Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	215004 K1.02	
	Importance Rating	3.4	

K1.02 – Knowledge of the physical connections and/or cause– effect relationships between SOURCE RANGE MONITOR (SRM) SYSTEM and the following: Reactor manual control

Proposed Question: Common 1

Unit 1 startup is in progress.

Operators are preparing to withdraw the SRM A and D detectors to maintain count rates within limits.

SRMs indications are as follows:

SRM A	22000 cps
SRM D	18000 cps
Retract Permit Light	Illuminated for all SRMs

IRMs indicate between 10 and 20 on range 1

SRM A and D drive motors are selected.

The Drive Out pushbutton is depressed, and sticks in the depressed position.

The two SRM detectors will stop withdrawing when ___(1)___. A Rod Block ___(2)___ occur.

A. (1) EITHER channel's count rate drops below 100 cps
(2) will NOT

B. (1) their RESPECTIVE full out limit is reached
(2) will

C. (1) EITHER channel's retract permit light extinguishes
(2) will NOT

D. (1) their RESPECTIVE retract permissive light extinguishes
(2) will

Proposed Answer: B

Explanation (Optional):

There are no interlocks that stop detector movement between the upper and lower stops, only the 1C651 pushbutton and the full in and out limits control movement. In this case the detectors will fully withdraw until the withdraw limit is reached. When counts go below 100 cps, the retract permit light goes out, and a Rod Out Block is generated.

A. Incorrect– Count rate dropping below 100 cps will result in a control rod block, but will not stop the detector drive.

B. Correct– The detector withdraws until the lower stop is reached. A rod–block will be generated when counts go below 100 cps.

C. Incorrect – The retract permit light will illuminate when individual count rate is above 100 cps. This indicates to the operator that sufficient count rate exists to withdraw SRM detectors without receiving a rod block, but will not restrict detector motion. Each channel has its own retract permit logic with no inputs from any other SRM logic.

D. Incorrect – The retract permit light will illuminate when individual count rate is above 100 cps. This indicates to the operator that sufficient count rate exists to withdraw SRM detectors without receiving a rod block, but will not restrict detector motion. Each channel has its own retract permit logic with no inputs from any other SRM logic.

Technical Reference(s): TM–OP–078A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–078A / 1340.c (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 6

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	259002 K1.08	
	Importance Rating	3.2	

K1.08 – Knowledge of the physical connections and/or cause– effect relationships between REACTOR WATER LEVEL CONTROL SYSTEM and the following: Recirculation system: Plant–Specific

Proposed Question: Common 2

A 40 MWth Power Maneuvering Increase request is in progress on a Reactor Recirc Pump.

Which one of the following identifies the Feedwater Level Control System signals that provide "proportional limit" input to the Reactor Recirc Speed Control System (RRSCS), AND describes the effect exceeding these proportional limits will have on RRSCS?

	Signals	Effects
A.	Total Feed Flow Average RPV Water Level	IMMEDIATELY places RRSCS in "HOLD" mode, then shifts RRSCS to "MANUAL" mode after a 30 minute time delay if the condition has not cleared
B.	Total Feed Flow Average RPV Water Level	IMMEDIATELY shifts RRSCS to "MANUAL" mode
C.	Total Steam Flow Total Feed Flow	IMMEDIATELY shifts RRSCS to "MANUAL" mode
D.	Total Steam Flow Total Feed Flow	IMMEDIATELY places RRSCS in "HOLD" mode, then shifts RRSCS to "MANUAL" mode after a 30 minute time delay if the condition has not cleared

Proposed Answer: D

Explanation (Optional):

A. Incorrect– RPV level not an input to RRSCS

B. Incorrect – RPV level not an input to RRSCS, places RRSCS in HOLD first

C. Incorrect – places RRSCS in hold first.

D. **Correct, total feed and steam flow signals input to proportional limits. When exceeded, then immediately RRSCS is placed in hold mode, and starts a 30 minute timer that shifts RRSCS to manual if limits are still exceeded.**

Technical Reference(s): TM–OP–064E (Attach if not previously provided)

OP–164–002 Rev 6, Sect. 2.10

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–064E / 16021 (As available)

Question Source: Bank # CERT LOC 23

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

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	262001 K2.01	
	Importance Rating	3.3	

K2.01 – Knowledge of electrical power supplies to the following: Off–site sources of power (AC Electrical Distribution)

Proposed Question: Common 3

Unit 1 startup is in progress.

The Main Generator has been synchronized to the grid.

Auxiliary Bus 11A is being transferred to the Main Generator supply.

The control switch for AUX XFMR 11 TO BUS 11A BKR 1A10101 sticks in the CLOSE position when released, and cannot be returned to the Normal After Close position.

AUX XFMR 11 TO BUS 11A BKR 1A10101 closes and remains closed.

Which of the following describes the Unit 1 response?

A. TIE BUS TO BUS 11A BKR 1A10104 immediately trips open
Aux Bus 11A is fed from the Aux Transformer, ONLY

B. TIE BUS TO BUS 11A BKR 1A10104 remains closed
Aux Bus 11A is fed from both Startup Bus 10 and the Aux Transformer

C. TIE BUS TO BUS 11A BKR 1A10104 trips open after a 15–second time delay
Aux Bus 11A is fed from the Aux Transformer, ONLY

D. AUX XFMR 11 TO BUS 11A BKR 1A10101 trips open if TIE BUS TO BUS 11A BKR 1A10104 does not open in 15 seconds
Aux Bus 11A is fed from Startup Bus 10, ONLY

Proposed Answer: B

Explanation (Optional):

TIE BUS TO BUS 11A BKR 1A10104 will not trip until the control switch for the related Aux Incoming Feeder Breaker 1A10101 is placed in the Normal After Close position. The trip logic requires the related control switch in NAT/NAC, the related sync switch ON, and the related Aux Incoming breaker closed. Without all three conditions, the auto trip does not occur. There is no time delay in the trip logic for the breakers.

A. Incorrect – 1A10104 will NOT immediately trip open.

B. Correct – Aux Buses remain fed off of SUB–10, which is supplied by SUT–10 from offsite and now will be paralleled with the Aux XFMR.

C. Incorrect – TIE BUS TO BUS 11A BKR 1A10104 will remain in the closed position

D. Incorrect – TIE BUS TO BUS 11A BKR 1A10104 will remain in the closed position

Technical Reference(s): E–102, Sheets 1 through 4; E–22, Sheets 1 through 4 (Attach if not previously provided)
ON–103–003; OP–103–001 Rev 28, Section 2.2
TM–OP–003

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–003 / 10054 (As available)

Question Source: Bank # TMOP003/10054/
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
55.43

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	209001 K2.03	
	Importance Rating	2.9	

K2.03 – Knowledge of electrical power supplies to the following: Initiation Logic

Proposed Question: Common 4

Unit 1 is operating at 80 percent power.

Annunciator 125V DC PANEL 1L610 SYSTEM TROUBLE (AR–106–A12) alarms.

It is determined that 125 VDC Bus 1D612 is de–energized.

Which of the following operational impacts is directly associated with this power loss?

A. RCIC Division 1 steam leak detection is inoperable

B. Control power is lost to the RHR Pump 1C and Core Spray Pump 1C breakers

C. Automatic initiation of Division 1 Core Spray logic will NOT actuate

D. Automatic initiation of Division 2 Core Spray and RHR Pump 1B will NOT actuate

Proposed Answer: C

Explanation (Optional):

A. Incorrect – This action/fault would be due to a loss of 1D634.

B. Incorrect – This action/fault would be due to a loss of 1D632.

C. Correct: Per ON–102–610, LOSS OF 125V DC BUS 1D610, the impact statements for loss of 1D612 states the following; Auto initiation of Div. 1 CS and RHR Pump A inoperable, however, RHR Pump C auto start from Div 2 Logic remains Operable. Core Spray Pump C and RHR Pump C can be manually started from 1C601 handswitch. (1D61407 RHR LOGIC) & (1D61403 CS LOGIC) 1A RHR & 1A CS Pump breakers lost control power (1D61431).

D. Incorrect – This action/fault would be due to a loss of 1D624.

Technical Reference(s): ON–102–610 Rev 14, Impact Statements for Loss of 1D612 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–049 / 192 b. (As available)
TM–OP–051 / 2093 d.

Question Source: Bank # S–209001–RBO–04–Q02

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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	215005 K3.03	
	Importance Rating	3.3	

K3.03 – Knowledge of the effect that a loss or malfunction of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM will have on following: Reactor manual control system: Plant–Specific.

Proposed Question: Common 5

Unit 1 is operating at rated power.

APRM 3 is bypassed.

Recirc flow transmitter FT–B31–1N014A fails to ZERO.

Which one of the following describes the response, if any, of the Reactor Manual Control and Power Range Neutron Monitoring Systems?

A. NO Control Rod block
NO Scram vote
NO RPS channels tripped

B. NO Control Rod block
ONE Scram vote
NO RPS channels tripped

C. Control Rod out block
ONE Scram vote
NO RPS channels tripped

D. Control Rod out block
TWO Scram votes
ALL RPS channels tripped

Proposed Answer: C

Explanation (Optional):

The flow transmitter instrument failure (0% flow) results in half of the flow signal originally input to APRM 1. The flow–biased setpoint will be significantly reduced from the normal full–power value. At full power, the power signal will exceed the flow–biased setpoint, resulting in an APRM Upscale, Rod Block and APRM Upscale Trip, Scram Vote. With the Two–Out–Of–Four Logic Module, Module Vote no scram channels will be tripped in RPS, since it requires two simultaneous Votes. Only one Vote exists.

A. Incorrect – At full power, the failed Recirc Flow Transmitter low would result in an APRM Upscale Rod Block, as well as APRM Upscale Trip and one Scram Vote, due to flow–biased setpoints exceeded. This is a possible choice if the candidate does not recognize the impact of the failed drive flow signal on the APRM.

B. Incorrect – At full power, the failed Recirc Flow Transmitter low would result in an APRM Upscale Rod Block, in addition to the Scram Vote.

C. Correct – As stated above, a Control rod withdraw block and Scram Vote will be generated from APRM 1. No RPS channels will trip as votes from 2 APRMs is required to trip any RPS channel.

D. Incorrect – Only one Vote exists from APRM 1. With only one Vote, no RPS scram channels are tripped. If the candidate believes two Votes exist, one in each RPS division, then all four scram channels would be tripped and a full scram occurs.

Technical Reference(s): OP–178–002, Attachment A (Attach if not previously provided)
AR–103–001 (A06) and (B06)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–078D / 15716/8 (As available)

Question Source: Bank # S–215005–RBO05–Q03
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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	264000 K3.02	
	Importance Rating	3.9	

K3.02 – Knowledge of the effect that a loss or malfunction of the EMERGENCY GENERATORS (DIESEL/JET) will have on following: A.C. electrical distribution

Proposed Question: Common 6

Unit 1 is at rated power. Unit 2 is shut down in Mode 4.

Startup Bus 20 is out–of–service and de–energized for maintenance.

All 4 kV ESS Buses are energized.

The normal supply breaker to ESS Bus 1A, 1A20101, spuriously trips.

Diesel Generator A starts and successfully re–energizes ESS Bus 1A.

Five minutes later, annunciator ENGINE LUBE OIL PRESSURE LOW (LA–0521–A01) alarms at 0C521A.

The NPO reports lube oil pressure is 30 psig and lowering.

Which of the below describes the response of DG A and ESS Bus 1A to these conditions?

	Diesel Generator	ESS Bus 1A
A.	Trips; DG A output breaker to ESS Bus 1A opens	Remains de–energized
B.	Trips; DG A output breaker to ESS Bus 1A opens	Re–energized from alternate supply breaker 1A20109
C.	Continues to run in EMERGENCY MODE with the Standby Oil Pump operating	Remains energized from DG A
D.	Continues to run in EMERGENCY MODE until the engine seizes and trips	Remains de–energized

Proposed Answer: A

Explanation (Optional):

A. Correct– With the DG running in Emergency, this Low Lube Oil pressure condition will trip the Diesel, which in turn trips the Generator Output Breaker. Based on the electrical line–up and no power available from SUB 20, 1A201 will de–energize.

B. Incorrect – ESS Bus 1A will remain de–energized, as the alternate supply breaker 1A20109 will not auto–close due to Startup Bus 20 de–energized for maintenance.

C. Incorrect – The standby Lube Oil pump would have started at 35 psig; since pressure is currently 30 psig, EDG will trip and de–energize the bus

D. Incorrect – The EDG will trip because Low Lube Oil pressure is one of the three trips that still function if the diesel is running in the Emergency Mode.

Technical Reference(s): TM–OP–024 (Attach if not previously provided)

LA–0521–A01, C01

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–024 / 2260 (As available)

Question Source: Bank # TMOP024/2068

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

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	218000 K4.02	
	Importance Rating	3.8	

K4.02 – Knowledge of AUTOMATIC DEPRESSURIZATION SYSTEM design feature(s) and/or interlocks which provide for the following: Allows manual initiation of ADS logic

Proposed Question: Common 7

Unit 1 has experienced a transient.

All low–pressure ECCS pumps were manually initiated.

One SRV is stuck OPEN.

Current conditions are as follows:

Reactor level	–119 inches, lowering at 5 inches/minute
Drywell pressure	2.13 psig, rising at 0.1 psig/minute
Reactor pressure	480 psig, lowering at 30 psig/minute

(1) What would be required to manually initiate ADS under the current conditions AND
(2) In 2 minutes, assuming the trends above continue, will ADS have automatically initiated?

A. (1) Arm and depress BOTH manual initiation push button switches (S30A AND S31A) on panel 1C601
(2) NO

B. (1) Arm and depress BOTH manual initiation push button switches (S30A AND S31A) on panel 1C601
(2) YES

C. (1) Arm and depress EITHER manual initiation push button switch (S30A OR S31A) on panel 1C601
(2) NO

D. (1) Arm and depress EITHER manual initiation push button switch (S30A OR S31A) on panel 1C601
(2) YES

Proposed Answer: A

Explanation (Optional):

A. Correct – (1) Manual initiation of ADS from the Control Room opens all six ADS SRVs and is accomplished by arming and depressing both manual initiation push button switches (S30A and S31A) on Panel 1C601. The ECCS pumps are running to satisfy the discharge pressure permissive (picking up relay contact K9A [K10A]), the ADS SRVs open.

(2) ADS will not auto–initiate in 2 minutes. Reactor level will only have reached the Level 1 setpoint to initiate the 102 second timer. ADS will not auto–initiate until the 102 seconds timer times out.

B. Incorrect – The 102 second timer would not yet have timed out so ADS did not auto initiate.

C. Incorrect – Both PBs must be armed and depressed.

D. Incorrect – Both PBs must be armed and depressed. The 102 second timer would not yet have timed out so ADS did not auto initiate.

Technical Reference(s): TM–OP–083E–ST; Automatic Depressurization System Revision 00, Pages 8 and 9 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–083E / 2105 (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
- 55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	217000 K4.06	
	Importance Rating	3.5	

K4.06 – Knowledge of REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) design feature(s) and/or interlocks which provide for the following: Manual initiation

Proposed Question: Common 8

RCIC tripped due to an electrical overspeed following an automatic initiation.

HPCI is maintaining reactor level at +15 inches, steady.

The RCIC electrical overspeed issue has been resolved.

RCIC is to be placed back in service.

Which one of the following will reset the RCIC trip and re–align RCIC to inject to the reactor?

A. Ensure the Electrical overspeed automatically reset as RCIC Turbine speed lowered
Hold the control switch for RCIC Turbine Trip and Throttling HV–15012 open until both red lights are lit
Raise flow controller output in MANUAL to inject to the reactor

B. Hold the control switch for RCIC Turbine Trip and Throttling HV–15012 closed until both amber lights are lit
Reset the RCIC initiation logic
Re–open RCIC Turbine Trip and Throttling HV–15012
RCIC will begin to re–inject to the reactor

C. Locally reset the overspeed device
Hold the control switch for RCIC Turbine Trip and Throttling HV–15012 open until both red lights are lit
Raise flow controller output in MANUAL to inject to the reactor

D. Hold the control switch for RCIC Turbine Trip and Throttling HV–15012 closed until both amber lights are lit
Place RCIC Turbine Flow Controller in MANUAL at minimum
Re–open RCIC Turbine Trip and Throttling HV–15012
Open RCIC injection valve HV–149–F013
Raise flow controller output in MANUAL to inject to the reactor

Proposed Answer: D

Explanation (Optional):

A. Incorrect – The electrical overspeed does not auto reset. HV–15012 must first be closed to re–latch the T/T valve, then reopened.

B. Incorrect – OP–150–001 Section 2.10.6 cannot be used unless the initiation is reset and F045 is closed. With the flow controller in AUTO and the F045 already open RCIC will overspeed as there is no flow path to the reactor with the F013 closed.

C. Incorrect – This is part of what is required for a mechanical overspeed reset.

D. Correct – Resetting the initiation does not close the F045; therefore, OP–150–001, Section 2.10.6 cannot be used unless F045 is closed and 2.10.7 applies. These actions ensure a flow path to the reactor and a controlled rise in RCIC turbine speed.

Technical Reference(s): OP–150–001 Rev 38, 2.10.7 and 2.10.6 Note (1) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–050 / 2018 (As available)

Question Source: Bank # TMOP050/2018/
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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	263000 K1.02	
	Importance Rating	3.2	

K1.02 – Knowledge of the physical connections and/or cause– effect relationships between D.C. ELECTRICAL DIATRIBUTION and the following: Battery charger and battery.

Proposed Question: Common 9

During normal operation, the AC power supply to battery charger 1D663 is lost.

Which one of the following describes the automatic actions required, if any, for the loss of the AC power to this battery charger?

A. The battery charger is immediately supplied by its alternate AC power

B. The battery charger must be manually aligned to its alternate AC power

C. The battery immediately feeds the 250 VDC bus

D. The alternate battery charger will automatically align to supply the 250 VDC bus

Proposed Answer: C

Explanation (Optional):

A. Incorrect: There is no alternate AC power supply for battery charger.

B. Incorrect: There is no alternate AC power supply for battery charger.

C. Correct: Battery feeds DC distribution bus directly.

D. Incorrect: There is no alternate charger for this bus

Technical Reference(s): AR–106–001 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–088 / 1394 (As available)

Question Source: Bank # LOC CERT 23
Modified Bank # ______ (Note changes or attach parent)
New ______

Question History: Last NRC Exam 2003

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

10 CFR Part 55 Content: 55.41 4,7
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	300000 K5.01	
	Importance Rating	2.5	

K5.01 – Knowledge of the operational implications of the following concepts as they apply to the INSTRUMENT AIR SYSTEM: Air Compressors

Proposed Question: Common 10

Unit 1 Instrument Air Compressor 1A is in service, with Instrument Air Compressor 1B in standby.

1C140A switch HSS–12500, I–A COMPRESSOR A/B BASE UNIT SELECT, is selected to COMPRESSOR A.

Unit 1 Instrument Air Compressors are aligned as follows:

	A	B
Control Room switch	AUTO	AUTO
1C140A panel switch I–A COMPRESSOR A(B) CONTROL MODE SELECT	MAN	AUTO
1C140A LOAD LIMIT SELECT	FULL	FULL

Due to a high demand, system pressure lowers to a minimum of 89 psig.

The Instrument Air System responds as designed. System pressure is 94 psig, up slow.

At this time, the 1A Compressor will be ___(1)___, and the 1B Compressor will be ___(2)___.

A. (1) running at 50% load
(2) Off

B. (1) running at 100% load
(2) Off

C. (1) running at 50% load
(2) running at 50% load

D. (1) running at 100% load
(2) running at 100% load

Proposed Answer: B

Explanation (Optional):

When the Lead Compressor Control Mode Select Switch is in the MAN position, and the Load Limit Select Switch is in FULL, the Lead Compressor will operate unloaded when system pressure is above 107 psig. If system pressure drops to 102 psig, SV–12508A2 will energize loading the compressor to 50 percent. If system pressure continues to drop to 95 psig, SV–12508A1 will energize loading the compressor to 100 percent. When system pressure rises to approximately 98 psig, SV–12508A1 will de–energize reducing the compressor load to 50 percent.

The Standby Compressor, with its local control switch in the AUTO position, and Load Limit Select Switch in FULL, will automatically start when system pressure drops to 87 psig, and will run (at 100 percent load) until system pressure is restored above 96 psig, at which time it will shift to 50 percent load.

A. Incorrect – If system pressure continues to drop to 95 psig, SV–12508A1 will energize loading the compressor to 100 percent.

B. Correct – The 1A compressor will be at full load as header pressure fell below 95 psig. The 1B compressor did not receive a start signal, as header pressure remained above 87 psig.

C. Incorrect – The lead compressor does not shift back to 50% load until pressure is at 98 psig. Standby compressor motor does not cycle on until system pressure drops to 87 psig.

D. The Standby compressor motor does not cycle on until system pressure drops to 87 psig.

Technical Reference(s): OP–118–001 Rev 32. section 2.1 and 2.2 (Attach if not previously provided)

TM–OP–018

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–088 / 1769 (As available)

Question Source: Bank # TMOP018/10229

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	4
	55.43	

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	205000 K6.02	
	Importance Rating	2.7	

K6.02 – Knowledge of the effect that a loss or malfunction of the following will have on the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) : D.C. electrical power

Proposed Question: Common 11

Unit 1 is shutdown.

RHR Pump 1B is operating in Shutdown Cooling (SDC).

A loss of DC bus 1D624 occurs.

Which of the following identifies how the loss of DC power affects RHR Pump 1B and the status of Shutdown Cooling?

A. RHR Pump 1B trips
Transfer to an alternate DC control power supply occurs automatically
RHR SDC may be placed back in service

B. RHR Pump 1B trips
Transfer to an alternate DC control power supply must be performed manually
RHR SDC may be placed back in service after the transfer

C. RHR Pump 1B breaker trip coil power automatically transfers to the backup DC control power supply
RHR SDC remains in service

D. RHR Pump 1B breaker cannot be tripped electrically
RHR SDC remains in service

Proposed Answer: D

Explanation (Optional):

A. Incorrect – The pump will not trip. Manual action is required to transfer to an alternate DC power supply.

B. Incorrect – pump power remains available and the pump remains running.

C. Incorrect – 1B RHR pump does not have a backup DC power supply for tripping the breaker.

D. Correct – IAW ON–102–620 – List 1 – RHR Pump B Auto and Manual auto functions from Div 1 logic are inoperable. Manual functions are functional after alternate DC supply is selected.

Technical Reference(s): ON–102–620 Rev 13– List 1 page 15 (Rev.13) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–049 / 192 (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

55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	239002 K6.05	
	Importance Rating	3.0	

K6.05 – Knowledge of the effect that a loss or malfunction of the following will have on the RELIEF/SAFETY VALVES : Discharge line vacuum breaker

Proposed Question: Common 12

A transient occurred on Unit 1. One SRV opened and then reseated.

Which of the following will result from a subsequent opening of the same SRV if its discharge line vacuum breaker is stuck open?

A. Steam would be released directly to the Drywell

B. Damage could occur in the Suppression Pool

C. Water would be drawn up the discharge piping once the SRV reseated

D. Steam would be released directly to the Suppression Chamber

Proposed Answer: A

Explanation (Optional):

A. Correct – Vacuum reliefs are located in Drywell.

B. Incorrect – When the Safety/Relief Valve reseats after lifting, the steam remaining in the discharge piping condenses and forms a vacuum which could draw water from the suppression pool up into the discharge piping. If the SRV were opened again while this condition exists, excessive pressure would be exerted by the water column on the valve discharge potentially resulting in damage in the suppression pool. For this reason there are two vacuum relief valves (6–inch diameter) installed in the discharge piping from each Safety/Relief valve that will open to prevent vacuum formation.

C. Incorrect – This concern is if the vacuum breaker failed closed

D. Incorrect – Vacuum reliefs are located in Drywell, not the Suppression Chamber.

Technical Reference(s): TM–OP–083–ST Page 12 (Rev.13) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–083 / 10021 (As available)

Question Source: Bank # SXD Bank

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 3

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	400000 A1.02	
	Importance Rating	2.8	

A1.02 – Ability to predict and / or monitor changes in parameters associated with operating the CCWS controls including: CCW temperature

Proposed Question: Common 13

Unit 1 is operating at rated power.

In regard to Unit 1 RBCCW, to raise the outlet temperature of the RBCCW heat exchanger one must ___(1)___ the flow of ___(2)___ through the RBCCW heat exchanger using a temperature control valve.

A. (1) lower
(2) RBCCW

B. (1) lower
(2) Service Water.

C. (1) raise
(2) Service Water

D. (1) raise
(2) RBCCW

Proposed Answer: B

Explanation (Optional):

RBCCW temperature on the outlet of the heat exchanger is controlled automatically by regulating the flow of Service Water through the heat exchanger using a temperature control valve.

A. Incorrect – Service Water flow is regulated not RBCCW.

B. Correct – Service Water flow is regulated, and flow must be lowered to raise RBCCW HX outlet temperature.

C. Incorrect – To lower RBCCW temperature you would raise the SW flow.

D. Incorrect – Service Water flow is regulated not RBCCW.

Technical Reference(s): TM–OP–014–ST (Rev 3) page 23; P&ID M–113 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–014 / 1683 (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
55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	223002 A1.02	
	Importance Rating	3.7	

A1.02 – Ability to predict and/or monitor changes in parameters associated with operating the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT–OFF controls including: Valve closures

Proposed Question: Common 14

Unit 1 was conducting a startup when a small–break LOCA occurred.

Drywell pressure reached a maximum of 1.9 psig.

Drywell pressure is now 1.4 psig, down slow.

Which one of the following choices correctly identifies for the Containment Radiation Monitors (CRMs):

(1) the status of the CRMs when Drywell pressure was above the high Drywell pressure isolation setpoint?

(2) the requirements, if any, to return the CRMs to service once below the setpoint?

	(1) Drywell pressure > setpoint	(2) Drywell pressure < setpoint
A.	remained in service	remains in service
B.	isolated	automatically returns to service
C.	isolated	can be manually placed in service If the isolation is reset
D.	isolated	can be manually placed in service, isolation reset is NOT required

Proposed Answer: C

Explanation (Optional):

A. Incorrect – CRM isolates on high DW pressure

B. Incorrect – no auto start feature to system

C. Correct – CRM Containment isolation valves automatically close on the following NSSSS isolation signals:
Low RPV Level 2 (38 inches)
High Drywell Pressure (+1.72 psig)
On an NSSSS isolation signal, the valves cannot be reopened until NSSSS logic is reset; no auto bypass timers are provided.

D. Incorrect – CRM does not isolate on low DW pressure

Technical Reference(s): ON–159–002, CONTAINMENT ISOLATION (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–059B / 2123 (As available)
TM–OP–079X / 1896

Question Source: Bank # S–272001–RBO–11–Q02
Modified Bank # (Note changes or attach pare
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
55.43

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	215003 A2.01	
	Importance Rating	2.8	

A2.01 – Ability to (a) predict the impacts of the following on the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Power supply degraded

Proposed Question: Common 15

Unit 1 is preparing for a reactor startup.

The reactor mode switch in STARTUP.

All control rods are fully inserted.

The high voltage power supply to IRM 1B fails low.

How does Unit 1 respond and what action(s), if any, is(are) required to begin control rod withdrawal?

A. Control rod block and RPS half–scram
Bypass the affected IRM
Reset RPS half–scram by momentarily Positioning REACTOR SCRAM RESET HS—C72A–1S05 to GRP 1/4 position

B. Control rod block and RPS half scram
Bypass the affected IRM
Reset RPS half–scram by momentarily positioning REACTOR SCRAM RESET HS–C72A–1S05 to GRP 1/4 position then the GRP 2/3 position

C. Control rod block, ONLY
Bypass the affected IRM

D. NO control rod block OR RPS half–scram
Control rod withdrawal may continue with no operator action in response to the IRM malfunction

Proposed Answer: B

Explanation (Optional):

A. Incorrect –. In this situation GROUP 2/3 must also be reset. This may be chosen if the student believes that with only a half/scram, only the GROUP 1/4 must be reset. In this situation the GROUP 2/3 must also be reset.

B. Correct – An IRM INOP condition results from detector power supply high voltage low. A Control Rod Withdrawal Block is generated if a channel INOP condition is detected, A RPS half–scram signal is generated if a channel INOP condition is detected. Reset RPS Trip System by Momentarily Positioning RPS SCRAM RESET Control Switch HS–C72A–1S05 as follows: To GROUP 1/4 position, To GROUP 2/3 position.

C. Incorrect – A half–scram occurs. The IRM must be bypassed and the half–scram reset to allow control rod withdrawal to continue.

D. Incorrect – The IRM downscale will not generate a control rod block, as IRMs are on Range 1 with all control rods inserted and startup about to commence. However, the high voltage power supply failing low causes an INOP trip (control rod block and half–scram).

Technical Reference(s): TM–OP–078B–ST Pages 23,26,27 (Attach if not previously provided)
AR–104–001 (A05)
OP–158–001 step 2.6.7

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–078B / 2337 (As available)

Question Source: Bank # TMOP078B/2337
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
55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	206000 A2.17	
	Importance Rating	3.9	

A2.17 – Ability to (a) predict the impacts of the following on the HIGH PRESSURE COOLANT INJECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: HPCI inadvertent initiation: BWR–2,3,4.

Proposed Question: Common 16

Unit 1 is at rated power.

I&C technicians are working on an issue regarding HPCI initiation logic.

Operators note an illuminated green light on HS–E41–1S17, INIT SIG RESET, on panel 1C601.

This indicates that...

A. HPCI initiation logic has actuated
HPCI is aligning to inject to the reactor
IAW OP–152–001, HPCI System, if securing HPCI, one of the actions required is to reduce turbine speed to ≈2200 rpm before depressing pushbutton HS–E41–S19, HPCI TURBINE TRIP

B. Division 1 HPCI initiation logic has actuated, ONLY
HPCI is NOT aligning for injection
IAW OP–152–001, HPCI System, the initiation logic can be reset by depressing pushbutton HS–E41–1S17, INIT SIG RESET

C. HPCI initiation logic has actuated
HPCI is aligning to inject to the reactor
IAW OP–152–001, HPCI System, if securing HPCI, one of the actions required is to reduce turbine speed to 0 rpm before depressing pushbutton HS–E41–S19, HPCI TURBINE TRIP

D. Division 1 HPCI initiation logic has actuated, ONLY
HPCI is NOT aligning for injection
The initiation logic cannot be reset until with pushbutton HS–E41–1S17, INIT SIG RESET, green light still illuminated

Proposed Answer: A

Explanation (Optional):

A. Correct – The HPCI Initiation Logic consists of a single channel, powered from 125 VDC (1D624), and can be actuated either automatically or manually. An actuation of the HPCI Initiation Logic Channel is indicated in the Control Room by an illuminated green light on HS–E41–1S17, INIT SIG RESET HS–E41–1S17 RESET on Panel 1C601. This green light illuminates when Initiation Relay K6 energizes. RPMs must be reduced to approx. 2200 per OP–152–001 step 2.10.7.

B. Incorrect – There is a single initiation logic channel. This distractor is plausible if the candidate confuses the HPCI initiation logic with the HPCI isolation logic, which is divisional.

C. Incorrect – RPMs must be reduced to approx. 2200 per OP–152–001 step 2.10.7.

D. Incorrect – There is a single initiation logic channel. This distractor is plausible if the candidate confuses the HPCI initiation logic with the HPCI isolation logic, which is divisional.

Technical Reference(s):	TM–OP–052–ST page 57	(Attach if not previously provided)
	OP–152–001 Rev 49, step 2.10.7	

Proposed references to be provided to applicants during examination: NONE

Learning Objective:	TM–OP–052 / 2038	(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
	55.43	

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	261000 A3.03	
	Importance Rating	3.0	

A3.03 – Ability to monitor automatic operations of the STANDBY GAS TREATMENT SYSTEM including: Valve operation

Proposed Question: Common 17

On a LOCA initiation, how does the Standby Gas Treatment System (SGTS) function to ensure the Secondary Containment drawdown is accomplished within three minutes?

A. SGTS Inlet Damper (HD–07553A/B) is held in the FULL OPEN position for 140 seconds after system initiation

B. SGTS Makeup Outside Air Damper (FD–07551A2/B2) is maintained CLOSED for 140 seconds after system initiation

C. Fan Inlet Dampers (FD–07551A1/B1) are held in the FULL OPEN position for maximum flowrate for 140 seconds, bypassing the flow controller

D. Reactor Building Recirculation System/SGTS Dampers (PDD–07554A/B) are held FULL CLOSED for 140 seconds, bypassing the pressure controller

Proposed Answer: B

Explanation (Optional):

A. Incorrect – Inlet Dampers (FD–07551A1/B1) are held open, bypassing the flow controller, NOT dampers (HD–07553A/B).

B. Correct – IAW TM–OP–070–ST Page 16 – The outside air damper is maintained closed for 140 seconds upon receipt of a containment isolation signal.

C. Incorrect – SGTS Inlet Dampers open fully, and remain open on a system initiation.

D. Incorrect – Reactor Building Recirculation System/SGTS Dampers (PDD–07554A/B) are NOT held FULL CLOSED for 140 seconds

Technical Reference(s): TM–OP–070–ST (Attach if not previously provided)
OP–070–001 Step 2.4.5.i (4)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–070 / 1991 (As available)
TM–OP–034 / 1274

Question Source: Bank # TMOP070/1991
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 8
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	212000 A3.07	
	Importance Rating	3.6	

A3.07 – Ability to monitor automatic operations of the REACTOR PROTECTION SYSTEM including: SCRAM air header pressure

Proposed Question: Common 18

Which of the following will result in venting the scram pilot air header?

A valid RPS actuation causing…

A. EITHER Scram Pilot Solenoid valve on each HCU to de–energize

B. BOTH Backup Scram Solenoid valves to energize

C. EITHER Scram Pilot Solenoid valve on each HCU to energize

D. BOTH Backup Scram Solenoid valves to de–energize

Proposed Answer: B

Explanation (Optional):

A. Incorrect – Both Scram Air Solenoid valves must de–energize to vent air from the scram inlet and outlet valves.

B. Correct – IAW TM–OP–058 pages 38 &39 – Each Backup Scram Valve is operated by a single DC powered solenoid. All solenoids are "energize–to–operate", and are powered by Class 1E 125V DC from Buses 1D614 and 1D624. Both RPS A and B Trip Systems must trip (de–energize) to energize the Backup Scram Valve Solenoid on each valve.

C. Incorrect – Both Scram Pilot Solenoid valves need to de–energize to vent air from the scram inlet and outlet valves.

D. Incorrect – Backup scram valves energize to operate.

Technical Reference(s): TM–OP–058 pages 38 &39 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–058 / 10071 (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

55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	211000 A4.08	
	Importance Rating	4.2	

A4.08 – Ability to manually operate and/or monitor in the control room: System initiation: Plant–Specific.

Proposed Question: Common 19

Following an ATWS, reactor pressure is steady at 950 psig.

Which of the following are observed indications when Standby Liquid Control (SBLC) is injecting into the core?

A. SBLC Tank level is lowering
SBLC SQUIB VLVS LOSS OF CKT CONTINUITY annunciator is extinguished

B. SBLC Pump discharge pressure is 1,150 psig
SBLC SQUIB VLVS LOSS OF CKT CONTINUITY annunciator is in alarm

C. SBLC Pump discharge pressure is 1420 psig
SBLC SQUIB VLVS LOSS OF CKT CONTINUITY annunciator is in alarm

D. SBLC Tank level is lowering
BOTH SBLC SQUIB READY A–B White indicating lights are lit

Proposed Answer: B

Explanation (Optional):

The selected SBLC Pump starts as indicated by the red pump running light on 1C601. Both squib valves fire as indicated by both squib valve continuity (white) lights extinguishing on 1C601 and the activation of annunciator AR–107–A03, SBLC SQUIB VALVES OF CKT CONTINUITY. Indication of discharge header pressure greater than reactor pressure (PI–C41–1R600), indication of system flow and SBLC storage tank level lowering (LI/FI–14806) on 1C601. Reactor Water Cleanup System Outboard Isolation Valve HV–144–F004 automatically closes to prevent removal of the poison solution from the reactor vessel.

A. Incorrect– SBLC SQUIB VLVS LOSS OF CKT CONTINUITY annunciator would be lit if the squib valves had fired.

B. Correct – SLC pump discharge pressure is 200 psig above reactor pressure and the alarm for squib valves fired is in.

C. Incorrect – indicates max discharge pressure because of no injection flow path (relief valve open).

D. Incorrect – white lights would be extinguished if the squib valves had fired.

Technical Reference(s): TM–OP–053–ST, (Attach if not previously provided)
OP–153–001 Rev 27, Step 2.2

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–053 / 1209 (As available)

Question Source: Bank # TMOP053/1209
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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	203000 A4.09	
	Importance Rating	4.1	

A4.09 – Ability to manually operate and/or monitor in the control room: System flow (RHR/LPCI Injection Mode)

Proposed Question: Common 20

Unit 1 experienced a LOCA.

Current Unit 1 plant conditions are as follows:

Reactor level	–160 inches, down slow
Reactor pressure	240 psig, down slow
Drywell pressure	5.7 psig, up slow

One minute later, Unit 2 receives a spurious low–pressure ECCS initiation signal on low reactor level.

Current Unit 2 plant conditions are as follows:

Reactor level	+30 inches, stable, controlled with RCIC and HPCI
Reactor pressure	900 psig, up slow, controlled with SRVs
Drywell pressure	0.4 psig, stable

Which of the following describes the total approximate RHR system flow indicated on each unit?

	Unit 1	Unit 2
A.	40000 gpm	2,000 gpm
B.	40,000 gpm	0 gpm
C.	20,000 gpm	2,000 gpm
D.	20,000 gpm	0 gpm

Proposed Answer: D

Explanation (Optional):

The preferred RHR Pumps for Unit 1 logic are 1A and 1B (one for each pumping loop) and for Unit 2 logic, the preferred RHR Pumps are 2C and 2D. Selecting one pump in each pumping loop in the RHR System ensure that, under the single failure criterion, at least one pump will be available for flooding the core. The "LOCA/False LOCA Preferred Pumps" interlock works in the following manner: Assume a LOCA signal is received for Unit 1 starting all four Unit 1 RHR Pumps. Subsequently, a LOCA signal is received on Unit 2, the 1C and 1D Unit 1 RHR Pumps would trip automatically, and only the 2C and 2D RHR Pumps on Unit 2 would auto start. On Unit 1 2 RHR pumps are running, injecting to the reactor at rated flow. Actual design flow per pump is 12,200 gpm and loop is 21,300 gpm.

On Unit 2 2 RHR pumps are running on min flow. Each pump discharge line connects to a common pumping loop minimum flow bypass line with a common minimum Flow Valve F007A/B. Each minimum flow line to the Suppression Pool is provided with flow restricting orifices to limit flow, and ensure the design minimum flow of 1,000 gpm per pump is maintained for pump cooling. The Min Flow Valves will close when flow is 3,000 gpm, but flow per pump is closer to 1,000 gpm. However, there is no minimum flow indication in the control room. The Control Room indication of total system flow is located in the system downstream of the min flow line. Therefore indicated flow would be "0" due to the location of the flow element in each loop.

A. Incorrect – ONLY 2 pumps would be operating on each unit. On Unit 1, 2 would be injecting at approx. 10000 gpm each. On Unit 2, 2 pumps would be operating on minimum flow. However, there is no minimum flow indication in the Control Room. Therefore indicated flow would be "0".

B. Incorrect – The flow is correct for Unit 2. On Unit 1 only 2 pumps are running and injecting .

C. Incorrect – The flow is correct for Unit 1. On Unit 2, 2 pumps would be operating on minimum flow. However, there is no minimum flow indication in the Control Room. Therefore indicated flow would be "0".

D. Correct – Unit 1 2 RHR pumps injecting to the reactor at ~20,000 gpm. Unit 2 2 RHR pumps running on minimum flow. However, there is no minimum flow indication in the Control Room. Therefore Unit 2 indicated flow would be "0".

Technical Reference(s): OP–149–001 Rev 42, Step 2.2.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–049 10493 (As available)

Question Source:	Bank #	S–203000–RBO–09–Q02	
	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	
	55.43	______	

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	262002 2.1.32	
	Importance Rating	3.8	

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

Proposed Question: Common 21

The Computer UPS 1D656 has been operating on Alternate AC due to maintenance on the inverter.

The inverter is being returned to service in accordance with OP–157–001, Computer and Vital UPS.

A precaution in the procedure states "Never close Battery Input Breaker (CB–1) without Precharge light illuminated."

If Battery Input Breaker CB–1 is closed without the Precharge light illuminated then...

A. damage to the battery bank will occur.

B. Battery Input Breaker (CB–1) will immediately trip open.

C. damage to the UPS internal circuit capacitors will occur.

D. the alternate AC source input to the Static Switch, Breaker CB–4, will immediately trip open.

Proposed Answer: C

Explanation (Optional):

A. Incorrect – concern is damage to the UPS solid–state electronics, not the DC battery.

B. Incorrect – No time delay on transfer back to preferred source

C. Correct – IAW TM–OP–017 Page 31. PRECHARGE pushbutton and indicating light (Not shown on Figure): on the Static Inverter Panel are provided for status indication for the UPS circuit cards. If the PRECHARGE light is not lit, the pushbutton must be depressed prior to closing CB–1. This is required in order to power up the printed circuit cards inside the UPS. This prevents damage to the UPS internal circuit capacitors. IAW OP–157–001 Step 2.3.2 Precaution Never close Battery Input Breaker (CB–1) without Precharge light illuminated or equipment damage may occur.

D. Incorrect – The preferred source breaker will not trip, the electrical transient will be confined to the UPS solid–state electronics.

Technical Reference(s): OP–117–001 Rev 21, Step 2.1.3 Note (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–017 / 10175 (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

55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	215004 2.1.28	
	Importance Rating	4.1	

2.1.28 Knowledge of the purpose and function of major system components and controls. (SRMs)

Proposed Question: Common 22

A refueling outage is in progress on Unit 2, with fuel shuffle in progress.

Which one of the following will occur if Source Range Monitor A mode switch is taken out of the OPERATE position and placed in the ZERO position?

A. SRM Downscale alarm, ONLY

B. Reactor scram
Control rod out block
SRM Downscale alarm

C. Control rod out block
SRM Upscale/Inop alarm

D. Reactor scram
Control rod out block
SRM Upscale/Inop alarm

Proposed Answer: C

Explanation (Optional):

SRM input to RPS is normally bypassed by installation of the shorting links. For fuel shuffle during an outage the shorting links are left installed. No scram can be generated by an SRM trip condition.

A. Incorrect – Taking the mode switch out of OPERATE generates an INOP signal not a downscale alarm.

B. Incorrect – A full scram or downscale alarm will NOT occur.

C. Correct – IAW TM–OP–78A – When the Mode Switch is taken out of Operate, an INOP signal is generated by the SRM Trip Unit. Note that the Upscale and Inop trips input to the same annunciator. It doesn't mean that an upscale trip is generated from one of the Inop trips.

D. Incorrect – A full scram will NOT occur because the shorting links are only removed during actual shutdown margin testing.

Technical Reference(s): TM–OP–078A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–078A / 1345 (As available)

Question Source: Bank # TMOP078A/1345

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

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	209001 A3.02	
	Importance Rating	3.8	

A3.02 – Ability to monitor automatic operations of the LOW PRESSURE CORE SPRAY SYSTEM including: Pump start

Proposed Question: Common 23

Unit 1 has experienced a large–break LOCA inside the Drywell.

Current plant conditions are as follows:

Reactor level	–125 inches, down slow
Reactor pressure	410 psig, down slow
Drywell pressure	6.4 psig, up slow

Diesel Generator D failed to start and cannot be manually started.

Which one of the following describes the status of the Core Spray System?

A. All pumps are running AND injecting to the reactor

B. All pumps are running on min flow

C. ONLY the A, B, and C pumps are running AND injecting to the reactor

D. ONLY the A, B, and C pumps are running on min flow

Proposed Answer: B

Explanation (Optional):

A. Incorrect – Reactor pressure is above CS pump shutoff head.

B. Correct – An auto start signal exists for all 4 CS pumps, but reactor pressure is above shutoff head for CS pumps, therefore all pumps will be running on min flow. The DG D failure will not affect the D CS pump since off site power is still available.

C. Incorrect – power is still available for CS pump D and RPV pressure is above CS pump shutoff head.

D. Incorrect – power is still available for CS pump D.

Technical Reference(s): TM–OP–051 (Attach if not previously provided)

OP–151–001 Section 2.2

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–051 / 2080.d (As available)

Question Source: Bank # LXR bank TMOP051/2080 001

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, 8

55.43 _____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	211000 K1.02	
	Importance Rating	2.7	

K1.02 – Knowledge of the physical connections and/or cause– effect relationships between STANDBY LIQUID CONTROL SYSTEM and the following: Core plate differential pressure indication

Proposed Question: Common 24

Which of the following describes how the Standby Liquid Control (SBLC) System is physically connected to the Nuclear Instrumentation system?

The SBLC injection line piping arrangement allows for measuring pressure ___(1)___ the core plate.

When SBLC injects, Core Plate ΔP will indicate ___(2)___ than actual.

A. (1) above
(2) higher

B. (1) above
(2) lower

C. (1) below
(2) higher

D. (1) below
(2) lower

Proposed Answer: C

Explanation (Optional):

A. Incorrect – SLC injection terminates below the core plate.

B. Incorrect – SLC injection terminates below the core plate. With SLC injecting, the below core plate pressure measurement will be higher (further from the above plate pressure) resulting in a higher ΔP.

C. Correct – IAW TM–OP–080. The arrangement used to sense core plate ΔP is commonly referred to as a "pipe–within–a–pipe." The inner pipe is the Standby Liquid Control (SBLC) System injection line, which terminates in an open diffusion sparger below the core plate. This sensing line routes the below core plate pressure signal for use in the following applications:

- **Core Plate ΔP (PDT–B21–1N032)**
- **Non–Calibrated Individual Jet Pump ΔP (FT–B21–1N034 series)**
- **Reactor Water Cleanup (RWCU) System Bottom Head Drain Flow (FT–G33–1N037)**

The outer pipe extends up, and penetrates the core plate to sense pressure above the core plate. This sensing line routes the above core plate pressure signal for use in the following applications:

- **Core Plate ΔP (PDT–B21–1N032)**
- **Core Spray Break Detection (PDIS E21–004A/B)**
- **CRD Drive/Cooling Water Pressure ΔP**

With SLC injecting, the below core plate pressure measurement will be higher (further from above plate pressure) resulting in a higher ΔP.

D. Incorrect – ΔP will be higher. See explanation above for B and C.

Technical Reference(s): TM–OP–080 page 11 (Attach if not previously provided)
TM–OP–053 page 22

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–053 / 1217 (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	6
	55.43	

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	262001 K3.06	
	Importance Rating	3.8	

K3.06 Knowledge of the effect that a loss or malfunction of the A.C. ELECTRICAL DISTRIBUTION will have on following: RPS

Proposed Question: Common 25

Both Units are operating at rated power.

Unit Aux Buses 11A and 11B are being supplied by Startup Bus 10.

All other equipment is in a normal alignment.

A loss of Startup Bus 10 occurs, due to a bus lockout.

Which of the following describes how RPS normal and alternate power supplies are affected?

A. Div 1 RPS alternate power supply is lost, ONLY

B. Div 2 RPS alternate power supply is lost
Div 2 RPS normal power supply and Div 1 RPS normal and alternate power supplies remain energized

C. Div 1 and Div 2 RPS alternate power supplies are lost
Div 1 and Div 2 RPS normal power supplies remain energized

D. Div 1 RPS alternate power supply is lost
Div 2 RPS normal power supply is lost
Div 1 RPS normal power supply and Div 2 RPS alternate power supply remain energized

Proposed Answer: C

Explanation (Optional):

A. Incorrect – Both Div1 and Div 2 RPS alternate power supplies are lost. Normal supplies are not affected.

B. Incorrect – Both Div1 and Div 2 RPS alternate power supplies are lost. Normal supplies are not affected.

C. Correct – ON –003–001 Section 2 and TM–OP–058 page 52. Both RPS MG Sets ran through the transfer so neither RPS normal supply is lost. Also, since the Unit 1 Aux Buses are both being fed from SUB–10, and the alternate power supplies to Div 1 and 2 RPS are ultimately fed from the Aux Buses, via 1B253 and 1B261, both U–1 Alternate RPS power supplies are lost.

If power from SUB 10 or SUB 20 is lost, the 4 KV ESS Buses will transfer to their alternate supply within 0.5 seconds, causing a loss of power to the associated RPS MG Set for the 0.5 second period.

The high inertia flywheel of the MG Set is designed to maintain output voltage within 5%five percent of the nominal 120 VAC MG Set output and frequency within 5%five percent of the nominal 60 hz MG Set output. The EPA Breakers are set to trip when nominal input voltage (MG Set output) is either 7%seven percent below (undervoltage) or 7%seven percent above (overvoltage) the nominal 120 VAC input, both with a 3.7 second time delay. The EPA Breakers will also trip if input frequency (underfrequency) lowers to approximately 5%five percent of the nominal 60 hz value with a 5.5 second time delay.

The combination of the MG Set flywheel and the EPA Breaker trip setpoints and time delays ensure RPS power remains available if power is lost to either the 10 or 20 SUB.

D. Incorrect – NO normal RPS power supplies are lost. Only the alternates for both divisions.

Technical Reference(s): ON –003–001 Section 2 (Attach if not previously provided)

TM–OP–058

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–058 / 2497 (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
	55.43	______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	239002 A2.03	
	Importance Rating	4.1	

A2.03 – Ability to (a) predict the impacts of the following on the RELIEF/SAFETY VALVES ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Stuck open SRV

Proposed Question: Common 26

Unit 1 is operating at rated power.

Operators note the following trends:

Reactor power	slight rise
Reactor pressure	lowering
Feedwater temperature	lowering
Generator MWe	lowering

Which one of the following describes what has occurred, and identifies a procedural action required in response?

A. The backup EHC pressure regulator has taken control
IAW ON–193–001, Turbine EHC System Malfunction, adjust the backup regulator until PRESSURE SET PT A9B) indicates 934 psig

B. An SRV has opened
IAW ON–183–001, Stuck Open Safety Relief Valve, prevent uncontrolled condensate injection before RPV pressure is < 700 psig

C. The backup EHC pressure regulator has taken control
IAW ON–193–001, Turbine EHC System Malfunction, monitor PRESSURE SET PT/MAIN STEAM PRESSURE A or B indications for evidence of oscillations

D. An SRV has opened
IAW EO–000–103, Primary Containment Control, when Suppression Pool temperature exceeds 120 °F, scram the reactor

Proposed Answer: B

Explanation (Optional):

A. Incorrect – this would cause an increase in reactor pressure

B. Correct – IAW ON–183–001 symptoms (see below). Step

C. Incorrect – this would cause an increase in reactor pressure. The actions noted are performed if control valve oscillations are noted.

D. Incorrect – Scram is required prior to SP temp reaching 110 degrees IAW TS.

Per ON–183–001
SYMPTOMS AND OBSERVATIONS
1.2 <u>Indicated feedwater flow greater than indicated steam flow.</u>
1.3 <u>Loss of generator MWE</u>.
1.4 <u>Feedwater temperature decrease</u> due to SRV steam bypassing feedwater heating.
1.5 <u>RPV pressure decreasing.</u>

Technical Reference(s): ON–183–001 Rev 29, section 1 and step 3.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–083 / 1661 (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 3
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	202002 K1.03	
	Importance Rating	3.7	

K1.03 – Knowledge of the physical connections and/or cause– effect relationships between RECIRCULATION FLOW CONTROL SYSTEM and the following: Reactor core flow

Proposed Question: Common 27

Unit 1 is operating at 85 percent power.

Recirc Pump B experiences a spurious Limiter #2 runback.

Subsequently, Recirc Pump A trips.

Actual core flow is now determined using…

A. indicated core flow, since the subtraction circuit compensates for any jet pump reverse flow in the non–operating loop.

B. core plate ΔP, because forward flow in the jet pumps in the non–operating A loop may impact the value of indicated core flow.

C. core plate ΔP, because closure of the RECIRC PUMP A DSCH (HV–143–F031A) following the pump trip will cause a loss of input from the recirc loop flow instrumentation.

D. sum of the jet pump loop total flows because the closure of the RECIRC PUMP A DSCH (HV–143–F031A) following the pump trip will cause a loss of input from the recirc loop flow instrumentation.

Proposed Answer: B

Explanation (Optional):

A. Incorrect – this method will be accurate only if recirc pump speed is >75%. Recirc Pump B speed at Limiter #2 will be approximately 48%.

B. **Correct – per ON–164–002: *"If recirculation pump speed is less than 75% of rated, core flow should be determined by using the Core Flow vs. Core Pressure Drop Curve provided"; AND... "In single loop operation, core flow indication is not accurate when recirculation pump speeds are less than 75% of rated pump speed (1260 rpm). There are two reasons for this inaccuracy:***

(1) When core flow is below about 38 Mlbm/hr, forward flow takes place through both loops of jet pumps, in single loop operation, however, the Reverse Flow Summer instrumentation will subtract off the measured flow in the idle loop.

(2) When the flow through a jet pump loop is too low to accurately measure the flow i.e., below about 8 Mlbm/hr), the individual jet pump low flow cut–off instrumentation provides a zero reading. The low forward or reverse flow through the jet pumps in the idle loop will not be accounted for."

C. Incorrect – total core flow does not utilize recirc loop flow as input.

D. Incorrect – total core flow does not utilize recirc loop flow as input.

Technical Reference(s): ON–164–002 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15306; TM–OP–064E / 16024 (As available)

Question Source: Bank # LXR bank

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

55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	201001 K2.05	
	Importance Rating	4.5	

K2.05 – Knowledge of electrical power supplies to the following: Alternate rod insertion valve solenoids: Plant–Specific.

Proposed Question: Common 28

Unit 1 is operating at rated power.

How would the Alternate Rod Insertion (ARI) system be affected on a loss of Class 1E 125 VDC ESS Distribution Panel 1D614?

ARI would...

A. still be able to initiate a scram because it is AC powered.

B. still be able to initiate a scram because it is de–energize to operate.

C. still be able to initiate a scram because one division would still have power.

D. not be able to initiate a scram.

Proposed Answer: D

Explanation (Optional):

A. Incorrect – ARI is DC powered and is energize to operate. This distractor describes RPS, which is AC and de–energizes to function.

B. Incorrect – it is energize to operate, unlike RPS which is de–energize to operate.

C. Incorrect – power to both divisions is required to block and vent the scram air header.

D. Correct – IAW TM–OP–58 pages 49 & 51. ARI Logic has two divisions. Each division controls the solenoid on one Vent valve and one Block Valve. Both divisions must actuate to block and vent the Scram Air Header. The ARI Logic is said to be "two–out–of–two–twice" logic. All solenoids are "energize–to–operate" and are DC–powered. ARI power is supplied to the ARI Panels (1CB224A and 1CB224B) by Class 1E 125 VDC ESS Distribution Panels 1D614 and 1D624.

Technical Reference(s): TM–OP–58 pages 49 & 51 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–058 / 2487 d. (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
55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	215002 K3.01	
	Importance Rating	3.3	

K3.01 – Knowledge of the effect that a loss or malfunction of the ROD BLOCK MONITOR SYSTEM will have on following: Reactor manual control system: BWR–3,4,5

Proposed Question: Common 29

Unit 1 is in a startup. APRMs are indicating 30 percent power.

A hardware problem on Rod Block Monitor (RBM) A results in an INOP trip.

(1) What is the status of RBM A?

(2) How does this failure affect the Reactor Manual Control System?

A. (1) auto bypassed
(2) NO control rod withdraw block present

B. (1) auto bypassed
(2) NO control rod withdraw or insert blocks present

C. (1) in-service
(2) Control rod withdraw block will be present

D. (1) in-service
(2) Control rod withdraw and insert block present

Proposed Answer: C

Explanation (Optional):

A reference APRM is used to unbypass(enable) itself when its value is above the LPSP value of 24.9%. In this case power is above that value and the RBM is NOT bypassed.

A. Incorrect – RBM is not auto–bypassed at 30 % power.

B. Incorrect – RBM is not auto–bypassed @30 % power.

C. Correct– IAW TM–OP–78K RBM INOP TRIP: The RBM INOP Trip assures that no control rod is withdrawn unless the RBM Channels are in service or correctly bypassed. A "hardware" INOP trip will result in a rod withdrawal block even with the RBM Auto bypassed (APRM below LPSP). In this condition, a hardware INOP condition will generate an INOP trip rod block.

D. Incorrect – the RBM only generates a withdraw block.

Technical Reference(s): TM–OP–078K (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–078K / 15806 (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 6

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	202001 K4.05	
	Importance Rating	2.9	

K4.05 – Knowledge of RECIRCULATION System design feature(s) and/or interlocks which provide for the following: Seal cooling

Proposed Question: Common 30

Unit 1 is operating at rated power.

RBCCW Inboard Isolation MOVs HV–11345(46) spuriously CLOSE.

Which of the following describes how the Reactor Recirculation System is affected by these valves closing?

(1) Recirculation Pump seal cavity temperatures will rise

(2) Seal purge flow is lost to BOTH of the Recirculation Pump seals

(3) Recirculation Pumps will have to be tripped due to high motor winding temperatures

A. (1) ONLY

B. (2) ONLY

C. (1) and (3) ONLY

D. (2) and (3) ONLY

Proposed Answer: A

Explanation (Optional):

A. **Correct – IAW TM–OP–064C– Page 34 – To aid in cooling the recirc pump seals an auxiliary impeller on the pump shaft circulates water in the seals through an integral heat exchanger which is cooled by RBCCW.**

B. Incorrect –. Seal purge flow is provided by CRD, which is not affected by the RBCCW isolation.

C. Incorrect – Recirc Pump motor cooling is provided by RBCW, not RBCCW.

D. Incorrect – Seal purge flow is supplied by the CRD system. Recirc Pump motor cooling is provided by RBCW, not RBCCW.

Technical Reference(s): TM–OP–064C– Page 34 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–064C / 2558 g. (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach pare
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
55.43

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	219000 K5.04	
	Importance Rating	2.9	

K5.04 – Knowledge of the operational implications of the following concepts as they apply to RHR/LPCI: TORUS/SUPPRESSION POOL COOLING MODE : Heat exchanger operation

Proposed Question: Common 31

What is the operational implication of throttling closed the RHR heat exchanger bypass valve when Suppression Pool Cooling is in service?

A. RHRSW flow through the heat exchanger shell side will lower
RHR loop cooldown rate will lower

B. RHRSW will flow through the heat exchanger tube side will rise
RHR loop cooldown rate will rise

C. RHR flow through the heat exchanger tube side will lower
RHR loop temperature will rise

D. RHR flow through the heat exchanger shell side will rise
RHR loop cooldown rate will rise

Proposed Answer: D

Explanation (Optional):

A. Incorrect– RHR service water is not affected because the bypass valve is on the RHR side

B. Incorrect – RHR service water is not affected because the bypass valve is on the RHR side

C. Incorrect – RHR flows thru the shell side of the heat exchanger

D. Correct – IAW TM–OP–049 – The two RHR Heat Exchangers (1E205A and B) are vertically mounted, tube and shell design. One heat exchanger is located on the common pump discharge header in each loop. RHR Service Water flows through the tube–side of the heat exchanger (max. 9,000 gpm) and RHR water flows through the shell–side (max 10,000 gpm). The HX outlet and bypass valves are both normally open capable of being throttled to control bypass flow around the heat exchanger and therefore, cooldown rate. Closing the bypass valve forces more flow thru the heat exchanger and increases cooldown rate.

Technical Reference(s): TM–OP–049 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–049 / 195 (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
55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	290003 K6.02	
	Importance Rating	2.7	

K6.02 – Knowledge of the effect that a loss or malfunction of the following will have on the CONTROL ROOM HVAC : Component cooling water systems

Proposed Question: Common 32

Unit 1 is at rated power.

Control Structure Chiller A (0K112A) is in service, with Control Structure Chiller B (0K112B) in standby.

A low chilled water flow condition occurs on the operating Control Structure Chilled Water (CSCW) loop.

One minute later, a LOCA in the Drywell occurs.

Which of the following describes the status of CSCW and Control Structure HVAC 1 minute later?

A. Control Structure HVAC train A remains in service
Control Structure HVAC train B started

B. Control Structure HVAC train B started once its associated CSCW Circulating Pump started

C. Control Structure HVAC train B started immediately when the low flow condition occurred on the operating CSCW loop

D. Both Control Structure HVAC trains will be in service
Both CSCW loops will be in service

Proposed Answer: B

Explanation (Optional):

A. Incorrect – The LOCA will result in standby train starting once its CSCW pump starts. The A train will trip due to the low chilled water flow condition.

B. Correct – IAW TM–OP–30 Page 35 – The standby function is logic–tied to the operation of the corresponding Control Structure Chilled Water System (CSCW) Train such that starting (manual or automatic) of the associated CSCW Circulating Pump will result in the startup of the standby HVAC Trains. The CSCW Circulating Pumps receive an automatic start signal whenever:

High return air temperature is sensed at 0V103A/B, 0V117A/B, or 0V115A/B

Low chilled water flow sensed in the operating CSCW Loop

C. Incorrect –. The standby CSCW Loop Circ Pump (OP162B) will start after the 40 sec time delay on the 'A' Loop low flow. The LOCA doesn't occur for another 20 seconds. The LOCA will result in standby train starting once the CSCW pump starts.

D. Incorrect – Both CSCW loops will not be in service.

Technical Reference(s): TM–OP–030, TM–OP–300 (Attach if not previously provided)
E-214 Sht 18, 19

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–030 / 1968 (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 6
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	268000 A1.02	
	Importance Rating	2.6	

A1.02 – Ability to predict and/or monitor changes in parameters associated with operating the RADWASTE controls including: Off–site release

Proposed Question: Common 33

Release of the Laundry Drain Sample Tank is in progress.

The LRW Outboard Isolation Valve (HV06432A2) then partially closes.

How is the release affected by the change in valve position?

A. The release continues at a slightly lower flowrate because HV06432A2 is not full open

B. The release continues at the same flowrate because discharge flowrate is controlled by LRW Discharge Flow Control Valve HV06434

C. The LRW Inboard Isolation Valve HV06432A1 automatically CLOSES
The release is terminated

D. The LRW Inboard Isolation Valve HV06432A1 automatically CLOSES
The Laundry Drain Sample Tank Pump (OP319A) trips
The release is terminated

Proposed Answer: **C**

Explanation (Optional):

A. Incorrect – The release will terminate because the inboard isolation valve closes when the outboard valve comes off its full open seat.

B. Incorrect – The release will terminate because the inboard isolation valve closes when the outboard valve comes off its full open seat.

C. Correct – IAW TM –OP–69L – Page 24 – The following trip is only associated with closing the inboard LRW Station Discharge Isolation Valve: Outboard NOT FULL OPEN (ZS–2, HV06432A2) when the outboard isolation valve is not 100% OPEN

D. Incorrect – There are no trips for the pumps based on discharge flow or flow path. Pumps trip on low tank level or motor overload.

Technical Reference(s): TM–OP–069L page 24 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–069 / 10525 (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 11

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	271000 A2.10	
	Importance Rating	3.1	

A2.10 – Ability to (a) predict the impacts of the following on the OFFGAS SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Offgas system high flow

Proposed Question: Common 34

Unit 1 is operating at rated power.

The following annunciators are received:

OFFGAS UNIT 1 TRAIN A FLOW HI (AR–131–A06)
TRAIN A FLOW HIGH (AR–RW–012–A06)

Which of the following identifies a cause of these alarms and the actions required in accordance with ON–143–001, Main Condenser Vacuum and Offgas System Abnormal?

A. A loss of steam seal pressure may have occurred
If steam seal header pressure has degraded to < 4 psig then Jog OPEN HV–10705, SSE Press Ctlr Byps, to maintain Steam Seal header pressure at 4 psig

B. A loss of steam seal pressure may have occurred
If steam seal header pressure has degraded to < 4 psig then Jog CLOSED HV–10705, SSE Press Ctlr Byps, to maintain Steam Seal header pressure at 4 psig

C. The Steam Jet Air Ejector (SJAE) steam supply may have isolated
IF SJAE steam pressure on PI–10701 < 110 psig, THEN transfer steam supply to the alternate source in accordance with OP–172–001

D. The SJAE steam supply may have isolated
Ensure SJAE isolation occurred by checking SJAE Suct Iso Vlvs HV–10716, HV–10717, HV–10718 and HV–10719 CLOSED
Insert a Recirc Limiter#2 runback

Proposed Answer: A

Explanation (Optional):

A. Correct – The alarms stated would occur if seal steam pressure was lowering or lost due to increased air inleakage through the Main Turbine seals. IAW ON–143–001. – Step 3.7.3.a – IF Steam Seal Evaporator supplying steam to the header, THEN Jog Open HV–10705, SSE Press Ctlr Byps, to maintain Steam Seal header pressure at 4 psig.

B. Incorrect – HV–10705, SSE Press Ctlr Byps, must be jogged OPEN to maintain Steam Seal header pressure at 4 psig.

C. Incorrect – SJAE isolation would result in lower offgas flows, even if reverse flow to the condenser were to occur. The action stated would be proper for that condition.

D. Incorrect – SJAE isolation would result in lower offgas flows, even if reverse flow to the condenser were to occur. The action stated would be proper for that condition.

Technical Reference(s): ON–143–001 rev 34 pages 15,16 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15310 (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

55.43

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	201002 A3.03	
	Importance Rating	3.2	

A3.03 – Ability to monitor automatic operations of the REACTOR MANUAL CONTROL SYSTEM including: Rod drift alarm

Proposed Question: Common 35

Unit 1 is operating at 80 percent power for a control pattern adjustment.

While moving control rods, which of the following could result in annunciator ROD DRIFT (AR–104–H05) alarming and why?

Using the...

A. CONTINUOUS INSERT pushbutton, because the RMCS timer circuit function is bypassed and an even reed switch position is detected.

B. CONTINUOUS WITHDRAW pushbutton, because the RMCS timer circuit function is bypassed and an even reed switch position is detected.

C. CONTINUOUS INSERT pushbutton, because the rod drift alarm circuitry is NOT bypassed and an odd reed switch position is detected.

D. CONTINUOUS WITHDRAW pushbutton, because the rod drift alarm circuitry is NOT bypassed and an odd reed switch position is detected.

Proposed Answer: C

Explanation (Optional):

A. Incorrect – While the RMCS timer function is bypassed by the use of the CONT INSERT PB, enabling a rod drift alarm, the rod drift alarm requires an odd reed switch to be detected without the RMCS timer running.

B. Incorrect – Continuous withdraw does not bypass the RMCS timer function, therefore the rod drift alarm for the rod being moved is not enabled.

C. Correct – IAW TM–OP–56A Page 12 – When the CONTINUOUS INSERT pushbutton is used, the timer does not function and the rod moves inward as before. However, when the pushbutton is released, there will be no "settle" function. A "rod drift" alarm may occur when using the CONTINUOUS INSERT pushbutton because the rod drift alarm circuitry is not bypassed for this operation (part of the timer circuit function is to bypass the rod drift alarm circuitry). An odd switch must be detected.

D. Incorrect – Continuous withdraw does not bypass the RMCS timer function, therefore the rod drift alarm for the rod being moved is not enabled.

Technical Reference(s): TM–OP–56A Page 12 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–056A / 2459 (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
55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	259001 A4.06	
	Importance Rating	3.4	

A4.06 – Ability to manually operate and/or monitor in the control room: Feedwater inlet temperature

Proposed Question: Common 36

Unit 1 is operating at 90 percent power.

Which of the following identifies how feedwater inlet temperature responds to a loss of extraction steam to ONE string of feedwater heaters, and the operator action required in response?

A. FW inlet temperature rises
Reactor power must be reduced to ≤ 69 percent

B. FW inlet temperature rises
Reactor power must be maintained ≤ the pre–transient power level of 90 percent

C. FW inlet temperature lowers
Reactor power must be reduced to ≤ 71 percent

D. FW inlet temperature lowers
Reactor power must be maintained ≤ the pre–transient power level of 90 percent

Proposed Answer: C

Explanation (Optional):

A. Incorrect – FW inlet temp would increase (less heating)

B. Incorrect – FW inlet temp would increase (less heating)

C. Correct – IAW ON–147–001 – Step 3.2 – Immediately Reduce Reactor Power IAW RE Instructions in CRC Book to ≤71% RTP. 69% is correct for Unit 2.

D. Incorrect – Rx power must be reduced to ≤ 71%

Technical Reference(s): ON–147–001 rev 24 – Step 3.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15304 (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
55.43

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	272000 2.4.49	
	Importance Rating	4.6	

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

Proposed Question: Common 37

Unit 1 startup is in progress.

Reactor pressure is 45 psig, stable.

Main Steam Line (MSL) Radiation Monitor B is downscale.

I&C is investigating the INOP light lit on MSL Radiation Monitor D.

The following annunciators are in alarm:

MN STM LINE HI RADIATION (AR–111–C03)
MN STM LINE HI HI RADIATION (AR–103–D01)

MSL Radiation Monitors A and C indicate 1.3E5 mR/hr and 1.9E5 mR/hr, respectively.

Which one of the following actions must be performed with respect to RPS and the Mechanical Vacuum Pump (MVP)?

A. Perform Immediate Operator Actions in response to the automatic scram
Verify the MVP tripped.

B. Perform Immediate Operator Actions in response to the automatic scram
Trip the MVP

C. Manually scram the reactor
Verify the MVP tripped

D. Manually scram the reactor
Close both MVP suction isolation valves

Proposed Answer: C

Explanation (Optional):

A. Incorrect – there are NO automatic scrams on HI–Hi rad levels, as the MSIV closure on high rad was removed

B. Incorrect – there are NO automatic scrams on HI–Hi rad levels, as the MSIV closure on high rad was removed. The MVP will trip on “A” MSL Rad Monitor levels.

C. Correct – ON–179–001 requires a manual scram. "A" MSLRM is greater than Hi–Hi of setpoint. The MVP will trip on “A” MSL Rad Monitor levels

D. Incorrect – MVP Suction Isolation Valves both automatically close on either A or B MSL High Rad.

Technical Reference(s): AR111–C03, AR103–D01 (Attach if not previously provided)
ON–179–001

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–043/1239 (As available)

Question Source: Bank # LXR
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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	201003 A1.02	
	Importance Rating	2.8	

A1.02 – Ability to predict and/or monitor changes in parameters associated with operating the CONTROL ROD AND DRIVE MECHANISM controls including: CRD drive pressure

Proposed Question: Common 38

Unit 2 CRD System is being placed in service, with CRD Pump 2A running.

Current system conditions are as follows:

CRD system flow	63 gpm
CRD drive water differential pressure	120 psid
In–service CRD Flow Control Valve	FV–246–F002B
FC–C12–2R600, CRD Flow Controller	AUTO

OP–255–001 directs the operator to establish approximately 250 psid CRD drive water differential pressure by throttling FV–246–F003, Drive Water Pressure Valve.

Which one of the following completes the statement below as the operator throttles CLOSED FV–246–F003, Drive Water Pressure Valve, in an attempt to achieve 250 psid?

FV–246–F002B, CRD Flow Control Valve, will throttle ___(1)___ to achieve 63 gpm and drive water ΔP will ___(2)___.

	(1)	(2)
A.	open	lower
B.	closed	lower
C.	open	rise
D.	closed	rise

Proposed Answer: C

Explanation (Optional):

A. Incorrect – drive water dp will rise

B. Incorrect – FCV needs to throttle open to maintain flow

C. Correct – With the given conditions (F003 full open) the drive water pressure will be low. The closing of the F003 would reduce the size of the hole in the flowpath thereby raising pressure. With the F002 in auto, it would have to open to maintain the desired flowrate. All of the plausibilities deal with the relationship of the flow control valve to the pressure control valve making any of them possible depending on where the student thinks the valves are.

D. Incorrect – If the F002 was in a different alignment this would be possible, i.e. on the drive water header. The student may choose this if they answer based on the F003, not F002B.

Technical Reference(s): TM–OP–055 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–055 / 10017 (As available)

Question Source: Bank # TMOP055/10017–9

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 2

55.43 ________

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295030 EK1.03	
	Importance Rating	3.8	

EK1.03 – Knowledge of the operational implications of the following concepts as they apply to LOW SUPPRESSION POOL WATER LEVEL: Heat capacity

Proposed Question: Common 39

The Unit 1 Suppression Pool has an unisolable leak.

Suppression Pool level lowered and stabilized at 11 feet 9 inches.

What are the operational implications at this Suppression Pool level?

A. The ability to adequately condense the steam generated from a LOCA is lost
HPCI is NOT available and RCIC is available for Rapid Depressurization

B. The Pressure Suppression Limit has been exceeded
SRV tailpipe spargers have become uncovered

C. HPCI and RCIC are isolated and are unavailable for use if required for RPV level and pressure control

D. RHR pumps cannot be used to assure adequate core cooling because their vortex limits have been exceeded

Proposed Answer: A

Explanation (Optional):

A. Correct; Per TSB 3.6.2.2 ..."If the suppression pool water level is too low, an insufficient amount of water would be available to adequately condense the steam from the S/RV quenchers, downcomers, or HPCI and RCIC turbine exhaust lines. Low suppression pool water level could also result in an inadequate emergency makeup water source to the Emergency Core Cooling System. The lower volume would also absorb less steam energy before heating up excessively. Therefore, a minimum suppression pool water level is specified." EO–000–103 requires isolating HPCI on low SP level, but isolation of RCIC is not required.

B. Incorrect – 12' is the lower limit of the PSL curve at normal sup chamber pressure, however, SRV tailpipe exhausts uncover at 5', not 12' which Is where the downcomers uncover.

C. Incorrect – No automatic isolations on SP level for RCIC & HPCI

D. Incorrect – adequate core cooling this takes precedence over exceeding vortex limits

Technical Reference(s): EO–000–103 rev 9, TSB 3.6.2.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PP002 / 14612 (As available)
TM–OP–059 / 10357

Question Source: Bank # Loc 23 CERT
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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295025 EK1.01	
	Importance Rating	3.9	

EK1.01 – Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE : Pressure effects on reactor power.

Proposed Question: Common 40

Unit 1 is operating at rated power.

Reactor pressure is rising very slowly.

How does the plant respond to this condition?

A. A negative reactivity addition will occur due to more steam voids resulting in a lower reactor power
EHC will throttle the Control Valves in the closed direction which will result in less steam voids and reactor power rising

B. A negative reactivity addition will occur due to less steam voids resulting in a lowering in reactor power
EHC will throttle the Control Valves in the closed direction which will result in less steam voids and lower reactor power

C. A positive reactivity addition will occur due to more steam voids resulting in a rise in reactor power
EHC will throttle the Control Valves in the open direction which will reduce steam voids and lower reactor power

D. A positive reactivity addition will occur due to less steam voids resulting in a rise in reactor power
EHC will throttle the Control Valves in the open direction which will raise the steam voids and lower reactor power

Proposed Answer: D

Explanation (Optional):

A. Incorrect– steam void content decreases adding positive reactivity (increasing Reactor power)

B. Incorrect – steam void content decreases adding positive reactivity (increasing Reactor power)

C. Incorrect – steam voids decrease on rising reactor pressure

D. Correct – IAW TM–OP–93L – When the pressure in the Reactor Vessel increases, steam void content decreases adding positive reactivity (increasing Reactor power) and lowering Reactor level.

With the EHC Pressure Control and Logic System in operation, increasing Reactor power causes an increase in Reactor pressure and Turbine Throttle pressure. The Throttle pressure increase requires the Turbine Control Valves to open wider in response to the increased steam production. The increase in Turbine steam flow causes an increase in Generator output power, corresponding to the increase in Reactor power. Decreasing Reactor power has the opposite effect.

Technical Reference(s): TM–OP–93L (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–093L / 10020 (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 1,4

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295006 AK1.01	
	Importance Rating	3.7	

AK1.01 – Knowledge of the operational implications of the following concepts as they apply to SCRAM : Decay heat generation and removal

Proposed Question: Common 41

The reactor has been operating at rated power for the past year.

A reactor scram occurs.

Approximately 8 to 10 seconds after the scram, decay heat will be approximately ___(1)___ of full power. Post–scram this decay heat will be removed via the ___(2)___.

A. (1) 12%
(2) SRVs

B. (1) 12%
(2) Bypass Valves

C. (1) 6%
(2) SRVs

D. (1) 6%
(2) Bypass Valves

Proposed Answer: D

Explanation (Optional):

A. Incorrect – Bypass valves not SRVS.

B.. Incorrect – 6% not 12%

C. Incorrect – Bypass valves not SRVS

D. Correct –Power level will be approximately 6% 8–10 seconds after a scram but Reactor Pressure is 920 psig and still dropping so all bypass valves are closed. The #1 BPV starts to open at approximately 1 ¼ minutes post–scram. (Simulator data)

Technical Reference(s): TM–OP–93L page 31 (Attach if not previously provided)
Simulator data

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–093L / 10322 (As available)

Question Source: Bank # SD bank
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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295019 AK2.03	
	Importance Rating	3.2	

AK2.03 – Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR and the following: Reactor feedwater

Proposed Question: Common 42

Which of the following describe how the Feedwater system would be affected by a loss of instrument air at rated power?

The Reactor Feedwater Pump minimum flow recirculation valves would fail ___(1)___ and feedwater pump shaft seal temperature would ___(2)___.

A. (1) open
(2) lower

B. (1) open
(2) rise

C. (1) closed
(2) lower

D. (1) closed
(2) rise

Proposed Answer: **A**

Explanation (Optional):

A. Correct – IAW ON–218–001 attachment A – Reactor Feed Pump – Minimum flow recirculation valves and seal injection TVs fail OPEN. Outboard and inboard seal drain valves fail CLOSED. With the TVs failed open, seal water flow would increase and shaft seal temperature would lower.

B. Incorrect – shaft seal temperature would lower

C. Incorrect – Minimum flow recirculation valves fail open

D. Incorrect – Minimum flow recirculation valves fail open and shaft seal temperature would lower

Technical Reference(s): ON–218–001 Rev 25, attachment A Item I. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–045 / 10297 (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

55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	600000 AK2.01	
	Importance Rating	2.6	

AK2.01 – Knowledge of the interrelations between PLANT FIRE ON SITE and the following: Sensors, detectors and valves

Proposed Question: Common 43

The following Priority One Simplex Alarm is received:

FIRE SUP X222_Z3 ALM
TIME: 0300 DATE: 08/14/13
02–656 WPS111 CNDNSR

Which of the following would be the plant response for the given Simplex Alarm?

A. Alarms for the Motor–Driven and Diesel–Driven Fire Pumps running will be received
HV16150 Condenser Area Transfer Sump Isolation Valve closes

B. High flow from FSH12201A (FSH FOR WPS–111 UNIT 1 TB CDSR AREA) and
WPS–111 OS&Y SUPPLY VALVE via ZS–12201A NOT Full open
Input to Radwaste Collection Tanks will rise

C. Alarms for the Motor–Driven and Diesel–Driven Fire Pumps running will be received
Input to Radwaste Collection Tanks will rise

D. High flow from FSH12201A (FSH FOR WPS–111 UNIT 1 TB CDSR AREA) and
WPS–111 OS&Y SUPPLY VALVE via ZS–12201A NOT Full open
HV16150 Condenser Area Transfer Sump Isolation Valve closes

Proposed Answer: A

Explanation (Optional):

A. Correct – PUMP (Fire) IS OPERATING (AR–036–B01) alarm will be received, and ENGINE RUNNING (AR–036–B05) alarm will be received, and HV16150 Condenser Area Transfer Sump Isolation Valve closes.

B. Incorrect – The candidate may believe that there will be an increase in flow to radwaste, but the sump isolates as part of the fire response. Thus there will be no sudden inrush of fire protection water to radwaste.

C. Incorrect – The candidate may believe that there will be an increase in flow to the radwaste, but the sump isolates as part of the fire response. Thus there will be no sudden inrush of fire protection water to radwaste.

D. Incorrect – : The high flow from the flow switch is expected on fire suppression initiation in the area. The supply valve is normally open. A trouble alarm will result if the valve is not full open. The valve is a manual valve and will be open. The candidate may believe the valve operates on an initiation signal.

Technical Reference(s): AR–036–B01, B05 (Attach if not previously provided)
TM–OP–013Z

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–013Z / 2181 (As available)

Question Source: Bank # NRC 2005
Modified Bank # ______ (Note changes or attach parent)
New ______

Question History: Last NRC Exam 2005

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

10 CFR Part 55 Content: 55.41 4
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295018 AK2.01	
	Importance Rating	3.3	

AK2.01 – Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER and the following: System loads

Proposed Question: Common 44

Unit 1 is operating at full power.

A loss of Reactor Building Closed Cooling Water (RBCCW) occurs.

With NO Operator action, which one of the following will occur and why?

A. Outboard MSIVs will close because Instrument Air is lost

B. Inboard MSIVs will close due to Main Steam Tunnel High Temperature

C. Inboard MSIVs will close because Containment Instrument Gas is lost

D. Outboard MSIVs will close due to Main Steam Tunnel High Differential Temperature

Proposed Answer: C

Explanation (Optional):

A. Incorrect – IA compressors are cooled by TBCCW.

B. Incorrect – Tunnel coolers cooled by SW (Secondary CTMT). Moreover, Hi Tunn Temp closes ALL MSIVs.

C. Correct – CTMT Inst Gas compressors cooled by RBCCW.

D. Incorrect – Tunnel coolers cooled by SW (Secondary CTMT). Moreover, Hi Tunn Diff Temp closes ALL MSIVs.

Technical Reference(s): ON–114–001, rev 23 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15300 (As available)
TM–OP–083 / 1651

Question Source: Bank # SD bank
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 4
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295016 AK3.03	
	Importance Rating	3.5	

AK3.03 – Knowledge of the reasons for the following responses as they apply to CONTROL ROOM ABANDONMENT : Disabling control room controls

Proposed Question: Common 45

The Control Room was evacuated due to a fire.

Control of components is transferred to Remote Shutdown Panel location(s) ...

A. to ensure automatic operation of all ECCS equipment is maintained to enable a safe shutdown and cooldown of the reactor.

B. to provide positive control of equipment required to safely shutdown and cooldown the reactor.

C. to remove Control Room control of all the plant safety related equipment and allow for a safe cooldown of the plant following a scram.

D. to remove Control Room control of all the RHR and Core Spray pumps to prevent spurious pump starts induced by the control room fire.

Proposed Answer: B

Explanation (Optional):

A. Incorrect– automatic operation of equipment is defeated in many cases when local control is taken.

B. Correct – IAW ON–100–009 only critical equipment required to control, shutdown and cooldown the plant is available at the remote Panels.

C. Incorrect – NOT ALL safety related equipment has remote control panels.

D. Incorrect – not all pumps have local controls.

Technical Reference(s): ON–100–009, rev 27 section 6.0 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15310 (As available)

Question Source: Bank # SD Bank

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

55.43 _____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295001 AK3.01	
	Importance Rating	3.4	

AK3.01 – Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : Reactor water level response

Proposed Question: Common 46

Unit 2 is operating at 50 percent power.

A Reactor Recirc Pump trips.

Which of the following is correct regarding the initial reactor level response, and why?

A. Reactor level rises due to the collapse of steam voids

B. Reactor level rises from displacement of water due to increased steam voiding

C. Reactor level lowers due to the collapse of steam voids

D. Reactor level lowers from displacement of water due to increased steam voiding

Proposed Answer: B

Explanation (Optional):

A. Incorrect – steam voiding increases.

B. Correct – IAW ON–164–002 – Loss of reactor recirc flow. Symptoms – Reactor vessel level increases. Displacement of water occurs due to increased steam voiding.

C. Incorrect – reactor level rises

D. Incorrect – reactor level rises

Technical Reference(s): ON–164–002, rev 36 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15308 (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 7,5

55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295037 EK3.06	
	Importance Rating	3.8	

EK3.06 – Knowledge of the reasons for the following responses as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : Maintaining heat sinks external to the containment

Proposed Question: Common 47

An ATWS occurred on Unit 2.

Initial ATWS power was 10 percent.

The MSIVs are open.

Current conditions are as follows:

Reactor level	–60 inches, down slow
Reactor pressure	920 psig, steady

A step in the EOPs allows for bypassing the Level 1 closure of the MSIVs.

What is the reason for performing this action?

A. To maintain Turbine Bypass Valve availability in anticipation of Rapid Depressurization

B. To facilitate a maximum cooldown rate

C. To avoid adding additional heat to the Suppression Pool and challenging containment

D. To ensure availability of the Feedwater pumps during level recovery

Proposed Answer: C

Explanation (Optional):

A. Incorrect – anticipation of Rapid Depressurization is not allowed in EO–113.

B. Incorrect – would not be cooling down in this situation, no information provided regarding core critical status.

C. **Correct – maintaining the condenser available helps ensure containment is not additionally challenged.**

D. Incorrect – Allow maintaining FW pump availability is desirable, it is not the reason is not a concern at this time.

Technical Reference(s): EO–000–113, rev 10 LQ/L–8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PP002 / 14613 (As available)

Question Source: Bank # SD Bank

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

55.43 _____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295004 AA1.03	
	Importance Rating	3.4	

AA1.03 – Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : A.C. electrical distribution

Proposed Question: Common 48

Unit 1 is operating at rated power.

A loss of 125 VDC occurs to ESS Bus 1A.

How would ESS Bus 1A be affected if Transformer T–101 Feeder Breaker from S/U Bus 10 trips open at this time?

A. ESS Bus 1A Normal Feeder Breaker would trip open
Diesel Generator A would NOT start

B. ESS Bus 1A Normal Feeder Breaker would remain closed
Diesel Generator A would NOT start

C. ESS Bus 1A Normal Feeder Breaker would trip open
Diesel Generator A would start but NOT load onto the bus

D. ESS Bus 1A Normal Feeder Breaker would remain closed
Diesel Generator A would start but NOT load onto the bus

Proposed Answer: B

Explanation (Optional):

A. Incorrect – ESS Bus 1A Normal Feeder Breaker would NOT trip open due to a loss of control power.

B. Correct – IAW ON–102–610 – A loss of 125 DC results in a loss of breaker control functions. In a normal situation, a trip of Transformer T–101 Feeder Breaker from S/U Bus 10 would result in a fast transfer to the alternate supply and the DG would not start. However, with the loss of DC, the feeder breakers will not operate.

IAW TM–OP–024–ST – the DG would not start, even with a loss of bus voltage, because it needs to see all three bus feeder breakers (Normal, Alternate, DC Output) open before a DG start signal occurs.

C. Incorrect – ESS Bus 1A Normal Feeder Breaker would NOT trip open due to a loss of DC control power.

D. Incorrect – The DG would not start – it needs to see all three bus feeder breakers (Normal, Alternate, DC Output) open.

Technical Reference(s): ON–102–610, rev 14 Att. A., List 1 (Attach if not previously provided)
TM–OP–024–ST Page 62

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–003 (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
55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295028 EA1.04	
	Importance Rating	3.9	

EA1.04 – Ability to operate and/or monitor the following as they apply to HIGH DRYWELL TEMPERATURE : Drywell pressure

Proposed Question: Common 49

Unit 2 scrammed from rated power.

A small high pressure steam leak occurred in the Drywell.

Current Drywell conditions are as follows:

Drywell temperature 320 °F, up slow
Drywell pressure 20 psig, up slow

To initiate Drywell sprays, the Drywell Spray Isolation Valves LOCA Isolation Manual Override Switch must be placed to OVERRIDE to permit manual operation of ___(1)___ Isolation Valve(s). Once sprays are initiated Drywell pressure will then begin to lower rapidly, mainly due to the effects of ___(2)___ cooling.

A. (1) ONLY the Outboard
(2) convective

B. (1) BOTH the Inboard and Outboard
(2) convective

C. (1) ONLY the Inboard
(2) evaporative

D. (1) BOTH the Inboard and Outboard
(2) evaporative

Proposed Answer: D

Explanation (Optional):

A. Incorrect – both valves are affected. Evaporative and convective cooling take place during spray operation but the rapid pressure reduction effects are due mainly to evaporative cooling.

B. Incorrect – Evaporative and convective cooling take place during spray operation but the rapid pressure reduction effects are due mainly to evaporative cooling.

C. Incorrect – both valves are affected.

D. Correct – IAW TM–OP–049 – With the auto closure signal present the closure signal can be overridden using the S17A/B, LOCA Isolation Manual Override Switch and then placing the valve control switch to OPEN. The override remains sealed in to the F021 and F016 Valves until the RHR Loop Initiation signal is reset or reset using the associated S17A/B Switch.

EO–000–103 step PC/P–7 – Spray operation reduces drywell temperature and pressure through the combined effects of evaporative and convective cooling. In a drywell, this cooling process results in an immediate and rapid and large pressure reduction than can be handled by the vacuum breakers. The convective cooling process occurs much slower than the evaporative cooling process.

Technical Reference(s): TM–OP–049 page 31 (Attach if not previously provided)
EO–000–103, rev 9 PC/P–7

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–049 / 10493 (As available)
PP002 / 14613

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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295026 EA1.03	
	Importance Rating	3.9	

EA1.03 – Ability to operate and/or monitor the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Temperature monitoring

Proposed Question: Common 50

A transient has resulted in Suppression Pool temperature rising and lowering level.

(1) How do the SPOTMOS NUMAC units on Panels 1C690A/B determine SPOTMOS average temperature (SPOTMOS AVG) at a normal Suppression Pool level?

(2) Which of the following describes the instrumentation available to determine temperature if Suppression Pool level lowered to 19 feet?

A. (1) Upper SPOTMOS RTDs are averaged
(2) SPOTMOS Division 1 lower RTDs only

B. (1) Upper SPOTMOS RTDs are averaged
(2) SPOTMOS Divisions 1 and 2 average temperature

C. (1) Upper & Lower SPOTMOS RTDs are averaged
(2) SPOTMOS Division 1 lower RTDs only

D. (1) Upper & Lower SPOTMOS RTDs are averaged
(2) SPOTMOS Divisions 1 and 2 average temperature

Proposed Answer: A

Explanation (Optional):

A. **Correct – IAW TM–OP–059Z Pages 11 – The SPOTMOS NUMAC Units TX–15751(2) are located in the Main Control Room at Panel 1C690A/B. The Nuclear Measurement Analysis ands Control (NUMAC) Units are a General Electric design Suppression Pool Temperature Monitoring System. Each Division's NUMAC calculates an average of its eight upper temperature elements to provide a SPOTMOS Average temperature. The four lower RTDs are not used in calculating this average, but are utilized for calculation of Bottom Pool Average temperature and Bulk Pool temperature. The Bottom Pool Average temperature is an average of the four lower (Division 1) detectors**

The upper RTDs are located at 20.5 feet therefore the lower RTDs are available at 19 feet.

B. Incorrect – ONLY the lower SPOTMOS RTDs are available. Average temp is determined from the upper SPOTMOS RTDs.

C. Incorrect – ONLY the Upper RTDs are used for the NUMAC average.

D. Incorrect – ONLY the lower SPOTMOS RTDs are available. Average temp is determined from the upper SPOTMOS RTDs. ONLY the Upper RTDs are used for the NUMAC average.

Technical Reference(s): TM–OP–059Z Pages 11 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: none

Learning Objective: TM–OP–059Z / 337 (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

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295003 AA2.04	
	Importance Rating	3.5	

AA2.04 – Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : System lineups

Proposed Question: Common 51

Unit 1 is operating at rated power.

TBCCW Pump 1A is in service, with TBCCW Pump 1B in standby.

A loss of power to 1B116 occurs.

The following annunciators are received:

TBCCW PUMP A MOTOR TRIP (AR–123–G01)
TBCCW PUMPS DISCHARGE HEADER LO PRESSURE (AR–123–G03)

Which one of the following identifies the response of the TBCCW pumps if the MCC is re–energized 25 seconds later?

	A Pump	B Pump
A.	restart	auto start
B.	remains off	auto start
C.	restart	remains in standby
D.	remains off	remains in standby

Proposed Answer: B

Explanation (Optional):

A. Incorrect – this would occur if power were restored within 15 seconds to A pump

B. Correct – Low pressure will start STBY pump, loss of power for >15 seconds will prevent pump restart on loss of power

C. Incorrect – this would occur if pressure did not drop to 65 psig and power were restored within 15 seconds to A pump

D. Incorrect – this would occur if pressure did not drop to 65 psig and power was not restored within 15 seconds to A pump

Technical Reference(s): ON–114–001, rev 19 section 2.0 (Attach if not previously provided)

TM–OP–015 pg 4

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–015 / 1733 (As available)

Question Source: Bank # #TMOP015/1733 001

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 4

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295021 AA2.02	
	Importance Rating	3.4	

AA2.02 – Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING : RHR/shutdown cooling system flow

Proposed Question: Common 52

Unit 1 is in Mode 4.

RHR Pump 1B is operating in Shutdown Cooling.

Annunciator HV–151–F006B/D and HV–151–F007B OPEN DRAIN RX VESSEL (AR–113–C09) is received.

PI–E11–1R–606B1, INLET PRESSURE TO HX B, is oscillating from 50 to 300 psig.

RHR Pump 1B amps are oscillating.

Which of the following explains what occurred?

A. RPS MG Set B tripped

B. HV–151–F017, RHR B INJ FLOW CTL, has inadvertently closed

C. HV–151–F006B, RHR SHUTDOWN COOLING RHR PUMP B SUCTION VLV, disc has separated from the stem

D. The RHR Pump 1B shaft sheared

Proposed Answer: C

Explanation (Optional):

A. Incorrect – An RPS loss would close the F008 and F009 causing the RHR pump to trip

B. Incorrect – Closure of the injection valve would produce a high discharge pressure with no flow

C. Correct – The indications in the stem show a loss of suction path. Pump discharge pressure and amps oscillating are indicative of cavitation. The F007 min flow valve open indicates a loss of system flow.

D. Incorrect – a shaft shear would result in no discharge pressure and low amps.

Technical Reference(s): ON–149–001 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–049 / 192 (As available)

Question Source: Bank # TMOP045/15297/4

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

55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295038 EK2.09	
	Importance Rating	2.9	

EK2.09 – Knowledge of the interrelations between HIGH OFF–SITE RELEASE RATE and the following: Post accident sample system (PASS): Plant–Specific.

Proposed Question: Common 53

In the event of a high offsite release following fuel degradation, which of the following describes operation of the Post–Accident Vent Stack Sampling System (PAVSSS)?

PAVSSS provides...

A. a standby rad monitoring function to monitor containment vent and purge lines post–accident.

B. a redundant and more accurate measurement of stack monitoring, since SPING is for low rad level use.

C. redundant monitoring of all ranges when SPING is removed from service for periodic maintenance.

D. a backup to SPING, since expected high post–accident background rad levels may result in loss of SPING monitoring capability.

Proposed Answer: **D**

Explanation (Optional):

A. Incorrect – Does not monitor vent and purge lines; Backup for accidents only.

B. Incorrect – PAVSSS can measure similar rad levels as SPING.

C. Incorrect – PAVSSS only has Mid–range noble gas and High–range noble gas channels.

D. Correct. Backup for accidents only. IAW TM–OP–079Z – Page 23 – Unlike the SPINGs, where the sample flowrate is adjusted automatically, the PAVSSS flowrate must be adjusted manually. It then delivers the sample stream to the Radiation Detectors. There are only two detectors in service on the PAVSSS; the Mid–Range Noble Gas Channel and the Hi–Range Noble Gas Channel.

Technical Reference(s): TM–OP–079Z – Page 23 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–079Z / 1941 (As available)

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

Question History: Last NRC Exam 2007

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

10 CFR Part 55 Content: 55.41 11
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295024 2.4.6	
	Importance Rating	3.7	

2.4.6 – Emergency Procedures / Plan: Knowledge of EOP mitigation strategies.

Proposed Question: Common 54

Which one of the following can be a DIRECT result of excessive primary containment pressure AND will require RAPID DEPRESSURIZATION of the Reactor Pressure Vessel?

A. Operation on the unsafe side of the RPV Saturation Curve

B. Operation in the unsafe region of the Pressure Suppression Limit

C. Exceeding RHR and Core Spray vortex limits when needed for Adequate Core Cooling

D. Operation above the RPV pressure lines on the Heat Capacity Temperature Limit

Proposed Answer: **B**

Explanation (Optional):

A. Incorrect – this is not a direct result of high PC pressure, and can be the result of RD with high containment temp.

B. Correct – this limit is dependent upon PC pressure and RD is required if PC pressure cannot be controlled within this limit.

C. Incorrect – not a result of high PC pressure and does not require RD.

D. Incorrect, not a direct result of high PC pressure.

Technical Reference(s): EO–000–103 rev 11, PC/P–8 (Attach if not previously provided)
EO–000–102 rev 9, SSES–EPG

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PP002 / 14613 (As available)

Question Source: Bank # LXR Bank
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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295005 2.2.22	
	Importance Rating	4.0	

2.2.22 – Knowledge of limiting conditions for operations and safety limits. (Main TB Trip)

Proposed Question: Common 55

By design, a reactor scram is generated when the Main Turbine stop valves automatically close on a turbine trip, because the subsequent pressure rise may result in exceeding the ___(1)___ if ___(2)___ fail to automatically open.

A. (1) MCPR safety limit
   (2) Safety Relief Valves

B. (1) RPV pressure safety limit
   (2) Turbine Bypass Valves

C. (1) MCPR safety limit
   (2) Turbine Bypass Valves

D. (1) RPV pressure safety limit
   (2) Safety Relief Valves

Proposed Answer: **C**

Explanation (Optional):

A. Incorrect – a failure of SRVs to operate in this case would not result in MCPR violation since BPVs would control pressure.

B. Incorrect – SRVs function to ensure RPV pressure limits are not exceeded during the turbine trip w/o BPV transient.

C. Correct – the transient analysis shows that MCPR may be exceeded. Per FSAR 15.2.3 and TSB 3.3.1.1 the TSV closure scram protects against the potential for exceeding the MCPR SL if BPVs fail to open.

D. Incorrect – a failure of SRVs to operate in this case would not result in a pressure SL violation since BPVs would control pressure.

Technical Reference(s): TS 3.3.1.1, FSAR 15.2.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–058 / 15970 (As available)

Question Source: Bank # LXR

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, 5

55.43

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	700000 2.1.19	
	Importance Rating	3.9	

2.1.19 – Ability to use plant computers to evaluate system or component status. (Generator Voltage and Electric Grid Disturbances)

Proposed Question: Common 56

Unit 1 is in startup.

Shortly after placing the Main Generator on line, the TCC calls the Unit 1 Control Room and notifies the crew of minor grid disturbances.

This results in the conditions shown below:

POINT ID	DESCRIPTION	CURRENT VALUE	QUAL
GNJ01	GENERATOR POWER	144.9 MW	GOOD
GNU02	GEN REACTIVE POWER	33.1 MVARS	GOOD
GNI02	GEN PHASE A CURRENT	2.79 KAMPS	GOOD
GNI03	GEN PHASE B CURRENT	0.0 KAMPS	GOOD
GNI04	GEN PHASE C CURRENT	2.83 KAMPS	GOOD

The conditions shown above REQUIRE…

A. IMMEDIATE opening of the generator exciter field breaker due to a phase to ground short.

B. entry into ON–198–003, UNIT 1 MAIN GENERATOR CONNECTED SINGLE PHASE TO GRID DURING STARTUP, to disconnect the generator from the grid.

C. entry into ON–198–002, UNIT 1 MAIN GENERATOR MVAR CONTROL FOR AUTO VOLTAGE REGULATOR OPERATION WHEN SYNCHED TO GRID, to reduce reactive load.

D. IMMEDIATE trip of the Main Turbine due to potential excessive turbine vibration as a result of generator phase imbalance.

Proposed Answer: B

Explanation (Optional):

A. Incorrect; this may damage the generator

B. Correct; the mismatch on amperage is indicative of single phase connection to grid

C. Incorrect; MW and MVAR are well within limits

D. Incorrect; ON–198–003 cautions that the turbine should not be tripped until the generator is divorced from the grid

Technical Reference(s): ON–198–003 rev 6, 3.6 & 3.7 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15297 (As available)

Question Source: Bank # AD045/1358 032

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

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295023 AK2.04	
	Importance Rating	3.2	

AK2.04 – Knowledge of the interrelations between REFUELING ACCIDENTS and the following: RMCS/Rod control and information system

K/A Justification: This question deals with refueling interlocks associated with RMCS and designed to prevent refueling accidents

Proposed Question: Common 57

Unit 1 is in Mode 5 with fuel movement in progress using the Unit 1 Refueling Platform.

The Reactor Select Switch is in REAC 1.

The Unit 1 Refueling Platform is positioned over the Unit 1 reactor. Refuel Switch #1 is activated.

The fuel grapple, monorail hoist, and frame mounted hoist are all UNLOADED.

NO control rod is selected.

What will occur if REVERSE refueling platform motion is attempted?

The platform...

A. WILL move because NO control rod is selected.

B. WILL move because the grapple and hoists are all unloaded.

C. WILL NOT move because Refuel Switch #1 is activated.

D. WILL NOT move because NO control rod is selected.

Proposed Answer: D

Explanation (Optional):

A. Incorrect – the platform will not move.

B. Incorrect – the platform will not move.

C. Incorrect – refuel switch #1 will only restrict platform reverse movement when the grapple or hoists are loaded and a control rod is withdrawn.

D. Correct, platform reverse movement over the core is prevented when no rod is selected because the RMCS, when a rod is selected, enables the refueling interlocks.

Technical Reference(s): TM–OP–081A (Attach if not previously provided)

OP–181–001 Step 2.3.1.e, Att A

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 12465 (As available)

Question Source: Bank # LXR

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 13, 6

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295031 EA2.01	
	Importance Rating	4.6	

EA2.01 – Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL : Reactor water level
K/A Justification: The K/A is matched because you are interpreting the effects and conditions occurring with reactor low level.

Proposed Question: Common 58

A LOCA occurred on Unit 1 following a loss of offsite power.

All control rods have inserted.

No Diesel Generators are running.

HPCI and RCIC are NOT available.

NO Diesel Fire pump is running.

Current reactor conditions are as follows:

Reactor level	–165 inches, down slow
Reactor pressure	815 psig, steady

Which of the following, if any, will maintain Steam Cooling in accordance with EO–100–102?

A. Steam cooling is not possible under these conditions

B. Perform Rapid Depressurization per EO–100–112

C. Maintain reactor pressure 815 to 915 psig

D. Maintain reactor level > –205 inches

Proposed Answer: D

Explanation (Optional):

A. Incorrect – The given conditions do support steam cooling.

B. Incorrect – Rapid depressurization accelerates the rate of inventory loss and pressure drop, thereby shortening the time that steam cooling is maintained.

C. Incorrect – RPV pressure must be stable or decreasing. Raising reactor pressure will be detrimental to the steam cooling. If RPV pressure is rising, the assumptions of the MZIWL calculation are no longer valid and the core may not be adequately cooled.

D. Correct – Steam cooling occurs when water heated in the core boils turns to steam and rises in the bundles cooling the upper portions. This occurs below –161 inches and continues to –205 inches (MZIRWL). For this to occur there must be a steam flow path and zero injection. From the stated conditions the break is providing a flow path (pressure is NOT rising).

Technical Reference(s): EO–000–102 rev 11, RC/L–27 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PP002 / 14591 (As available)

Question Source: Bank # LXR Bank
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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295034 EK1.02	
	Importance Rating	4.1	

EK1.02 – Knowledge of the operational implications of the following concepts as they apply to SECONDARY CONTAINMENT VENTILATION HIGH RADIATION : Radiation releases

Proposed Question: Common 59

A Design Basis Fuel Handling accident has occurred.

The 818' hatch is installed.

Which one of the following describes the consequences of this event if the Refuel Floor High Exhaust Duct Radiation Monitors AND the Refuel Floor Wall Exhaust Duct radiation monitors fail to function?

Any release as a result of this accident will…

A. be processed by SGTS.
Dose to site personnel at site exclusion area boundary will NOT exceed dose limits.

B. NOT be processed by SGTS.
Dose to site personnel at site exclusion area boundary may exceed dose limits.

C. be processed by Zone 3 HVAC.
Dose to site personnel at site exclusion area boundary will NOT exceed dose limits.

D. NOT be processed by SGTS.
Dose to site personnel at site exclusion area boundary will NOT exceed dose limits.

Proposed Answer: B

Explanation (Optional):

A. Incorrect – will not be processed by SBGT as Secondary Containment will not be automatically isolated and SBGT will not automatically initiate.

B. Correct – a failure of these rad monitors will prevent proper operation of the Secondary Containment isolation and SBGT start, therefore site boundary dose limits may be exceeded.

C. Incorrect, the normal ventilation system does not have the capability to process the atmosphere under accident conditions.

D. Incorrect, site boundary dose rates may exceed limits since SBGT will not be available for atmosphere processing.

Technical Reference(s): TS 3.3.6.2 bases, TM–OP–070 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–070 / 1200 (As available)

Question Source: Bank # TMOP079E/1200 007

Modified Bank # ______ (Note changes or attach paren

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

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295008 AK2.08	
	Importance Rating	3.4	

AK2.08 – Knowledge of the interrelations between HIGH REACTOR WATER LEVEL and the following: Main turbine: Plant–Specific
KA Justification: Knowledge of Main Turbine trip on RPV high level, which is the relationship between the two, is a low level of difficulty. This question goes one level beyond that basic knowledge

Proposed Question: Common 60

Unit 1 is operating at rated power.

One channel of the High Reactor Vessel Level 8 inputs to the Main Turbine trip logic becomes DEVIANT.

How is the Main Turbine trip logic affected?

The trip logic...

A. becomes a two–out–of–two logic ONLY when the DEVIANT level channel is placed in Maintenance Bypass.

B. immediately becomes a two–out–of–two logic.

C. remains a two–out–of–three logic.

D. becomes a two–out–of–two logic after a 90–second time delay.

Proposed Answer: D

Explanation (Optional):

A. Incorrect – signal does not need be in Maintenance Bypass

B. Incorrect – 90 second time delay

C. Incorrect – becomes two–out–of–two logic

D. Correct – IAW TM–OP–45I – Page 14 – <u>Main Turbine (Level 8) Trip (+ 54 inches)</u> NRLA, NRLB, and NRLC are input signals to Main Turbine high level trips. ICS output is a contact closure to the existing two–out–of–three relay logic. If a signal is "DEVIANT or UNUSABLE or in maintenance bypass" it is removed from the L8 trip logic after a 90 second time delay, and the remaining two signals provide the trip using two–out–of–two logic. Only one signal may be automatically removed from service due to excess deviation (± 10 inches).

Technical Reference(s): TM–OP–45I – Page 14 (Attach if not previously provided)

ON–145–001 Step 2.1.3.a

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–045I / 16006 (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

55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295032 EK3.01	
	Importance Rating	3.5	

EK3.01 – Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE : Emergency/normal depressurization

Proposed Question: Common 61

In accordance with EOP bases, which of the following identifies the reasons EO–100–104, Secondary Containment Control, requires a Rapid Depressurization when the Maximum Safe Temperature is exceeded in two or more areas?

Rapid Depressurization...

(1) facilitates RPV level restoration.

(2) places the primary system in its lowest energy state.

(3) reduces the flow from the break into the Reactor Building.

(4) rejects heat to the Suppression Pool in preference to outside the primary containment.

A. (2) and (3), ONLY

B. (1), (3) and (4), ONLY

C. (1), (2) and (4), ONLY

D. (2), (3) and (4), ONLY

Proposed Answer: D

Explanation (Optional):

A. Incorrect – rejecting heat to the Suppression Pool in preference to outside containment is an additional reason.

B. Incorrect – level restoration is handled in other EOP actions. Placing the primary system in its lowest energy state is an additional reason.

C. Incorrect – level restoration is handled in other EOP actions. Reducing the flow from the break into the Reactor Building is an additional reason.

D. Correct – Should secondary containment area temperatures continue to increase to their Max Safe values in more than one area with a primary system discharging into secondary containment, the RPV must be rapidly depressurized. Depressurizing the RPV <u>promptly places the primary system in its lowest possible energy state, rejects heat to the suppression pool in preference to outside the containment, and reduces the driving head and flow of primary systems that are unisolated and discharging into the secondary containment.</u>

Technical Reference(s): EOP 000–104 rev 9, Bases Step SC/T–8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PP002 / 14613 (As available)

Question Source: Bank # SD Bank

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

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295007 AA1.03	
	Importance Rating	3.4	

AA1.03 – Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE : RCIC: Plant–Specific

Proposed Question: Common 62

Unit 1 has scrammed.

Reactor pressure is being controlled with SRVs.

RCIC is being used to maintain RPV level.

The RCIC controller is in MANUAL. The controller has just been adjusted to establish 625 gpm injection to the reactor.

Assuming no operator action, how will RCIC operation be affected if reactor pressure rises from 800 to 1050 psig?

A. RCIC pump flow and RCIC Turbine speed will both rise

B. RCIC pump flow and RCIC Turbine speed will both remain the same

C. RCIC pump flow will rise, RCIC Turbine speed will remain the same

D. RCIC pump flow will lower, RCIC Turbine speed will remain the same

Proposed Answer: D

Explanation (Optional):

A. Incorrect – flow will lower as pressure rises

B. Incorrect – as pump discharge head increase with RPV pressure rise, flow will lower

C. Incorrect – selecting this demonstrates a lack of understanding on how the controllers function

D. Correct – IAW TM–OP– 050 Page 41 – If the flow controller is in manual, then the output dialed in by the operator becomes a turbine speed demand that is independent of flow. The turbine speed is then constant and flow varies with the changes seen by the discharge head at the pump.

Technical Reference(s): TM–OP– 050 Page 41 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–050 / 2012 (As available)

Question Source: Bank # SD Bank
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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295029 EA2.01	
	Importance Rating	3.9	

EA2.01 – Ability to determine and/or interpret the following as they apply to HIGH SUPPRESSION POOL WATER LEVEL : Suppression pool water level

Proposed Question: Common 63

Unit 2 was operating at rated power when an event occurred resulting in rising Suppression Pool level.

Which of the following describes the concern if Suppression Pool level reaches 40 feet?

A. If running, HPCI and RCIC could trip on High Turbine Exhaust pressure
Drywell Vacuum Breakers will become covered

B. Starting RCIC could result in equipment damage
Operation of an SRV at its lowest relief setpoint may result in exceeding the capability of the SRV tail pipe

C. Suppression Chamber spray nozzles have become submerged
The range of Suppression Pool level instrumentation has been exceeded

D. Suppression Chamber spray nozzles have become submerged
Operation of an SRV at its lowest relief setpoint may result in exceeding the capability of the SRV tail pipe

Proposed Answer: B

Explanation (Optional):

A. Incorrect – there would be no adverse consequences on HPCI if it is in operation. The DW Vacuum breakers begin to cover at 43 feet.

B. Correct – IAW EOP Bases At levels above 38', challenges occur with respect to component operability and primary containment structural integrity. For example, at 38' operation of an SRV at its lowest relief setpoint may result in exceeding the capability of the SRV tail pipe, tail pipe supports, quencher, or quencher supports. At 43' the drywell vacuum breakers begin to cover. At 49' suppression chamber spray nozzles are submerged and the range of suppression pool water level instrumentation is exceeded. Operation at these higher levels will require additional resources.

Both HPCI and RCIC are ensured to be running when pool level reaches 25'. If the turbines are already running as pool level exceeds 25', continued operation will not result in adverse consequences.

C. Incorrect – Suppression Chamber spray nozzles become submerged at 49 feet. SP level can be determined up to 49 feet.

D. Incorrect – Suppression Chamber spray nozzles become submerged at 49 feet.

Technical Reference(s): EO–000–103 rev 9, Bases steps SP/L–12 &14 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–059 / 10357 (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

55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295009 2.4.35	
	Importance Rating	3.8	

2.4.35 – Emergency Procedures / Plan: Knowledge of local auxiliary operator tasks during emergency and the resultant operational effects. (low reactor water level)

Proposed Question: Common 64

Unit 1 was operating at rated power when a Station Blackout occurred.

Reactor level is lowering.

ES–013–001, Fire Protection System Crosstie to RHRSW, is being performed to align RHRSW A for reactor injection.

Fire Protection Header Pressure is 80 psig and stable.

Diesel Engine Driven Fire Pump 0P511 is NOT available.

Which of the following identifies actions that must be performed by the local operator when aligning fire water to RHRSW to allow for RPV injection?

(NOTE: The choices below do NOT identify ALL required actions necessary for the complete alignment)

A. Start the motor driven fire pump locally
Unlock and OPEN 0PI–127

B. Unlock and OPEN 0PI–127
Verify the Backup Diesel Driven Fire Pump is in operation

C. CLOSE 0PI–127
Manually start the Backup Diesel Driven Fire Pump

D. Verify the Backup Diesel Driven Fire Pump is in operation
Ensure the RHRSW CROSSTIE VALVES HV–112–F073A and HV–112–F075A are CLOSED

Proposed Answer: B

Explanation (Optional):

A. Incorrect– Pump has no power due to Station Blackout.

B. Correct – IAW ES–013–001 step 4.8.1 NOTE: If Engine Driven Fire Pump 0P511 NOT available, Cross connect Backup fire protection system with plant yard as follows. Unlock and open 0PI–127. When system pressure is ≤85 or additional flow is required. Ensure backup diesel engine driven fire pump is in operation.

C. Incorrect – 0PI–127 must be OPENED and the **backup** diesel engine driven fire pump will start. A manual start is not required.

D. Incorrect – RHRSW CROSSTIE HV–112–F073A and 75A must be OPEN

Technical Reference(s): ES–013–001 step 4.8.1 NOTE (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PP006 / 5425 (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
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295010 AK2.05	
	Importance Rating	3.7	

AK2.01 – Knowledge of the interrelations between HIGH DRYWELL PRESSURE and the following: Drywell Cooling and ventilation

Proposed Question: Common 65

Unit 1 was operating at rated power when Drywell temperature and pressure rose due to a small LOCA.

Drywell pressure peaked at 2.0 psig.

Which one of the following describes the current Drywell cooling capabilities for these conditions, assuming NO operator action has occurred?

A. Drywell Cooling fans are RUNNING
Reactor Building Chilled Water is supplying the coolers

B. Drywell Cooling fans are TRIPPED due to the LOCA
Fans should be restarted in FAST speed

C. Drywell Cooling fans are TRIPPED due to the LOCA
Fans should be restarted in SLOW speed

D. Drywell Cooling fans are RUNNING
NO cooling water is being supplied to the coolers

Proposed Answer: C

Explanation (Optional):

A. Incorrect – Fans will be tripped due to LOCA signals

B. Incorrect – Fans are not restarted in fast speed procedurally.

C. Correct – Fans are tripped due to LOCA and will be restarted in slow speed by procedure.

D. Incorrect – Fans will be tripped.

Technical Reference(s): TM–OP–073 (Attach if not previously provided)
OP–160–001 rev 13

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–073 / 1908 (As available)

Question Source: Bank # LXR Bank – Cert #23
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 9, 10
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	2.1.1	
	Importance Rating	3.8	

Knowledge of Conduct of Operations requirements

Proposed Question: Common 66

Unit 1 is operating at rated power.

An annunciator alarms on panel 1C601 due to planned activities being performed by operators in the field.

This alarm had been previously identified during the pre–job brief for this activity as expected to occur.

The annunciator window is NOT flagged.

This is the FIRST time this annunciator has alarmed due to this activity.

Which of the following is the <u>required</u> response (if any) by the PCO for this alarm?

A. NO response is required

B. Announce the alarm to the US as “expected”, ONLY

C. Announce the alarm to the US as “expected”, THEN read the alarm window aloud

D. Contact the NPOs to verify that the alarm was caused by their activity AND report the result to the US

Proposed Answer: C

Explanation (Optional):

A. Incorrect – If flagged no response would be required

B. Incorrect – Must at minimum paraphrase the alarm window

C. Correct, Per OP–AD–004, step 11.2.1
Expected Alarms:
An expected alarm is one that has been previously identified by a procedure or brief to the PCO / Field Operator and has been communicated to and concurred by the Unit Supervisor.
For expected alarms, announce the alarm to the US using their name and refer to the alarm as "expected." Then, read the alarm window aloud (wording can be paraphrased).

Since this is the first time this alarm has lit, the reading of the window cannot be waived by the US.

D. Incorrect– Does not satisfy requirement of reporting alarm window to US.

Technical Reference(s): OP–AD–004 R 25,step 11.2.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD044 / 15314 (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 X
Comprehension or Analysis ____

10 CFR Part 55 Content: 55.41 10
55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	2.1.37	
	Importance Rating	4.3	

Knowledge of procedures, guidelines, or limitations associated with reactivity management.

Proposed Question: Common 67

Which of the following activities are required to be PERFORMED by an active licensed operator, in accordance with NDAP–QA–0338, Reactivity Management and Controls Program?

(1) Operating HCU SRI Test Switches with the Control Rod at position 00

(2) Reducing power with the Recirc MG scoop positioner locally when it is locked per the applicable Off–Normal procedure

(3) SRV operations from the Remote Shutdown Panel Room

(4) Operating the HCU SRI Test Switches when directed by Emergency Operating Procedures

ONLY...

A. (2)

B. (1), (2) and (3)

C. (3) and (4)

D. (1), (2) and (4)

Proposed Answer: **B**

Explanation (Optional):

A. Correct – This is the only item that requires an active license operator to perform the task

B. Incorrect – (1) and (3) do not require an active license per the procedure

C. Incorrect – (3) and (4) do not require an active license per the procedure

D. Incorrect – (1) and (4) do not require an active license per the procedure

Technical Reference(s): NDAP–QA–0338 Att. F (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 14904 (As available)

Question Source: Bank # AD044/14904/5
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 6
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	2.2.35	
	Importance Rating	3.6	

Ability to determine Technical Specification Mode of Operation

Proposed Question: Common 68

A refueling outage is in progress.

The Reactor Mode Switch is in REFUEL.

ALL RPV Head Closure Bolts are fully tensioned.

Reactor coolant temperature is 205 °F.

In accordance with Technical Specifications definitions, which of the following is the correct MODE of operation, based on these conditions?

A. MODE 2, STARTUP

B. MODE 3, HOT SHUTDOWN

C. MODE 4, COLD SHUTDOWN

D. MODE 5, REFUELING

Proposed Answer: A

Explanation (Optional):

A. Correct – IAW TS Table 1.1–1, with the MODE SWITCH in Refuel and the head closure bolts fully tensioned you are in MODE 2 STARTUP.

B. Incorrect – would be true with the mode switch in SHUTDOWN

C. Incorrect – would be true if RCS Temperature was < 200 °F. with the Reactor Mode Switch in SHUTDOWN

D. Incorrect – would be true if one or more reactor vessel head closure bolts were less than fully tensioned.

Technical Reference(s): TS Table 1.1–1 (Attach if not previously provided)
TM–OP–401

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–401 / 13424 (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
55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	2.2.25	
	Importance Rating	3.2	

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

Proposed Question: Common 69

Which one of the following describes why Technical Specifications requires that the MCPR limits be reduced when the plant is in single–loop operation for an extended period?

A. To account for the core flow imbalance affecting the APRM readings

B. To ensure that the peak clad temperature post–LOCA will not exceed 2200 °F

C. To account for the reduction in the margin to safety limits

D. To ensure the margin to limit for exceeding 1% fuel cladding plastic strain is not challenged

Proposed Answer: C

Explanation (Optional):

A. Incorrect – No core flow imbalance should occur if operating in single loop operations. Drive flow mismatch is occurring, requiring adjustment of APRM setpoints.

B. Incorrect – This is true, but to maintain APLHGR within limits per TSB 3.2.1.

C. Correct – IAW TS Bases 3.4.1 page 3 – during single loop operation modification to the MCPR setpoints is required to maintain fuel thermal margins during the AOOs analyzed.

D. Incorrect – This is a concern with the LHGR limit per TSB 3.2.3.

Technical Reference(s): TS Bases 3.4.1 page 3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD046 / 14476 (As available)

Question Source: Bank # AD046/14476/1

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

55.43

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	2.3.15	
	Importance Rating	2.9	

Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, potable survey instruments, personnel monitoring equipment, etc.

Proposed Question: Common 70

Unit 1 is operating at rated power.

A regularly scheduled TIP run has just started.

Annunciator RX BLDG AREA PANEL 1C605 HI RADIATION (AR–101–B05) alarms.

Investigation determines that the alarm is due to High Radiation in the TIP Drive Mech Area.

Which of the following describes:

(1) If entry to EO–000–104, Secondary Containment Control, is required?

(2) Where the trip unit associated with the alarm can be reset once the condition clears?

A. (1) EO–000–104 entry is required
(2) Trip unit can be reset either in the Main Control Room or in the relay room

B. (1) EO–000–104 entry is required
(2) Trip unit can be reset ONLY in the relay room

C. (1) EO–000–104 entry is NOT required
(2) Trip unit can be reset either in the Main Control Room or in the relay room

D. (1) EO–000–104 entry is NOT required
(2) Trip unit can be reset ONLY in the relay room

Proposed Answer: D

Explanation (Optional):

A. Incorrect – EOP entry not required because condition is NOT "unexplained". Trip unit cannot be reset from the control room.

B. Incorrect – EOP entry not required because condition is NOT "unexplained".

C. Incorrect – Trip unit cannot be reset from the control room.

D. **Correct – IAW EOP–000–104 – An Entry condition, – Unexplained area Rad Level above Hi Alarm. However, the bases document discusses that some areas would be excluded from this entry including the TIP Room. In this case the alarm would be explained/expected and the entry would not be required.**

IAW TM–OP–079B Page 9 & 10 – Each Indicator and Trip Unit has a Reset Switch and a Mode Switch. The Reset Switch is used to manually clear the seal–in alarm lights after the initiating condition clears. The indicator and trip unit are located in the Control Building.

Technical Reference(s): TM–OP–079B Page 9–11 (Attach if not previously provided)

EO–000–104 bases

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–079B / 10407 (As available)

PP002 / 14585

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 10,11

55.43 ____

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	2.3.13	
	Importance Rating	3.4	

Knowledge of Radiological Safety Procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high radiation areas, aligning filters, etc.

Proposed Question: Common 71

An operator is required to enter a Locked High Radiation Area (LHRA) to perform a valve lineup.

A valid dose extension has been authorized.

Radiation surveys indicate that the radiation levels in the work area for this operator are at the MINIMUM value required for classification as a LHRA.

The operator has accumulated 996 mRem TEDE in the current calendar year.

(1) Of the times listed below, which is the MAXIMUM amount of time that the operator can work in this area without exceeding the Susquehanna annual dose limit, post dose extension, for TEDE?

(2) What is required as a MINIMUM prior to entering a LHRA?

A. (1) One Hour
(2) an HP Pre–Job Tailboard and an ALARA Pre–Job Review

B. (1) Three Hours.
(2) an HP Pre–Job Tailboard and an ALARA Pre–Job Review

C. (1) One Hour
(2) an HP Pre–Job Tailboard ONLY

D. (1) Three Hours
(2) an HP Pre–Job Tailboard ONLY

Proposed Answer: B

Explanation (Optional):

A. Incorrect. This would be true if no dose extension were authorized

B. Correct. The annual TEDE limit with a dose extension is 4000 mrem, and the minimum dose rate in an HRA is 1001 mr/hr. The operator can receive up to 3004 mrem, therefore can work for 3 hrs.

Both an ALARA and HP Tailboard are required IAW NDAP–QA–0626 step 7.5.6 and NDAP–QA–1191 section 6.

C. Incorrect. This would be true if no dose extension were authorized. An ALARA brief is required.

D. Incorrect – An ALARA Brief is required.

Technical Reference(s): NDAP–QA–0626 rev 28 step 7.5.6 (Attach if not previously provided)
NDAP–QA–1191 rev 17 section 6.4

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD044 / 15107 (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 12
55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	2.4.1	
	Importance Rating	4.6	

Knowledge of EOP entry conditions and immediate action steps.

Proposed Question: Common 72

With Unit 1 operating at rated power, which of the following events requires an EOP entry and reactor scram?

A. Feedwater transient
Reactor level lowers to +19 inches, then begins to rise

B. EHC malfunction
Reactor pressure rises to 1090 psig, then lowers and stabilizes at 1050 psig

C. Recirc Pump trip
Region II of the Power/ Flow Map is entered

D. CRD hydraulic transient
Two control rods drift full–in

Proposed Answer: B

Explanation (Optional):

A. Incorrect – Scram not required. Feedwater transients that lower to the scram setpoint require a scram. The scram setpoint is ≥13 inches however, there are no immediate operator actions in ON–145–001. There is no direction to scram at a given value. The expectation is that they will scram BEFORE reaching an automatic scram setpoint. OP–AD–004 guidance for manual scram limits on reactor level is +18".

B. Correct – Scram required. The EHC malfunction results in reactor pressure above the scram setpoint. If during a plant transient the operator observes an existing situation where the Reactor Protection System did not initiate an automatic reactor scram when required, he/she shall initiate a manual reactor scram IAW OP–AD–002 step 5.14.3 a. EO–100–102, RPV Control Entry is required due to exceeding 1.087 psig, and re–entry when RPV level drops below the 13" due to shrink post–Scram.

C. Incorrect – Scram not required. A Recirc pump trip can result in entry into restricted regions of the power to flow map. Region II requires immediate exit but not immediate scram IAW ON–178–002. Region I may require an immediate scram.

D. Incorrect – Scram not required. ON–155–001, Control Rod Problems directs an immediate operator scram if 3 or more control rods drift given this plant condition.

Technical Reference(s): OP–AD–002 rev 41, Step 5.14.3.a. (Attach if not previously provided)
OP–AD–001 rev 49, step 6.2.1
EO–000–102 Entry

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD044 / 14674 (As available)

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

Question History: Last NRC Exam 2007

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

10 CFR Part 55 Content: 55.41 10
55.43

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	2.4.29	
	Importance Rating	3.1	

Knowledge of the emergency plan.

Proposed Question: Common 73

An event occurred at Unit 2 at 0300. The event is NOT a security event.

An Unusual Event was declared today at 0305.

In accordance with EP–PS–126, Emergency Plan Communicator (Control Room), which of the following identifies the agencies required to be notified and the required time the notifications must be made by?

A. NRC, PEMA, Columbia County and Luzerne County
By 0315

B. NRC, PEMA, Columbia County and Luzerne County
By 0320

C. PEMA, Columbia County and Luzerne County
By 0315

D. PEMA, Columbia County and Luzerne County
By 0320

Proposed Answer: D

Explanation (Optional):

A. Incorrect – NRC 15 minute notification not required unless security event.

B. Incorrect – NRC 15 minute notification not required unless security event.

C. Incorrect – Notification required within 15 minutes of declaration, not 15 minutes of event.

D. Correct – IAW EP–PS–126 Att. A step 2.e. – Within 15 minutes of declaration, using the purple colored phone button, dial "191" to transmit the ENR form to the agencies (PEMA , Columbia & Luzerne Counties)

Technical Reference(s): EP–PS–126 Att. A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: EP001 / 1135 (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

55.43

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	2.4.4	
	Importance Rating	4.5	

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

Proposed Question: Common 74

On Unit 1, a large, un–isolable leak develops in the suction line of RHR Pump B.

Which procedures will have to be entered as the transient progresses?

A. ON–169–002, Flooding in Reactor Building, ONLY

B. EO–100–104, Secondary Containment Control, ONLY

C. EO–100–103, Primary Containment Control, EO–100–104, Secondary Containment Control, and ON–169–002, Flooding in Reactor Building, ONLY

D. EO–100–102, RPV Control, EO–100–103, Primary Containment Control, EO–100–104, Secondary Containment Control, and ON–169–002, Flooding in Reactor Building

TABLE 18
SUPP POOL EQUALIZATION LEVELS

LEAK LOCATION	EXPECTED POOL LVL (FT)
HPCI	18
RCIC	19.5
RHR A	16
RHR B	17
CS A	13
CS B	19

Proposed Answer: D

Explanation (Optional):

A. Incorrect – EO–100–102, 103 and 104 also requires entry due to the rise in RB water level (see below explanation).

B. Incorrect – PC CONTROL requires SP level below 22 feet. However, the SP will not continue to drain because the Unit 1 and 2 floor drains are not cross–connected. The stem conditions give sufficient information to correctly conclude that the Suppression Pool will stabilize at 17 feet (Table 18 of EO–100–103). Therefore, Applicant may reasonably select this.

C. Incorrect – EO–100–102 also requires entry. Controlled shutdown is not appropriate since PC control requires scram before reaching 17 feet.

D. Correct – Table 18 of EO–100–103 tells us that SP will stabilize at 17 feet. EO–100–104 requires entry on RB Water Level above high alarm. EO–100–103 step SP/L–5 requires EO–100–102 entry and scram and isolate HPCI before level reaches 17 feet. Flooding in the RB requires entry into ON–169–002.

Technical Reference(s): EO–100–103 rev 9, 104 rev 9, 102 rev 11; ON–169–002 rev 6. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PP002 /14583 (As available)

Question Source: Bank # LXR

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

55.43 ______

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	2.2.2	
	Importance Rating	4.6	

Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels

Proposed Question: Common 75

A transient on Unit 1 resulted in the following conditions:

Reactor level	–10 inches, steady
Reactor pressure	600 psig, down slow
Drywell pressure	10 psig, up slow

Which one of the following describes actions required to override RHR Injection in accordance with OP–149–001?

A. Manually initiate both divisions of RHR
Close RHR INJ FLOW CTL HV–151–F017A and HV–151–F017B after 45 seconds

B. Close RHR INJ FLOW CTL HV–151–F017A and HV–151–F017B after 45 seconds

C. Manually initiate both divisions of RHR
Place all RHR Pump control switches to STOP

D. Place all RHR Pump Control Switches to stop

Proposed Answer: C

Explanation (Optional):

A. Incorrect – OP–149–001 Note at 2.8.3 warns that this action will not work >420 psig.

B. Incorrect – OP–149–001 Note at 2.8.3 warns that this action will not work >420 psig

C. Correct – IAW OP–149–001 sect. 2.8.5 – IF RHR NOT initiated, Prevent injection per following:
b. Arm AND Depress initiation buttons
c. Place pump control switches to STOP, THEN Release.
d. Observe white pump override lights ILLUMINATED, and NO RHR Pumps running

D. Incorrect – correct if initiation signal was present (it is not since RPV level is not ≤ –129" and RPV pressure is > 420 psig) and pumps were is in operation

Technical Reference(s): OP–149–001 rev 42, step 2.8. 5 (Attach if not previously provided)
TM–OP–049

Proposed references to be provided to applicants during examination: NONE

Learning Objective: OP–149–001 / 197 (As available)

Question Source: Bank # SY017C01/024/1
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
55.43

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295003 AA2.04	
	Importance Rating		3.7

AA2.04 – Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : System lineups

K/A Justification: The system lineup interpretation is for the diesel generators following the LOOP

Proposed Question: SRO: 76

A loss of offsite power has occurred.

Diesel Generator status is as follows:

DG A NOT running
Starting air receiver pressure < 20 psig

DG B Tripped on generator differential
Electrical is investigating to determine the cause

DG C Running loaded to ESS Buses 1C and 2C

DG D Tripped on low lube oil pressure due to a large leak

ESW Pump C failed to start. All other ESW pumps are available.

Which of the following the actions that are required to be performed?

A. Perform an Emergency Shutdown of DG C
Enter EO–100–030, Station Blackout
Substitute DG E for DG C

B. Perform an Emergency Shutdown of DG C
Enter EO–100–030, Station Blackout
Substitute DG E for DG A

C. Reset the DG B Lockout Relay
Enter ON–104–001, Unit 1 Response to Loss of All Offsite Power
Substitute DG E for DG C

D. Reset the DG B Lockout Relay
Enter ON–104–001, Unit 1 Response to Loss of All Offsite Power
Substitute DG E for DG A

Proposed Answer: B

Explanation (Optional):

A. Incorrect – Preference is to substitute 'E' DG for A DG because 'C' ESW pump failed to start. Substituting 'E' for 'C' would still not provide ESW flow to cool 'E' DG.

B. Correct – E0–100–030 is entered due to loss of all DGs Per OP–054–001, Diesel Failure is imminent if operated without ESW longer than 4.5 minutes loaded or 8 minutes unloaded. Swap 'E' DG for 'A' to assure ESW flow.

C. Incorrect – it is inappropriate to reset a lockout until its cause is determined. Entry into ON–104–001 would appropriate with at least 1 ESS Bus energized. However, DG C must be shutdown because diesel failure is imminent if operated without ESW longer than 4.5 minutes loaded or 8 minutes unloaded. Preference is for A DG before C because of loss of ESW Pump C.

D. Incorrect – Resetting the lockout and entering ON–104–001 incorrect as noted for distractor C. Swap 'E' DG for 'A' to assure ESW flow.

Technical Reference(s):	EO–100–030 Rev 29 2.0 Caution 1 and Note following 2.8.1	(Attach if not previously provided)
	OP–054–001	

Proposed references to be provided to applicants during examination: NONE

Learning Objective:	PP002 / 14585 PP002 / 14594	(As available)

Question Source:	Bank #	LXR	
	Modified Bank #		(Note changes or attach parent)
	New		
Question History:	Last NRC Exam	2007	

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 #	1	1
	Group #	1	1
	K/A #	295037 EA2.06	
	Importance Rating		4.1

EA2.06 – Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : Reactor pressure

Proposed Question: SRO: 77

Unit 1 was at rated power when an ATWS occurred.

MSIVs are closed.

HPCI and RCIC have tripped.

Current conditions are as follows:

Reactor power	16 percent
Reactor level	–163 inches, down slow
Reactor pressure	800 to 1050 psig, controlled with SRVs

All low–pressure ECCS pumps are running

Which of the following identifies the actions required to be directed?

A. Wait until reactor level reaches –205 inches
Lower reactor pressure using SRVs until low–pressure ECCS begins to inject
Restore reactor level to the target band specified by EO–100–113, Level/Power Control

B. Stop and Prevent injection with the exception of CRD and Standby Liquid Control in accordance with EO–100–113, Level/Power Control
Lower reactor pressure in accordance with EO–100–112, Rapid Depressurization

C. Stop and Prevent all injection from all EO–100–113, Level/Power Control Table 15 systems
Lower reactor pressure in accordance with EO–100–112, Rapid Depressurization

D. Open SRVs to lower reactor pressure to 500 to 600 psig
Use Condensate to restore reactor level to the target band specified by EO–100–113, Level/Power Control

Proposed Answer: B

Explanation (Optional):

A. Incorrect – This only applies in EO–100–102, RPV Control. EO–100–113 has no provisions for Steam Cooling with an ATWS and injection sources available.

B. Correct – IAW EO–100–113, Level/Power Control Step LQ/L–14, 18

C. Incorrect – CRD and SLC remain available in ATWS and should continue to inject to control reactor power.

D. Incorrect – Lowering pressure below 800 psig is undesirable because of the difficultly controlling level, power, and pressure (per LQ/L–14). Rapid Depressurization is recommended when high–pressure injection cannot be obtained.

Technical Reference(s): EO–000–113 Rev 10, LQ/L–14 and LQ/L–18 (Attach if not previously provided)

EO–100–112 Rev 6, RD–6

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PP002 / 14594 (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 #		1
	Group #		1
	K/A #	295031 EA2.04	
	Importance Rating		4.8

EA2.04 – Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL: Adequate core cooling

Proposed Question: SRO: 78

Unit 1 experienced a loss of offsite power and a LOCA in the Drywell.

Current conditions are as follows:

Reactor level –185 inches, down slow
Reactor pressure 475 psig, steady, controlled with SRVs

The only system that can be aligned for RPV injection is RHR Loop A, but RHR Pumps 1A and 1C have tripped.

RHRSW A is cross–tied to RHR Loop A, and RHRSW Pump 2A was just started.

NO other injection systems are available.

Which of the following actions is now required?

A. When reactor level is < –205 inches, enter and perform EO–100–112, Rapid Depressurization

B. Direct the TSC to perform EP–DS–002, RPV and PC Flooding

C. Continue a normal cooldown with sustained opening of SRVs until reactor level is < –205 inches, then enter and perform EO–100–112, Rapid Depressurization

D. Immediately enter and perform EO–100–112, Rapid Depressurization

Proposed Answer: **D**

Explanation (Optional):

A. Incorrect – The override in RC/L–15 requried RD be performed immediately if an injection source is lined up with a pump running.

B. Incorrect – although the TSC must be contacted to perform the EP–DS procedure, adequate core cooling IS assured (see A above).

C. Incorrect – IAW EO–000–102 Steps RC/L 24 & 26 – with no injection sources available:
EXIT RC/P AND CONTROL PRESS ONLY AS FOLLOWS:
IF SP Level is >5 feet then
STABILIZE PRESS WITHIN 100 PSIG OF ITS
EXISTING VALUE WITH SRV'S USING
OPENING SEQUENCE ABC

D. Correct – The override in RC/L–15 requried RD be performed immediately if an injection source is lined up with a pump running.

Technical Reference(s): EO–000–102 Rev 7, RC/L–15 and 27 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: PP002 / 14591 (As available)
PP002 / 14594

Question Source: Bank # LXR Bank
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 #		1
	Group #		1
	K/A #	295023 2.1.23	
	Importance Rating		4.4

2.1.23 – Conduct of Operations: Ability to perform specific and integrated plant procedures during all modes of operation (Refueling accidents)

Proposed Question: SRO: 79

A spent fuel bundle was dropped in the Unit 1 Fuel Pool.

A Zone 3 isolation occurred.

Reactor Building HVAC Zones 1 and 2 are still running.

The STA reports that a valid SBGT NG Hi–Hi release rate alarm exists. The peak SBGT SPING release rate observed was 1.1 E8 μCi/min.

Refuel floor normal–range ARMs are in HI alarm. High–range ARMs are all downscale.

Which of the following is required?

A. Perform a normal unit shutdown per GO–100–004
Initiate ES–134–003, Re–Establishing Reactor Building HVAC

B. Enter EO–100–104, Secondary Containment Control
Confirm all isolations occurred in accordance with ON–159–002, Containment Isolation

C. Shut down Reactor Building Zone 1 HVAC in accordance with OP–134–002, Reactor Building HVAC Zones 1 and 3
Confirm all isolations occurred in accordance with ON–159–002

D. Enter EO–100–105, Radioactivity Release Control
Initiate offsite dose calculations

Proposed Answer: B

Explanation (Optional):

A. Incorrect – While a primary system is not discharging into secondary containment, no indication of rad conditions exceeding max safe values is indicated.

B. Correct – EO–100–104 entry condition on Zone 3 vent exh rad high and valid SPING NG hi–hi conditions. EO–100–104 step SC/1 requires confirmation of the Zone 3 isolation per ON–159–002.

C. Incorrect – no guidance to shut down Zone 1 HVAC

D. Incorrect – no entry condition for EO–100–105 exists, as SBGT rad levels remain below the 2E8 entry condition and normal offsite release rate is on the order of <1E4.

Technical Reference(s): EO–100–104 Rev 10, step SC/1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PP002 / 14585 (As available)
PP002 / 14594

Question Source: Bank # PP002/14594
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 #		1
	Group #		1
	K/A #	295028 2.1.25	
	Importance Rating		4.2

2.1.25 – Ability to interpret reference materials such as graphs, curves, tables, etc. (High drywell temperature)

Proposed Question: SRO: 80

Unit 1 experienced a steam leak inside the Drywell.

Numerous control rods failed to insert on the scram. Initial ATWS power was 25%.

Standby Liquid Control failed to inject.

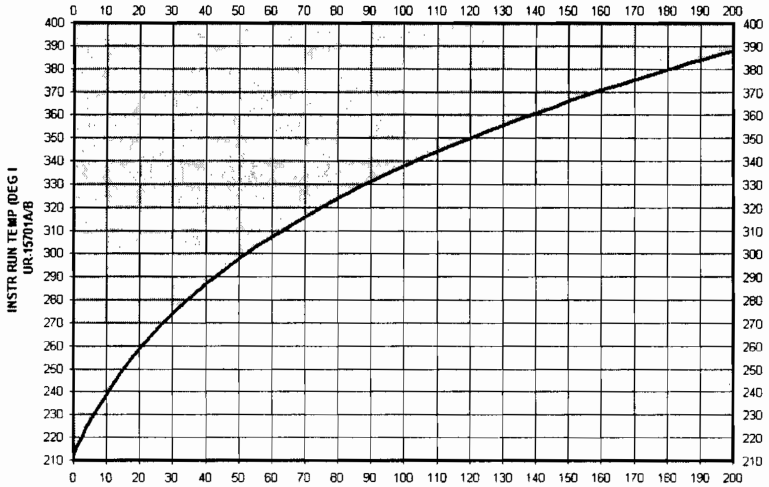
Rapid Depressurization has been performed. Reactor pressure is 40 psig, steady.

Instrument run temperature on UR–15701A is 350°F, steady.

PCO reports evidence of erratic reactor level indication.

Given the figure below, determine what action(s) must be directed.

FIG 1 SAT
SATURATION CURVE



A. Exit EO–100–113, Level/Power Control level and pressure legs
Enter EO–100–114, RPV Flooding
Inject to the RPV to maintain reactor pressure above the Minimum Steam Cooling Pressure

B. Exit EO–100–113, Level/Power Control level and pressure legs
Enter EO–100–114, RPV Flooding
Inject to the RPV with ALL available sources up to the elevation of the Main Steam Lines

C. Exit EO–100–113, Level/Power Control level and pressure legs
Enter EO–100–114, RPV Flooding
Inject to the RPV ONLY with sources external to the Primary Containment up to the elevation of the Main Steam Lines

D. Continue in EO–100–113, Level/Power Control
Supplement injection with Core Spray until all reactor level indications show above TAF

Proposed Answer: **A**

Explanation (Optional):

A. **Correct – Since all control rods not are inserted, RPV flooding should be conducted in an attempt to maintain pressure above the MSCP (IAW EO–100–114). Due to the limited number of control rods that remain out, attempting to do so may result in flooding to the steam lines, however, it is not appropriate to intentionally attempt to flood to the steam lines.**

B. Incorrect – with some rods not inserted, the vessel should not be flooded to the main steam lines without first attempting to establish reactor pressure > MSCP.

C. Incorrect – with some rods not inserted, the vessel should not be flooded to the main steam lines without first attempting to establish reactor pressure > MSCP.

D. Incorrect – since erratic level indication was observed, the level leg of L/P control should be exited and flooding performed.

Technical Reference(s): EO–100–114, Rev 9 RF–20 (Attach if not previously provided)
EO–100–113 Rev 10 LQ/L–2

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PP002 / 14594 (As available)

Question Source: Bank # LXR
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 #		1
	Group #		1
	K/A #	295019 2.4.6	
	Importance Rating		4.7

2.4.6 – Emergency Procedures / Plan: Knowledge of EOP mitigation strategies (Partial or Total Loss of Inst. Air)

Proposed Question: SRO: 81

A reactor startup is in progress on Unit 1. Reactor power is 20 percent.

A seismic event occurs.

The reactor automatically scrams. All control rods fully insert.

A loss of Instrument Air occurs.

Current reactor conditions are as follows:

Reactor level	+5 inches, down slow
Reactor pressure	900 psig, up slow
Drywell pressure	1.21 psig, up slow
Drywell temperature	125 °F, up slow

The Seismic Monitor has been determined to be Inoperable

If level continues on its present trend, which of the following systems may be used to restore and maintain reactor level, AND how would this event be classified for the given conditions?

	RPV Level Control Systems	Classification
A.	Condensate, Feedwater, CRD, RCIC, HPCI	Alert
B.	Condensate, Feedwater, CRD, RCIC, HPCI	Unusual Event
C.	CRD, RCIC, HPCI, SBLC	Alert
D.	CRD, RCIC, HPCI, SBLC	Unusual Event

Proposed Answer: **C**

Explanation (Optional):

A. Incorrect – IAW EO–100–102, with a loss of instrument air, feedwater will be unavailable. This is also stated in ON–118–001, Loss of Instrument Air.

B. Incorrect – See "A" above. Also, IAW ON–000–002, Natural Phenomena, Section 5.3 – Earthquake – "Per Reg Guide 1.166, if the Seismic Monitoring System is inoperable the OBE will be considered to have been exceeded…"

Therefore an ALERT must be declared IAW Table O (OA5).

C. Correct – IAW EO–100–102, with a loss of instrument air, feedwater will be unavailable. Therefore per STEPS RC/L–4 and RC/L–5 apply for using Table 3 and 5 systems which include those given in the answer. IAW ON–000–002, Natural Phenomena, Section 5.3 – Earthquake – "Per Reg Guide 1.166, if the Seismic Monitoring System is inoperable the OBE will be considered to have been exceeded…"

Therefore an ALERT must be declared IAW Table O (OA5).

D. Incorrect – This would be correct for a seismic event not exceeding an OBE.

Technical Reference(s): EO–100–102, ON–118–001 Rev 26 (Attach if not previously provided)

ON–000–002 Rev 28

Proposed references to be provided to applicants during examination: (EAL Chart/Table O)

Learning Objective: PP002 / 14592 (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 5,1

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295025 EA2.02	
	Importance Rating		4.2

EA2.02 – Ability to determine and/or interpret the following as they apply to HIGH REACTOR PRESSURE: Reactor power

K/A Justification – The combination of high reactor pressure and the reactor power resulting from the event must be interpreted to determine how the plant was affected and the applicable TS action remaining after the reactor power transient is mitigated.

Proposed Question: SRO: 82

Unit 2 was operating at rated power when SRVs J, L and K were declared inoperable on July 1 at 0000 due to a generic issue with their ADS actuation solenoids.

At 0100, a Unit 2 shutdown began.

At 0800, with the plant at 22 percent power, the outboard MSIVs closed.

RPS failed to initiate a scram.

SRVs did not open until reactor pressure rose to their safety setpoints.

Which of the following identifies 1) the first action that should directed to insert control rods, AND 2) the most limiting Technical Specification requirement in effect due to the status of the SRVs?

A. (1) Maximize CRD to drift control rods
(2) Reactor steam dome pressure must be ≤ 150 psig by July 2 at 1200

B. (1) Verify ATWS–ARI automatically initiated
(2) Reactor steam dome pressure must be ≤ 150 psig by July 2 at 1200

C. (1) Maximize CRD to drift control rods
(2) Mode 4 must be reached by July 2 at 1200

D. (1) Verify ATWS–ARI automatically initiated
(2) Mode 4 must be reached by July 2 at 1200

Proposed Answer: **B**

Explanation (Optional):

A. Incorrect – ATWS–ARI will automatically initiate before operator action and result in control rods scramming in.

B. Correct – IAW TM–OP–055 – ATWS–ARI initiates from the ATWS–RPT logic, which occurs from either of the following signals:

Reactor High–Pressure (1,135 psig)

Reactor Low Level 2 (–38 inches) (10–second time delay)

The first SRV's safety setpoint is 1,175 psig, so the ATWS–ARI setpoint would be exceeded.

TS 3.5.1 Action H. –Two or more ADS valves inoperable. H.2 Reduce reactor steam dome pressure to ≤ 150 psig. In 36 hours

C. Incorrect – ATWS–ARI will automatically initiate before operator action and result in control rods scramming in. This action (TS Action 3.4.3 A.2) –would apply if the SRV safety functions were inoperable

D. Incorrect – This action (TS Action 3.4.3 A.2) –would apply if the SRV safety functions were inoperable

Technical Reference(s): TS 3.5.1.H.2 (Attach if not previously provided)

TM–OP–055, ON–164–002 Sect. 5.0; TRM Tbl 2.2–1

Proposed references to be provided to applicants during examination: TS 3.5.1, TS 3.4.3

Learning Objective: TM–OP–064C / 2558 (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 1, 7

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	295002 AA2.01	
	Importance Rating		3.1

AA2.01 – Ability to determine and/or interpret the following as they apply to LOSS OF MAIN CONDENSER VACUUM : Condenser vacuum/absolute pressure

Proposed Question: SRO: 83

A Unit 1 startup is in progress. Reactor power is 92 percent.

Main Condenser vacuum is initially stable at 1.5 in Hg absolute, but begins to degrade. Condenser vacuum stabilizes at 6.1 in Hg abs.

Main Turbine Exhaust Pressure rises to 6.1 in Hg abs, but is now stable.

Condensate temperature is 135 °F, steady.

Which of the following describes…

(1) the action(s) required NOW?
AND
(2) additional action(s) required IF vacuum continues to degrade?

A. (1) Initiate a Recirc Limiter # 2 runback in accordance with ON–143–001, Main Condenser Vacuum and Offgas System Off–Normal Operation
(2) Initiate a Recirc Limiter # 1 runback

B. (1) Reduce reactor power to at least 90 percent using Reactor Recirc Pumps, per GO–100–002, Plant Startup, Heatup and Power Operation, in accordance with ON–143–001
(2) Initiate a Recirc Limiter # 2 runback

C. (1) Verify that the Recirc Pump rundown has occurred, in accordance with ON–143–001
(2) Direct performance of Scram, Scram Imminent actions in accordance with ON–100–101

D. (1) Initiate a manual Recirc Limiter # 1 runback, per GO–100–002, in accordance with ON–143–001
(2) Direct performance of Scram, Scram Imminent actions in accordance with ON–100–101

Proposed Answer: **C**

Explanation (Optional):

A. Incorrect – IAW ON–143–001, Att E., a runback initiation is not required however a rundown has already occurred at 6" HgA and must be verified.

B. Incorrect – A Rx Recirc Pump rundown of 5% occurs at 6"HgA. Using GO–100–002 guidance would not apply to the situation.

C. Correct – IAW ON–143–001, Att E., a Rx Recirc Pump rundown of 5% occurs at 6" HgA and must be verified. Performance of Scram, Scram Imminent actions are required per Att.D step 3.3 if backpressure continues to degrade.

D. Incorrect – No guidance for these actions in GO–100–002.

Technical Reference(s): ON–143–001 Att. E and Step 3.2 (Attach if not previously provided)

Att. D – step 3.3

Proposed references to be provided to applicants during examination: ON–143–001 Att. E W/O labels that are in the graph

Learning Objective: AD045 / 15304 (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 #		1
	Group #		2
	K/A #	295035 2.4.30	
	Importance Rating		4.1

2.4.30 – Emergency Procedures / Plan; Knowledge of events related to system operation / status that must be reported to internal organizations or external agencies, such as the state, the NRC, or the transmission system operator.

Proposed Question: SRO: 84

Unit 1 is operating at rated power.

The following events occur at the indicated times

0100 A scheduled plant shutdown for refueling is initiated.

0200 40 percent of the offsite siren notification system inside the Emergency Planning Zone (EPZ) is discovered inoperable.

0300 While investigating a low ΔP condition in Reactor Building Zone 1 HVAC, operators report Central Railroad Bay Door 101 is open without Control Room authorization. The Central Railroad Bay is configured as Zone 1.

0400 Security reports Central Railroad Bay Door 101 cannot be closed.

0800 The offsite siren notification system is restored to full operability.

Which of the following describes the EARLIEST ENS notification requirement to the NRC?

A. 0500

B. 1000

C. 1100

D. 1200

Proposed Answer: **C**

Explanation (Optional):

A. Incorrect – This would be correct if the shutdown was required by Tech Specs and initiated – NDAP–QA–0720 Att.F #1.

B. Incorrect – IAW NDAP–QA–0720 – Att. G #2. – Eight Hour ENS notification.
Any event that results in a major loss of emergency assessment capability, offsite response capability, or offsite communications capability (e.g. significant portion of control room indication, Emergency Notification System, or offsite notification system)

Major loss of the offsite notification system is defined in EP–AD–011 as the inoperability of 50% or more of the public Notification System sirens or > 50% of the public inside the EPZ cannot be notified due to siren failure.
At 40% , it would not meet the ENS notification requirement.

C. Correct – Secondary Containment is inoperable and represents a loss of safety function reportable per NDAP–QA–0720 Att G and P: Any event or condition that at the time of discovery could have prevented the fulfillment of the safety function of structures or systems that are needed to
c. Control the release of radioactive material*, or
d. Mitigate the consequences of an accident.

D. Incorrect – This would be correct if the HPCI system inoperability was determined to be the time that HPCI was isolated and tagged.

Technical Reference(s): NDAP–QA–0720 Rev 19 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Portions of NDAP–QA–0720 Att E, F, G

Learning Objective: AD044 / 15221 (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 10

Comments:

Examination Outline Cross–reference:

Level	RO	SRO
Tier #		1
Group #		2
K/A #	295033 EA2.01	
Importance Rating		3.9

EA2.01 – Ability to determine and/or interpret the following as they apply to HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS : Area radiation levels

Proposed Question: SRO: 85

Unit 1 is operating at rated power.

The Unit 1 Reactor Building SPING is out of service.

A RWCU pipe break occurs in the RWCU room.

Security reports steam exiting Unit 1 Reactor Building, north end.

The following radiation levels are observed:

RWCU Recirc Pp Acc ARM	8 R/hr
Containment High–Range ARM	15 R/hr

The TSC is waiting for RP to perform offsite dose calculations.

The Emergency Director is evaluating an upgrade to a Site Area Emergency.

Which of the following actions are required to be directed?

A. Scram the reactor in accordance with EO–000–104, Secondary Containment Control, and EO–000–105, Radioactivity Release Control
Enter EO–000–102, RPV Control, and commence a plant cooldown at less than 100 °F/hr

B. Isolate Zones 1 and 3 HVAC per ES–070–001, in accordance with EO–000–104, Secondary Containment Control
Commence a controlled reactor shutdown per GO–100–004, Plant Shutdown to Minimum Power.

C. Scram the reactor in accordance with EO–000–105, Radioactivity Release Control
Enter EO–000–102, RPV Control, and perform a Rapid Depressurization per EO–000–112

D. Scram the reactor in accordance with EO–000–104, Secondary Containment Control, and EO–000–105, Radioactivity Release Control
Enter EO–000–102, RPV Control, and commence a plant cooldown at greater than 100 °F/hr

Proposed Answer: A

Explanation (Optional):

A. **Correct – Entry exists to EO–105 above the ALERT level for a rad release due to a primary system discharging and resulting in an unmonitored release. That procedure directs you to scram and enter EO–102 to commence a cooldown at <100 degrees/hr. An entry also exists for EO–104 for a primary discharge in a table 9 area. The guidance is the same as for EO–105**

B. Incorrect – Not an initial action to isolate zones. First priority is to shutdown the reactor then cooldown and depressurize to remove energy from release.

C. Incorrect – no guidance for a rapid depressurization based on stem conditions. Containment Rad levels are well below 50 R/hr.

D. Incorrect – no guidance to exceed 100 degree/hr cooldown rate

Technical Reference(s): EO–100–104 Rev 10 (Attach if not previously provided)
EO–100–105 Rev 4 , RR–5
EO–100–102 Rev 7, RC/P–7

Proposed references to be provided to applicants during examination: NONE

Learning Objective: PP002 / 24594 (As available)

Question Source: Bank # PP002/2622/15

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 5,10

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	259002 A2.07	
	Importance Rating		2.5

A2.07 – Ability to (a) predict the impacts of the following on the REACTOR WATER LEVEL CONTROL SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of comparator bias signal

Proposed Question: SRO: 86

Unit 1 is operating at rated power.

A Reactor Feedwater Pump (RFP) discharge flow transmitter input to ICS has failed on RFP A. It has been placed in Maintenance Bypass.

The FW LEVEL CTL/DEMAND SIGNAL controller, LIC–C32–R600, is in AUTO with a setpoint of +35 inches. Feedwater level control (FWLC) is selected to 3 Element Control.

Reactor level is +35 inches, steady.

The 2 remaining RFP A discharge flow transmitter inputs to ICS then slowly fail upscale.

Which of the following describes how ICS responds, and the operator action required?

A. ICS automatically shifts to 1 Element Control
Reactor level remains steady at +35 inches
In accordance with ON–145–001, RPV Level Control System Malfunction, place the 2 inputs that just failed to Maintenance Bypass, then shift back to 3 Element Control

B. ICS remains in 3 Element Control
Reactor level rises to approximately +45 inches, then slowly falls and stabilizes at +35 inches
In accordance with ON–145–001 place FW LEVEL CTL/DEMAND SIGNAL controller LIC–C32–R600 in MANUAL and maintain reactor level +20 to +45 inches

C. ICS automatically shifts to 1 Element Control
Reactor level remains steady at +35 inches
In accordance with ON–145–001 verify FW LEVEL CTL/DEMAND SIGNAL controller LIC–C32–1R600 is controlling correctly in AUTO

D. ICS remains in 3 Element Control
Reactor level lowers to approximately +32 inches, then slowly rises and stabilizes at +35 inches
In accordance with ON–145–001 select FWLC to 1 Element Control

Proposed Answer: **D**

Explanation (Optional):

A. Incorrect – ICS will remain in 3 element control unless all the failed inputs are in Maintenance Bypass. FWLC 3 element control will respond to the change in measured FW flow and reactor level will fall until the level bias overcomes the FW–steam flow mismatch.

B. Incorrect – Level would fall in response to the apparent rise in FW flow, and ICS 3 Element Control would initially reduce injection in an attempt to lower FW flow to match steam flow. Taking manual control is unnecessary as level will be maintained at +35 inches, and selecting 1 Element Control will allow the system to continue to control level automatically.

C. Incorrect – ICS will remain in 3 element control unless all the failed inputs are in Maintenance Bypass. FWLC 3 element control will respond to the change in measured FW flow and reactor level will fall until the level bias overcomes the FW–steam flow mismatch.

D. Correct – IAW ON–145–001, Step 2.3.2, subsequent failures of RFP discharge flow transmitters will result in the failed transmitter's value still being used in the total FW flow determination, until manually selected to Maintenance Bypass. On subsequent upscale failures 3 Element Control will respond to the apparent FW–steam flow mismatch and reduce injection. Level will fall until the deviation in level vs. the setpoint overcomes the effect of the mismatch. The R600 controller integral action will eventually return level to the setpoint. Step 4.10.2.a – IF FWLC System is still operating in 3 Element Control, then Select FWLC to 1 Element Control in accordance with OP–145–006 and continue to operate FWLC System in AUTO to stabilize reactor level.

Technical Reference(s): ON–145–001 Rev 32, Section 2.3, 4.10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–045I / 16008 (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 #		1
	K/A #	205000 A2.09	
	Importance Rating		3.8

A2.09 – Ability to (a) predict the impacts of the following on the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions Reactor low water level

Proposed Question: SRO: 87

Unit 1 is in Mode 4 following a scram 2 days ago.

RHR Loop B is operating in Shutdown Cooling.

Current conditions are as follows:

Reactor level	+90 inches, steady
Reactor coolant temperature	170 °F, steady

A reactor coolant leak occurs in the RPV bottom head drain line.

Reactor level lowers to +10 inches, and is still lowering slowly.

Which of the following correctly identifies (1) what is required to satisfy Technical Specifications, AND (2) the action(s) that should be directed to meet TS?

A. (1) Within 1 hour, establish reactor coolant circulation by another method
(2) Raise reactor level to ≥ +45 inches using Core Spray per OP–151–001, Core Spray System

B. (1) Within 2 hours, restore RHR Shutdown Cooling to operation
(2) Raise reactor level to ≥ +13 inches using Core Spray per OP–151–001, then restart RHR Loop B in Shutdown Cooling in accordance with ON–149–001, Loss of RHR Shutdown Cooling Mode

C. (1) Within 1 hour, establish reactor coolant circulation by another method
(2) Raise reactor level to ≥ +13 inches using Core Spray per OP–151–001

D. (1) Within 2 hours, restore RHR Shutdown Cooling to operation
(2) Place RHR Loop A in Shutdown Cooling in accordance with OP–149–002, RHR Shutdown Cooling

Proposed Answer: **A**

Explanation (Optional):

A. Correct – IAW ON–149–001 Section 3.3.6. Shutdown cooling suction isolation valves isolate at 13", making both loops of RHR unavailable for Shutdown Cooling. In order to restore core circulation, the operators are required to either start a Recirc pump, or raise RPV level above +45".
With Both Loops unavailable TS 3.4.9. Action B.1 applies – Verify reactor coolant circulating by an alternate method within one hour of discovery of no reactor coolant circulation.

B. Incorrect – Action in 2 hours is insufficient, Required Action B.1 requires coolant circulation within 1 hour. SDC restoration within 2 hours represents misapplication of the LCO 3.4.9 Note allowing RHR SDC to be removed from service for 2 hours.

C. Incorrect – Natural Circulation is assured only at +45 inches.

D. Incorrect – Action in 2 hours is insufficient, Required Action B.1 requires coolant circulation within 1 hour. Shutdown cooling suction isolation valves isolate at 13", making both loops of RHR unavailable for Shutdown Cooling, placing the other division of RHR in SDC is not possible without level restoration.

Technical Reference(s): ON–149–001 Rev 26 (Attach if not previously provided)
TS 3.4.9

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15305 (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 #		1
	K/A #	262001 2.4.11	
	Importance Rating		4.2

2.4.11 – Emergency Procedures / Plan: Knowledge of abnormal condition procedures. (A.C. Electrical Distribution)

Proposed Question: SRO: 88

ESS Bus 1A201 has just been transferred from its normal power source to its alternate power source.

The normal source breaker control switch was left in the "Normal After Close" position.

The alternate source ESS transformer experiences a lockout.

What is the status of ESS Bus 1A201 1 minute later, and what actions are required?

A. ESS Bus 1A201 will be energized
Place ESW in service to provide cooling Diesel Generator A in accordance with OP–054–001, ESW System

B. ESS Bus 1A201 will be energized
In accordance with ON–104–201, Loss of 4KV Bus 1A, restore CIG per OP–125–001, Containment Instrument Gas System

C. ESS Bus 1A201 will be de–energized
In accordance with ON–104–201, manually start DG A and ensure the emergency source breaker closes after its interlocks for auto closure are met

D. ESS Bus 1A201 will be de–energized
In accordance with OP–104–001, 4KV Electrical System, reposition the 1A201 normal source breaker control switch to "Normal After Trip"
In accordance with ON–104–201, confirm DG A then automatically starts and the emergency source breaker closes after its interlocks for auto closure are met

Proposed Answer: **B**

Explanation (Optional):

A. Incorrect – a momentary loss of power would occur but the DG would start and provide a power source for the bus (see Distractor B discussion). ESW Pump A would automatically have started after a 40–sec TD.

B. Correct – with the normal source breaker control switch left in the "Normal After Close" position, the alternate source would not auto close. With all 3 feeder breakers open the DG would start and IAW ON–104–201, Loss of 4KV Bus 1A, Att. a for a momentary loss of the bus you would restore CIG in accordance with OP–125–001, Containment Instrument Gas System. (step 3.5)

C. Incorrect – The DG would be supplying the bus, manual start not required.

D. Incorrect – The DG would be supplying the bus regardless of the position of the normal source breaker HS.

Technical Reference(s): ON–104–201 (Attach if not previously provided)

OP–104–001

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15304 (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:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	261000 2.1.20	
	Importance Rating		4.6

2.1.20 – Conduct of Operations: Ability to interpret and execute procedure steps. (SGTS)

K/A Justification: Meeting procedural & TS requirements for using SGTS for purge meets the intent of interpreting the procedure at an SRO level

Proposed Question: SRO: 89

Unit 1 is in Mode 4.

Zone 1 Secondary Containment isolation has been bypassed to support modifications to the isolation logic.

SGTS Train B is unable to meet the heating coil temperature differential requirement.

Preparations are in progress to purge the Drywell prior to the initial containment entry.

In accordance with SSES requirements and the above conditions, the Drywell purge is ___(1)___ because ___(2)___.

A. (1) NOT permitted
(2) both trains of SGTS must be operable

B. (1) NOT permitted
(2) Unit 1 Secondary Containment OPERABILITY must be restored

C. (1) permitted
(2) only one SGTS train is required to be operable

D. (1) permitted
(2) Unit 1 is in MODE 4

Proposed Answer: A

Explanation (Optional):

A. Correct – IAW TRM 3.6.1.1

B. Incorrect – Operability of Secondary Containment is not required in Mode 4 and is not required for Drywell purge.

C. Incorrect – both SGTS trains must be operable, student may chose this if they fail to remember that the required heater ΔT of 17°is required for SGTS operability.

D. Incorrect – both SGTS trains must be operable

Technical Reference(s): TRO 3.6.1.1 (Attach if not previously provided)

OP–170–001 Step 2.2.1.a

NDAP–QA–0309 Rev 29 section 6.2.3

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–070 / 13280 (As available)

Question Source: Bank # TMOP070/13280/3

Modified Bank # ______ (Note changes or attach parent)

New ______

Question History: Last NRC Exam ______

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis ______

10 CFR Part 55 Content: 55.41 ______

55.43 2

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	400000 2.2.42	
	Importance Rating		4.6

2.2.42 – Equipment Control : Ability to recognize system parameters that are entry–level conditions for Technical Specifications (Component cooling water)

Proposed Question: SRO: 90

Unit 1 was operating at rated power, with the RHRSW Pump 1B out–of–service for planned maintenance, when the unit automatically scrammed from rated power due to the MSIVs failing closed.

As RHR Loop 1A was being placed in Suppression Pool cooling, the RHRSW HX A OUTLET, HV–11215A, lost indication in the Control Room as soon as its handswitch was taken to OPEN.

Subsequently, the breaker for HV–11215A was found in the tripped–free condition.

Which of the following identifies the most limiting Technical Specification Required Action(s) that must be completed for Unit 1 for RHRSW?

A. Restore RHRSW valve HV–11215A OR RHRSW Pump 1B OPERABLE within 8 hours

B. Restore RHRSW valve HV–11215A OR RHRSW Pump 1B OPERABLE within 12 hours

C. Restore RHRSW valve HV–11215A OPERABLE within 72 hours

D. Restore RHRSW Pump 1B OPERABLE within 72 hours

Proposed Answer: **A**

Explanation (Optional):

A **Correct – Both RHRSW subsystems are inoperable on Unit 1. Entry into TS 3.7.1 Condition C is required. Because the HV–11215A failure prevents aligning RHRSW Pump 2A to the RHR 1A HX, the 8–hour Completion Time applies. Recovering either the Unit 1 valve or pump will allow exit of Condition C.**

B Incorrect – This reflects application of a loss of the UHS, plausible if the candidate concludes that a loss of function of both RHRSW subsystems has occurred. However RHRSW Pump 2B can still be aligned to the RHR 1B HX, so a total loss of UHS has not occurred. Additionally, 8 hours is more limiting that 12 hours.

C Incorrect – This reflects mis–application of the Condition B 72–hour Completion Time for the inabilty to align the RHRSW Pump 2A to the RHR 1A HX, and/or a failure to recognize the applicabilty of the 8–hour Completion Time for Condition C.

D Incorrect – This reflects a failure to recognize the applicabilty of the 8–hour Completion Time for Condition C.

Technical Reference(s): TS 3.7.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: TS 3.7.1

Learning Objective: TM–OP–016 / 12548 (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

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	245000 A2.09	
	Importance Rating		2.8

A2.09 – Ability to (a) predict the impacts of the following on the MAIN TURBINE GENERATOR AND AUXILIARY SYSTEMS ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Turbine vibration

Proposed Question: SRO: 91

Unit 1 startup is in progress. Reactor power is 15 percent.

Turbine startup in progress. Ten minutes ago 1410 rpm was selected.

Annunciator TURBINE GENERATOR BEARING HI VIBRATION ALARM (AR–105–E05) alarms.

Bearing #7 rotor and casing vibration are at 12 mils, rising at 1 mil/minute.

(1) What actions are required now?

(2) What actions would be required if the trend continues after 8 minutes?

A. (1) Scram the reactor
Manually trip the Main Turbine and enter ON–193–002, Main Turbine Trip
(2) SELECT ALL VALVES CLOSED
Break condenser vacuum immediately

B. (1) Scram the reactor
Manually trip the Main Turbine and enter ON–193–002, Main Turbine Trip
(2) SELECT ALL VALVES CLOSED
Break condenser vacuum when main turbine is less than 1200 rpm

C. (1) Manually trip the Main Turbine and enter ON–193–002, Main Turbine Trip
(2) SELECT ALL VALVES CLOSED
Scram the reactor
Break condenser vacuum immediately

D. (1) Manually trip the Main Turbine and enter ON–193–002, Main Turbine Trip
(2) SELECT ALL VALVES CLOSED
Scram the reactor
Break condenser vacuum when main turbine is less than 1200 rpm.

Proposed Answer: **C**

Explanation (Optional):

A. Incorrect – Scram is not required with reactor power below 26%

B. Incorrect – Scram is not required with reactor power below 26%

C. Incorrect – Vacuum should be broken when below 1200 rpm

D. Correct. required for vibration exceeding 20 mils. (IAW OP–193–001 Step 2.6.3.g(4)– IF a Turbine Rub develops as evidenced by a steady vibration level then an rising trend of 1 Mil/Min for 3 minutes, SELECT ALL VALVES CLOSED AND IF vibration continues to go up to >20 mils, vacuum should be broken when below 1200 rpm.

Technical Reference(s): AR–105–001 D05 and E05; (Attach if not previously provided)
OP–193–001 Rev 45, 2.6.3

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–093 / 10218 (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 #	201006 2.2.12	
	Importance Rating		4.1

2.2.12 – Knowledge of surveillance procedures (RWM)

Proposed Question: SRO: 92

Unit 1 is conducting a downpower for a Drywell entry at power per GO–100–004, Plant Shutdown To Minimum Power.

Reactor power is 10 percent.

The Rod Worth Minimizer is being evaluated for operability in accordance with SO–131–003, Rod Worth Minimizer Operability Demonstration.

A control rod was selected OUTSIDE of the current RWM Group.

The rod withdraw pushbutton was depressed. The control rod moved from 12 to 14.

The rod withdraw pushbutton was depressed again. The control rod moved from 14 to 16.

The rod insert pushbutton was depressed until the control rod moved back to 12.

Which of the following actions is the CORRECT action?

A. Execute ON–155–001, Control Rod Problems, for control rod double notching due to RMCS failure

B. With Reactor Engineering concurrence, repeat the surveillance steps associated with control rod withdrawal block

C. Mark surveillance as failed and write a CR
Continue with the shutdown per GO–100–004
NO additional actions are required

D. Mark surveillance as failed and write a CR
Continue with the shutdown per GO–100–004
Control rod movement may continue ONLY by using a second qualified person to ensure the rod insertion sequence is followed

Proposed Answer: **D**

Explanation (Optional):

A. Incorrect – No RMCS failure occurred except that a rod out block from the RWM did not occur as required. Rod did not double notch; it was moved twice.

B. Incorrect – Surveillance steps are not repeated if they fail.

C. Incorrect – Tech Spec action required for surveillance failure.

D. Correct – The RWM failed to generate a control rod withdrawal block when requried. Therefore, TS LCO 3.3.2.1 Condition D Required Action D.1 allows rod movement as long as it is verified by a second qualified person to be in compliance with the rod sequence.

Technical Reference(s): TS3.3.2.1 (Attach if not previously provided)
SO–131–003

Proposed references to be provided to applicants during examination: None

Learning Objective: 13066 (As available)

Question Source: Bank # TMOP401/13426/10
Modified Bank # ______ (Note changes or attach parent)
New ______

Question History: Last NRC Exam ______

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

10 CFR Part 55 Content: 55.41 ______
55.43 2

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	286000 2.4.31	
	Importance Rating		4.1

2.4.31 – Emergency Procedures / Plan: Knowledge of annunciator alarms, indications or response procedures (Fire Protection)

Proposed Question: SRO: 93

Unit 1 is operating at rated power.

The lube oil header to the Main Turbine bearings ruptures. A large fire breaks out, spreading over the 699' and 729' elevations of the turbine building.

Scram Imminent actions are directed, but the reactor scrams when the Main Turbine trips on high vibration.

Turbine bearing vibrations continue rising rapidly.

Subsequently, the Reactor Feedwater Pumps trip due to a loss of condenser vacuum.

Bypass valves are cycling open and closed on low condenser vacuum. Reactor pressure is approximately 960 psig, up slow.

In accordance with ON–013–001, which of the following actions is required <u>first</u> in response to the fire–induced transient?

A. Immediately break condenser vacuum

B. Open SRVs as necessary to lower reactor pressure < 945 psig

C. Close the MSIVs and main steam line drains at panel 1C601

D. Trip the Recirc Pumps by tripping the RPT breakers locally, at the breakers

Proposed Answer: **C**

Explanation (Optional):

A. Incorrect – MSIVs have failed to automatically isolate on low condenser vacuum. The procedure for breaking condenser vacuum (OP–143–001) assumes an MSIV auto–isolation will occur on low vacuum.

B. Incorrect – This reflects guideance from EO–100–102 Step RC/P–4 for reducing pressure with cycling SRVs, but does not apply for cycling main turbine bypass valves.

C. Correct – Per ON–013–001 operator actions for Turbine Building fire step G.3, fires can result in failure of the MSIVs to automatically close on low condenser vacuum. Manual action to close the MSIVs with vacuum already below the isolation setpoint is required.

D. Incorrect – Recirc Pump EOC–RPT would have automatically initiated when the turbine tripped.

Technical Reference(s): ON–013–001 Step G.3 Sec. 5.0/Att G, (Attach if not previously provided)

Proposed references to be provided to applicants during examination: ON–013–001

Learning Objective: AD045 / 15307 (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 #		3
	Group #		1
	K/A #	2.1.39	
	Importance Rating		4.3

Knowledge of conservative decision making practices

Proposed Question: SRO: 94

Unit 1 has experienced a LOCA.

Current reactor conditions are as follows:

Reactor level	–164 inches, down slow
Reactor pressure	150 psig, down slow

Core Spray Loop A is injecting 6200 gpm with both pumps.

RHR Loop A is injecting 10,000 gpm, with RHR Pump A only.

Suppression Pool level is 17 feet, steady, after a leak that was since isolated.

Which of the following is required in respect to the RHR and Core Spray Pump flow rates IAW EOPs?

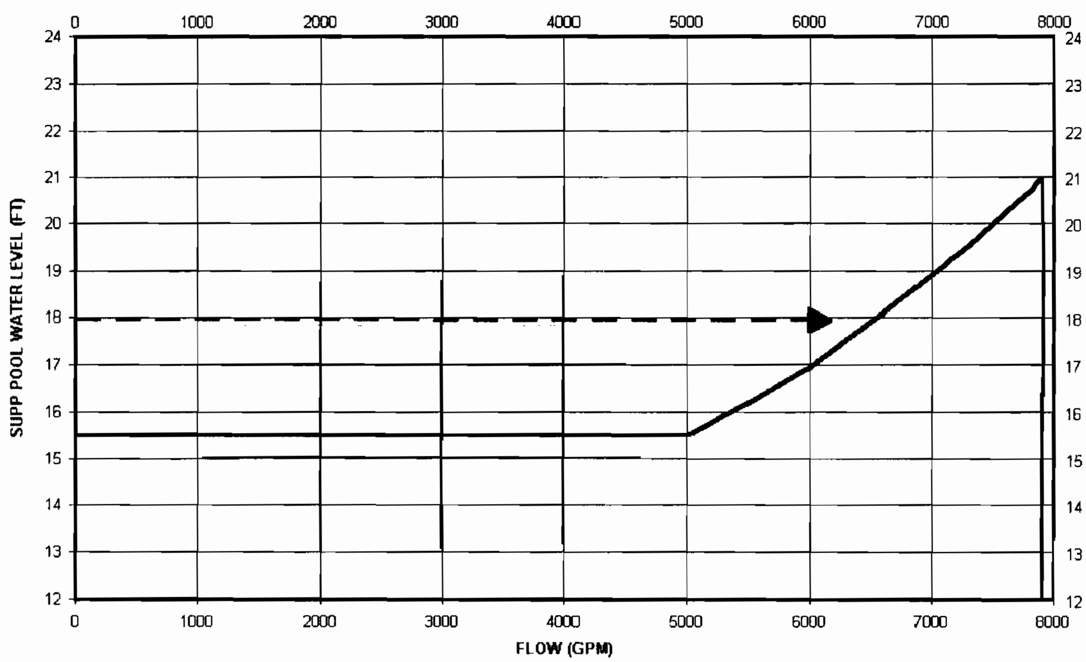
A. Limit Core Spray Loop A flow to approximately 6000 gpm
Override RHR Pump A

B. Limit Core Spray Loop A flow to approximately 6000 gpm
Limit RHR Loop A flow to approximately 6000 gpm

C. Maintain the current flow rates of BOTH Core Spray and RHR

D. Maximize the flow rates of BOTH Core Spray and RHR

FIG 7 VL
RHR & CS VORTEX LIMIT



Proposed Answer D

Explanation (Optional):

A. Incorrect – with RPV level < –161 injection must be maximized irrespective of vortex limits. This would be the required action with level greater than TAF.

B. Incorrect – with RPV level > –161 injection must be maximized irrespective of vortex limits. This is plausible as the CS action would be required with level greater than TAF, and represents misapplication of the CS curve to RHR.

C. Incorrect – Injection must be maximized not maintained at present level.

D. Correct – IAW EO–000–102 Step RC/L –10:
IRRESPECTIVE OF VORTEX LIMITS WITH TABLE 3 SYSTEMS PERFORM ALL:
1 LINE UP FOR INJECTION
2 START PUMPS
3 RAISE INJECTION TO RESTORE AND MAINTAIN LVL > –161"

Technical Reference(s): EO–000–102 Step RC/L–10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: none

Learning Objective: ____________ (As available)

Question Source: Bank # PP002/2604/1
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 #		3
	Group #		2
	K/A #	2.2.14	
	Importance Rating		4.3

Knowledge of the process for controlling equipment configuration or status.

Proposed Question: SRO: 95

Unit 1 is in a refueling outage.

Maintenance signed off of the Clearance Order for the replacement/testing of SRVs at 0030.

Operations is performing the restoration valve line–up CL–125–0012, Unit 1 Containment Instr Gas System Mechanical, as outlined in the Outage Schedule in preparation for Post–Maintenance Testing (PMT).

The operator performing the valve line–up reports an air leak at Main Steam Line A PSV–141F013G Solenoid SV–14113G3.

If the valve line–up is not completed, the PMT scheduled to start in the morning will be delayed.

What actions MUST be taken for the leaking solenoid?

A. Isolate the leak and apply a Status Control Tag in accordance with NDAP–QA–0302, System Status And Equipment Control
Suspend performing CIG CL, and initiate an Aborted Evolution Control Log Form in accordance with OP–AD–002, Standards For Shift Operations

B. Reapply the original clearance in accordance with NDAP–QA–0322, Energy Control Process
Suspend performing CIG CL, and initiate an Aborted Evolution Control Log Form in accordance with OP–AD–002, Standards For Shift Operations

C. Isolate the leak and apply a Status Control Tag in accordance with NDAP–QA–0302, System Status And Equipment Control
Complete the remainder of the CIG CL

D. Reapply the original clearance in accordance with NDAP–QA–0322, Energy Control Process
Isolate the leak and document the alternate position of the valve that was closed in accordance with OP–AD–092, Check–Off List Program
Complete the remainder of the CIG CL

Proposed Answer: **C**

Explanation (Optional):

A. Incorrect – there is no reason to suspend the lineup.

B. Incorrect – once the original clearance has been removed it cannot be reapplied. A new clearance would be needed. If the operator believes that is permitted, this answer may be chosen. There is no reason to stop the rest of the lineup and complete the paperwork for an aborted evolution.

C. Correct – This fits the definition of an emergent issue since it requires unscheduled after hours support and should be handled as emergent work. The leak must be isolated and since there is no procedure controlling the valve position to isolate the leak, a status control tag should be used. The remainder of the lineup may be completed since it is not impacted by the leak.

D. Incorrect, the original clearance cannot be re–applied.

Technical Reference(s): NDAP–QA–0322, Rev 41, NDAP–QA–0302 Rev 25 (Attach if not previously provided)
OP–AD–002,
OP–AD–092

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 15314 (As available)

Question Source: Bank # LXR #423
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 3

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		3
	Group #		3
	K/A #	2.3.5	
	Importance Rating		2.9

Knowledge of radiation monitoring systems such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.

Proposed Question: SRO: 96

While conducting a radioactive liquid release, on both units annunciator RADWASTE EFFLUENT MON DNSCALE/INOP (AR–107(207)–F06) alarms.

An investigation finds that RITS–06433, LIQUID RADWASTE RADIATION, is malfunctioning and can NOT be repaired quickly.

Regarding the rad monitor system operation and the radioactive liquid release, which of the following is correct?

A. The release AUTOMATICALLY terminated
The release may recommence at one–half the original release rate, under the original release permit

B. The release must be MANUALLY terminated
The release may recommence with a new release permit AND with Plant Effluent Radiation Monitor Inoperable requirements satisfied

C. The release must be MANUALLY terminated
The release may recommence at one–half the original release rate, under the original release permit

D. The release AUTOMATICALLY terminated
The release may recommence with a new release permit AND with Plant Effluent Radiation Monitor Inoperable requirements satisfied

Proposed Answer: **D**

Explanation:

A. Incorrect – correct in that it is an auto termination but resuming at half the release rate is not permitted under the original permit.

B. Incorrect – automatically terminates.

C. Incorrect – automatically terminates.

D. Correct – IAW ON–069–001 Section 3.8
IF Plant LRW Effluent Discharge Isolation valves automatically isolated due to Effluent Monitor Downscale/Inop/Sample Flow low, Proceed as follows: Determine cause of RITS–06433 LIQUID RADWASTE RADIATION (Downscale/Inop/Sample Flow Low signal). Correct Condition that caused isolation.

IF RITS–06433 is able to be placed back in service, Perform Section 3.7 of this procedure as required to ensure operability.

IF RITS–06433 is unable to be placed back in service or sample loop flow is unable to be established, Perform the following: Initiate new release permit with Plant Effluent Radiation Monitor Inoperable requirements satisfied. Record action taken in comments section of existing release permit.

Technical Reference(s): ON–069–001 Rev 19 Section 3.8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15300, AD045 / 15304 (As available)

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

Question History: Last NRC Exam

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

10 CFR Part 55 Content: 55.41
55.43 4, 5

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	2.4.37	
	Importance Rating		4.1

Knowledge of the lines of authority during emergency plan implementation

Proposed Question: SRO: 97

Unit 2 has experienced a LOCA.

Venting the drywell in accordance with ES–173–003, Venting Suppression Chamber Without Radiological Release Limitation, is IMMEDIATELY required.

The Shift Manager is NOT in the Control Room, but will return in 5 minutes.

All Emergency Response Facilities are fully staffed and activated.

Unit 1 is operating normally in Mode 1.

Who has the authority to direct implementation of ES–173–003?

A. ONLY the Shift Manager, upon return to the Control Room

B. The Unit Supervisor assigned the Command Function by the Shift Manager on his departure

C. The TSC Emergency Director

D. The Recovery Manager

Proposed Answer: **B**

Explanation (Optional):

A. Incorrect – The SM can delegate his command function to the US.

B. Correct – IAW OP–AD–002 – Step 5.6.17 – When the Shift Manager is required to leave the Control Room the following requirements shall be met: Control Room command function is assigned to a qualified Unit Supervisor.

IAW OP–AD–055 Step 8.8.5 – Approval to perform the following ES procedures must be provided by the Shift Manager or designee: ES–173–003, Venting Suppression Chamber Without Radiological Release Limitation

C. Incorrect – SM, or designee, must authorize this procedure.

D. Incorrect – SM, or designee, must authorize this procedure.

Technical Reference(s): OP–AD–002 Rev 41 step 5.6.17 (Attach if not previously provided)
OP–AD–055 Rev 14 Step 8.8.5

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD044 / 14808 (As available)

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

Question History: Last NRC Exam

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

10 CFR Part 55 Content: 55.41
55.43 3

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		3
	Group #		2
	K/A #	2.2.40	
	Importance Rating		4.7

Ability to apply technical specifications for a system.

Proposed Question: SRO: 98

Unit 1 is in Mode 4. Unit 2 is in Mode 3.

Division 1 LOOP/LOCA testing is in progress on Unit 1.

As part of the test, the Diesel Generators A and C start, and load to their respective Unit 1 ESS Buses.

Unit 1 low–pressure ECCS pumps respond as follows after their respective ESS Buses are re–energized:

RHR Pump 1A	Starts at 3.5 seconds
RHR Pump 1C	Starts at 3.8 seconds
Core Spray Pump 1A	Starts at 10.9 seconds
Core Spray Pump 1C	Starts at 9.5 seconds

Which of the following identifies the actions required to satisfy Technical Specifications?

TS 3.5.2	ECCS and RCIC – SHUTDOWN
TS 3.8.1	AC SOURCES – OPERATING
TS 3.8.2	AC SOURCES – SHUTDOWN

A. Declare RHR Pump 1C INOPERABLE; no TS entry required
Declare DG C INOPERABLE; no TS entry required on Unit 1, Unit 2 enters TS 3.8.1
DG C can be declared OPERABLE if the RHR Pump 1C breaker control power DC knife switch opened

B. Declare RHR Pump 1C INOPERABLE; no TS entry required
Declare DG C Inoperable; Units 1 and 2 enter TS 3.8.2

C. Declare RHR Pump 1C INOPERABLE; Unit 1 enters TS 3.5.2
Declare DG C Inoperable; Unit 1 enters TS 3.8.2, Unit 2 enters TS 3.8.1

D. Declare RHR Pump 1C INOPERABLE; Unit 1 enters TS 3.5.2
Declare DG A and C INOPERABLE; Unit 1 enters TS 3.8.2, Unit 2 enters TS 3.8.1
DG C can be declared OPERABLE if the RHR Pump 1C breaker control power DC knife switch opened

Proposed Answer: **A**

Explanation (Optional):

A. **Correct – With Unit 1 in Mode 4 the 1C RHR pump can be declared out of service with the other pump in the loop and both pumps in the other division still operable and no entry into Tech Specs.**

Only 2 D/G are required operable by TS 3.8.2 and no LCO entry is required on Unit 1.

Surveillance requirements for Unit 2 D/G operability in Mode 1 requires DG auto–starts from standby condition and: energizes permanently connected loads in < 10 seconds, energizes auto–connected shutdown loads through individual load timers.

With the 1A RHR pump DC knife switch open the pump not loading in the proper time does not inop the D/G per TSB for SR 3.8.1.18.

B. Incorrect – 3.8.2 S/D Electrical is not applicable for Unit 2 in Mode 3.

C. Incorrect – TS 3.5.2 entry not required for single RHR pump inoperable in Mode 4. DG C inoperability can be restored by defeating RHR Pump 1A auto–start capability.

D. Incorrect – TS 3.5.2 entry not required for single RHR pump inoperable in Mode 4. DG A is operable. This distractor is plausible if the candidate assumes the as–found timer setting > nominal setpoint renders the timer inoperable.

Technical Reference(s): TM–OP–049, TSB 3.8.2 (Attach if not previously provided)
TS 3.5.2, 3.8.1, 3.8.2

Proposed references to be provided to applicants during examination: TSB Table B 3.8.1–1

Learning Objective: AD044/14639 (As available)

Question Source: Bank # LXR Requal
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:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	2.1.35	
	Importance Rating		3.9

Knowledge of the fuel–handling responsibilities of SRO's.

Proposed Question: SRO: 99

Unit 1 is performing fuel movement in the reactor.

An incorrect fuel bundle was unintentionally grappled and then raised directly above its original location. The bottom of the bundle is clear of the core gridwork.

The bundle has not been moved in any direction other than straight up.

In accordance with ON–081–002, Refuel Platform Anomaly, where must the fuel bundle be directed to be placed, and whose permission is required to be obtained prior to resuming Refuel operations?

(Assume the appropriate level for concurrence is obtained)

A. The fuel bundle may be returned to its original location
Refuel operations may continue with the permission of the Shift Manager

B. The fuel bundle must be transferred to a setdown location in the fuel pool
Refuel operations may continue with the permission of the Shift Manager

C. The fuel bundle may be returned to its original location
Refuel operations may continue with the permission of the Manager–Nuclear Operations

D. The fuel bundle must be transferred to a setdown location in the fuel pool
Refuel operations may continue with the permission of the Manager–Nuclear Operations

Proposed Answer: **D**

Explanation (Optional):

A. Incorrect – It is transferred to a setdown location in the fuel pool. Assistant Ops Manager–Shift/WCC OR Manager–Nuclear Operations permission is required.

B. Incorrect – Assistant Ops Manager–Shift/WCC OR Manager–Nuclear Operations permission is required.

C. Incorrect – It is transferred to a setdown location in the fuel pool.

D. Correct – ON–081–002

Section 6. 0 – Unintentional engagement of the Grapple requires an assessment of load position. If the fuel bundle/blade guide has not been raised completely out of its original location (i.e., if the bottom of the fuel bundle or blade guide has not been raised above the top of the Top Guide, Control Blade, or top of Fuel Pool Rack), it is returned to its original location. If the fuel bundle/blade guide has been raised completely out if its original location, it is transferred to a setdown location in the fuel pool.

Step 4.15 Prior To continuing further Fuel Handling Activities, Obtain permission from Assistant Ops manager – Shift/WCC OR Manager – Nuclear Operations AND concurrence of applicable Unit Supervisor and Refuel Floor Manager.

Technical Reference(s): ON–081–002 Rev 23 Sect. 4.15 & 6.0 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15304 (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 7

Comments:

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	2.4.9	
	Importance Rating		4.2

Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies

Proposed Question: SRO: 100

Unit 1 is in Mode 4.

One loop of RHR is operating in Shutdown Cooling.

Primary Containment is NOT established

Secondary Containment is established

In accordance with ON–149–001, Loss of RHR Shutdown Cooling Mode, which of the following alternate methods of decay heat removal is permitted if a loss of SDC were to occur?

(1) Core Spray injection from the Suppression Pool and return path through 2 SRVs. One loop of Suppression Pool Cooling available.

(2) RHR injection from the Suppression Pool via operable heat exchanger and return path through 2 SRVs

(3) Allow reactor pressure to rise to > 20 psig but < 98 psig and establish a steam flow path to the Main Condenser, maintaining reactor pressure

(4) Allow reactor pressure to rise to > 20 psig but < 98 psig and operate SRVs as necessary, maintaining reactor pressure

A. (1) and (2)

B. (3) and (4)

C. (1), (2) and (3)

D. (1), (2), (3) and (4)

Proposed Answer: **A**

Explanation (Optional):

A. **Correct – Per ON–149–001, Rev.25, page 18 & 19 –**
In Mode 3 or 4 with Primary or Secondary Containment NOT established or Mode 5 with Reactor Vessel head installed and detensioned or Reactor Vessel head removed and Main Steam Line plugs not installed, cooling by injection from Suppression Pool (CS/RHR) and return to the Suppression Pool through SRVs may be used

When using CS method, RHR in suppression pool Cooling Mode is used to provide cooling as required. Preferred SRV's for this evolution are designated and are those having discharge piping with no bends or long runs of nearly horizontal piping. Although these SRV's are preferred, if not available, any other SRV may be used. <u>One concern in this configuration is that rapid cooling due to high flow of cooler water from suppression pool may result in exceeding 100°F/hour cooldown rate.</u>

<u>In Mode 3 with Primary and Secondary containment established</u>, reactor pressure may be maintained greater than 20 psig (to clear column of water from WV discharge downcomers if steam flow is routed or diverted there) and less than 98 psig (below reactor high pressure isolation). Steam may be routed to the main condenser or suppression pool and methods of makeup previously discussed may be used to maintain level. <u>This method may also be used in Mode 4 with Primary and Secondary containments established</u>. Reactor pressure and temperature may be allowed to rise until within pressure limits cooling by boiling as above. One factor to be considered in Mode 4 is that using this method will result in entering the Emergency Plan. The major factor that must be determined before using this method is that Primary and Secondary containments are established in order to prevent release of radioactive materials to the environment.

B. Incorrect – This concern is associated with using the RWCU system in letdown or recirc.

C. Incorrect – this method is not permitted without establishment of primary and secondary containment.

D. Incorrect – this method is not permitted without establishment of primary and secondary containment.

Technical Reference(s): ON–149–001, Rev. 25, page 18 &19 discussion and Att.A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: AD045 / 15320 (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: