101) via Unit 1 Circulating Water (CW).
- All power is lost to the Unit 1 non-safeguards buses.
- A PEO finds that 1-HV-WM181, Outfall 004 CWS DISCH VLV, is open.

Which ONE (1) of the following is the status of the discharge?

- A. Discharge is secured due to X-RV-5253, LWPS Discharge Isolation Valve closing from loss of Unit 1 CW pumps. Release permit must be closed and reinitiated when Unit 1 CW is restored.
- B. Discharge is secured due to X-RV-5253, LWPS Discharge Isolation Valve closing from loss of Unit 1 CW pumps. Release permit may remain open and release reinitiated when Unit 1 CW is restored.
- C. Discharge continues due to X-RV-5253, LWPS Discharge Isolation Valve remaining open due to Unit 2 CW pumps meeting required coincidence. Terminate the release and close out the Release permit.
- D. Discharge continues due to X-RV-5253, LWPS Discharge Isolation Valve remaining open due to Unit 2 CW pumps meeting required coincidence. Release permit may remain open and release reinitiated when Unit 1 CW is restored.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Release permit must be closed, however, required coincidence is not met for valve closure, therefore, the release was not terminated.
- B. Incorrect. Release permit could remain open but only if it were determined that the release did not need to be terminated.
- C. Correct.
- D. Incorrect. Partially correct in that the release will be terminated, however, once terminated the release permit must be closed out.

Technical Reference(s) SYS.WP1, page 36 & Logic Dg. (Attach if not previously provided)
STA-603, pgs. 5, 9,& 13

Proposed references to be provided to applicants during examination: NONE

Learning Objective: SYS.WP1.OB02 (As available)

Question Source: Bank # SYS.WP1.OB02-27
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 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	<u>3</u>
	Group #	_____	<u>4</u>
	K/A #	<u>G2.4.22</u>	_____
	Importance Rating	_____	<u>4.0</u>

Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.

Proposed Question: SRO 99

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- EDG 1-02 is out of service and is expected to return to service in two (2) hours.
- Subsequently, the following events occur:
 - A loss of offsite power.
 - The reactor is tripped and the crew enters EOP-0.0A, Reactor Trip or Safety Injection
 - SI is NOT actuated.
 - The crew made a transition to FRH-0.1A, Loss of Secondary Heat Sink, based on a CSFST RED Path.
- DG 1-01 output breaker subsequently trips on a differential lockout on Bus 1EA1.

Which ONE (1) of the following describes the actions that will be taken and its bases?

- A. Immediately transition to ECA-0.0A, Loss Of All AC Power. All other procedures in the ERG network assume **both** 6.9 KV ESF busses are available.
- B. Immediately transition to ECA-0.0A, Loss Of All AC Power. All other procedures in the ERG network assume a **minimum** of ONE (1) 6.9 KV ESF bus is available.
- C. Remain in FRH-0.1A until feed is restored and the RED condition is cleared, and then transition to ECA-0.0A, Loss of All AC Power. RED or ORANGE path Function Recovery procedures must be performed until the condition is cleared, or unless a higher priority RED or ORANGE condition exists.
- D. Remain in FRH-0.1A until directed to return to procedure in effect, and then transition to ECA-0.0A, Loss of All AC Power. RED or ORANGE path Function Recovery procedures must be finished to completion unless a higher priority RED or ORANGE condition exists.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.7	
	Importance Rating		3.8

Knowledge of event based EOP mitigation strategies.

Proposed Question: SRO 100

Given the following:

- A Steam Generator Tube Rupture (SGTR) has occurred on Unit 2.
- Actions have been taken in EOP-3.0B, Steam Generator Tube Rupture, to the point where a recovery procedure will be selected.

Which ONE (1) of the following procedures is the preferred method for a post-SGTR cooldown, and describes the primary concern over use of the procedure?

- A. EOS-3.1B, Post SGTR Cooldown Using Backfill; concern is length of time to cooldown due to capacity of waste processing facilities.
- B. EOS-3.1B, Post SGTR Cooldown Using Backfill; concern is secondary side water potentially diluting primary side boron concentration.
- C. EOS-3.3B, Post SGTR Cooldown Using Steam Dump; concern is radiological consequences if condenser steam dump is not available.
- D. EOS-3.3B, Post SGTR Cooldown Using Steam Dump; concern is availability of Auxiliary Feedwater if condenser steam dump is not available.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. The concern described is for use of SG blowdown.
- B. Correct. Generally preferred method is backfill. Dilution of primary is a concern.
- C. Incorrect. Concern is correct and procedure selection is desirable if feedwater supply is limited due to the speed at which the cooldown can be performed; however, EOS-3.1B is preferred.
- D. Incorrect. Concern is correct and procedure selection is desirable if feedwater supply is limited due to the speed at which the cooldown can be performed; however, EOS-3.1B is preferred.

Technical Reference(s) EOP-3.0B Basis; (Attach if not previously provided)
Attachment 6, Page 41

Proposed references to be provided to applicants during examination: NONE

Learning Objective: EO3.XG5.OB13 (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 5

Comments: