1. Unit 2 is at 100% power.

A leak develops on the instrument line connected to the 3B Condensing Chamber that depressurizes the reference leg and seats the Excess Flow Check Valve (EFCV) in that line.

Actual RPV level remains steady at 23 inches and drywell pressure remains below 1.0 psig.

Using P&ID M-352, Sheet 2, PROVIDED SEPERATELY, what is the effect, if any, of this condition on the RPS low RPV level scram function.

A. IF actual RPV level lowered to 1 inch, a full scram would be initiated.

B. IF actual RPV level lowered to 1 inch, a half scram ONLY would be initiated.

C. As a result of depressurizing this instrument line, a full scram would be initiated.

D. The associated level transmitters would NOT be affected due to the operation of the excess flow check valve in the instrument line.

Answer Key		
Question # 1 RO		
Choice		Basis or Justification
Correct:	A	CORRECT – LT-101C & D will sense a HIGH level. LT-101A & B are still available to detect and initiate scram on actual LOW level condition.
Distractors:	B	INCORRECT – While LT-101C & D will sense a HIGH level, LT-101A & B are still available to detect and initiate scram on actual LOW level condition. Plausible if candidate misunderstands RPS logic arrangement.
	C	INCORRECT – Instruments would sense HIGH level – Plausible if candidate misunderstands level detector theory of operation.
	D	INCORRECT – Leak is DOWNSTREAM of Instrument Line EFCV. Ball check valve closes, isolating the instrument line, ambient losses will depressurize the reference leg side of the instrument, LT101 C, D will sense a high level. Plausible if candidate does not understand physical arrangement of instrument lines and condensing chamber lines.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation		
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank (4397)	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	M-352 Sh 2	
Learning Objective:	PLOT-5002B-3d	
K/A System:	212000 RPS	Importance: RO / SRO 3.7 / 3.9
K/A Statement:	K1.02 - Knowledge of the physical connections and/or cause- effect relationships between REACTOR PROTECTION SYSTEM and the following: Nuclear boiler instrumentation	
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:	**M-352 Sh 2 Required**	

2. If a Group II isolation is actuated with a Traversing In-Core Probe detector in the core, the inserted detector withdraws to the "in-shield" position and the associated ____(1)____ will close. In the event the detector fails to withdraw, the TIP Shear Valve ____(2)____ actuated.

A. (1) TIP Ball Valve ONLY
   (2) will be automatically

B. (1) TIP Ball Valve ONLY
   (2) can be manually

C. (1) TIP Ball Valve AND TIP Purge Valve
   (2) will be automatically

D. (1) TIP Ball Valve AND TIP Purge Valve
   (2) can be manually

Answer Key		
Question # 2 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - If a PCIS Group II isolation signal is received while any TIP detectors are outside of their shield, the detector(s) will withdraw to the "in-shield" position and the associated ball valve will close. The isolation signal also closes the TIP purge valve. In the event the detector fails to withdraw, the TIP Shear Valve (XV-2-07-102) will be manually actuated IAW SO 7F.7.A, "Traversing In Core Probe System Isolation in the Event of Containment Isolation".
Distractors:	A	INCORRECT - The detector withdraws to the "in-shield" position; SV-109 also closes. Shear valve does NOT automatically actuate.
	B	INCORRECT - SV-109 also closes.
	C	INCORRECT - Shear valve does NOT automatically actuate.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(9)

Source Documentation			
Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam: (PB 2009) ☐ Other Exam Bank: ()	
Reference(s):	GP-8.B COL, SO 7F.7.A		
Learning Objective:	PLOT-5007F-3a, PLOT-5007G-4I		
K/A System:	223002 PCIS/Nuclear Steam Supply Shutoff	Importance:	RO / SRO 2.7 / 2.9
K/A Statement: K1.13 - Knowledge of the physical connections and/or cause-effect relationships between PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF and the: Traversing in-core probe system			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

3. Unit 2 is at 100% power.

A loss of the Division I 125V DC power supply 20D21 (2PPA) has occurred to the Safety Relief Valve (SRV) Solenoids.

The following conditions exist:

- Annunciator 227 C-5 BLOWDOWN VALVES POWER MONITOR alarm is received.
- Division II 125V DC solenoid power is energized and available.
- Both Divisions 125V DC ADS Logic power are energized and available.

Based on the above conditions, which one of the following is correct regarding the capability to manually open ADS and non-ADS SRVs from the Control Room?

A. Only ADS SRVs can be manually opened. All Non-ADS SRVs are without power.

B. Only the Division II ADS and non-ADS SRVs can be manually opened.

C. All ADS SRVs can be manually opened, but only three (3) of the Non-ADS SRVs can be manually opened.

D. All ADS and Non-ADS SRVs can be manually opened.

Answer Key		
Question # 3 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - Each SRV (ADS or Not) has both normal 20D21 (Div I) and alternate 20D24 (Div II) 125V DC power to solenoids. A loss of one supply will not prevent SRV (ADS or Not) operation manually.
Distractors:	A	INCORRECT - Each SRV (ADS or Not) has both normal 20D21 (Div I) and alternate 20D24 (Div II) 125V DC power to solenoids. Plausible because of common misconception that only ADS SRVs have alternate power.
	B	INCORRECT - Each SRV (ADS or Not) has both normal 20D21 (Div I) and alternate 20D24 (Div II) 125V DC power to solenoids. Plausible because candidate may confuse the effects of the ADS logic power loss with valve power loss.
	C	INCORRECT - Each SRV (ADS or Not) has both normal 20D21 (Div I) and alternate 20D24 (Div II) 125V DC power to solenoids. Plausible if candidate makes conceptual error for ADS versus non-ADS valve solenoid power. Note: During App 'R' fire, 3 SRVs are protected due to cable runs.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	3.5	3	10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank ()	☒ Previous NRC Exam: (PB 2002) ☐ Other Exam Bank: ()	
Reference(s):	ARC 227 C-5 Blowdown Valves Power Monitor		
Learning Objective:	PLOT5001G - 2b		
K/A System:	239002 Relief/Safety Valves	Importance:	RO / SRO 2.8 / 3.2
K/A Statement:	K2.01	Knowledge of electrical power supplies to the following: SRV solenoids	
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

4. Given the following:

- Units 2 and 3 were initially operating at 100% power
- Both units scram when a loss of offsite power (LOOP) occurs
- All 4 EDGs start and re-energize their associated busses
- Two minutes later, the following alarms are received:
    - 001 C-1 “E12 BUS DIFFERENTIAL OR OVERCURRENT RELAYS”
    - 005 B-4 “E43 BUS DIFFERENTIAL OR OVERCURRENT RELAYS”

With no operator actions, which Standby Liquid Control Pumps have power available to their motors?

A. 2A, 3A ONLY

B. 2B, 3B ONLY

C. 2A, 2B, 3A ONLY

D. 2B, 3A, 3B ONLY

Answer Key		
Question # 4 RO		
Choice		Basis or Justification
Correct:	D	SBLC Power Supplies are: 2A: E124-R-C, 2B: E224-R-B, 3A: E134-W-A, 3B: E234-R-B. Alarm 005 B4 has no relevance because no SBLC pumps are powered off the E-43 bus, Alarm 001 C1 indicates that the E12 bus is locked out and unavailable, so 2A SBLC pump does NOT have power to the motor.
Distractors:	A	2A has no power, 2B, 3A, 3B have power. Plausible if candidate does not know SBLC Pump power supplies.
	B	2A has no power, 2B, 3A, 3B have power. Plausible if candidate does not know SBLC Pump power supplies.
	C	2A has no power, 2B, 3A, 3B have power. Plausible if candidate does not know SBLC Pump power supplies.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	PLOT 5011, M-1-S-46		
Learning Objective:	PLOT 5011 Obj 2a		
K/A System:	211000 – Standby Liquid Control	Importance:	RO / SRO 2.9 / 3.1
K/A Statement: K2.01 – Knowledge of the electrical power supplies to the following: SBLC Pumps.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

5. Unit 2 is operating at rated power:

- Drywell pressure is .6 psig and slowly rising.
- Drywell venting is in progress and the "A" SBGT train and fan are placed in service in accordance with SO 7B.3.A-2 "Containment Atmosphere Pressure Control and Nitrogen Makeup" to vent the Drywell.
- Subsequently drywell pressure is .5 psig and slowly lowering.
- Ten minutes later a loss of 'B' RPS occurs.

For the above conditions, which one of the following describes the status of the SBGT system and drywell pressure?

A. Both the "A" and "B" SBGT trains and fans will be running, drywell pressure will start to rise.

B. The "A" SBGT train and fan will continue running, "B" SBGT train and fan will remain shutdown. Drywell pressure will continue to lower.

C. The "A" SBGT fan will trip; the "B" SBGT train and fan will start. Drywell pressure will start to rise.

D. Both the "A" and "B" SBGT trains and fans will be running. Drywell pressure will continue to lower.

Answer Key		
Question # 5 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - On a loss of RPS "B", the "B" SBGT train and fan will start. Drywell pressure will start to rise due to a PCIS GRP 3 isolation signal (AO-2510 DW Vent outboard 2" vent valve will close).
Distractors:	B	INCORRECT - On a loss of RPS "B", the "B" SBGT train and fan will start. Drywell pressure will start to rise due to a PCIS GRP 3 isolation signal (AO-2510 DW Vent outboard 2" vent valve will close).
	C	INCORRECT - The "A" SBGT fan does not receive a trip signal on a loss of RPS "B".
	D	INCORRECT - Drywell pressure will start to rise due to a PCIS GRP 3 isolation signal (AO-2510 DW Vent outboard 2" vent valve will close).

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	PLOT-5009A and PLOT -5007G		
Learning Objective:	PLOT-5009A-6c		
K/A System:	261000 Standby Gas Treatment System	Importance:	RO / SRO 3.2 / 3.4
K/A Statement: K3.03 – Knowledge of the effect that a loss or malfunction of the Standby Gas Treatment System will have on the following: Primary Containment Pressure			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

6. Unit 2 is operating at 100% power when a complete loss of Off-Site power occurs.

All EDGs start and power their respective 4KV busses.

One minute later, which of the following components will have cooling water flow available?

A. Station Air Compressors.

B. Instrument Nitrogen Compressors.

C. RWCU Non-Regenerative Heat Exchangers.

D. Condensate Pump Motor Lower Bearing Cooler.

Answer Key		
Question # 6 RO		
Choice		Basis or Justification
Correct:	A	CORRECT –.During the LOOP, TBCCW pumps trip, forty seconds later RBCCW will provide cooling to essential loads which include station air compressors and CRD Pumps.
Distractors:	B	INCORRECT – This is a non-essential load. Plausible if candidate believes otherwise.
	C	INCORRECT – This is a non-essential load. Plausible if candidate believes otherwise.
	D	INCORRECT – Condensate pump coolers are cooled by TBCCW, which loses power on a LOOP, and is NOT backed up by RBCCW. Plausible if candidate believes the coolers will still have cooling water.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(4)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank (2971)	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	ON-118 Loss of TBCCW System - Procedure		
Learning Objective:	PLOT-5035-3b		
K/A System:	400000 Component Cooling Water	Importance:	RO / SRO 2.9 / 3.3
K/A Statement:	K3.01 - Knowledge of the effect that a loss or malfunction of the CCWS will have on the following: Loads cooled by CCWS		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

7. Unit 2 is operating at 25% power when the following occurs.

   - #2 APRM fails downscale (not INOP).

   Which of the following describes the expected plant response?

   A. Alarm ONLY.

   B. Alarm, Rod Block, AND Half scram.

   C. Alarm, Rod Block, AND Full scram.

   D. Alarm AND Rod Block; NO scram signals

Answer Key		
Question # 7 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - APRM downscale (≤ 3.2 %) in MODE 1 will generate a control rod withdraw block and downscale alarm 211 C-2 only.
Distracters:	A	INCORRECT - APRM downscale (≤ 3.2 %) in MODE 1 will generate a control rod withdraw block and downscale alarm 211 C-2 only.
	B	INCORRECT - A scram vote signal is only generated for : APRM Inop Trip High Neutron Flux Simulated Thermal Power High
	C	INCORRECT - A scram vote signal is only generated for : APRM Inop Trip High Neutron Flux Simulated Thermal Power High

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam: (2007 ILT) ☐ Other Exam Bank: ()	
Reference(s):	PLOT 5060, ARC 211 C-2		
Learning Objective:	PLOT 5060 – 3a		
K/A System:	215005 APRM/LPRM	Importance:	RO / SRO 3.7 / 3.7
K/A Statement:	K4.01 - Knowledge of AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM design feature(s) and/or interlocks which provide for the following: Rod Withdrawal Blocks		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

8. Given the following:

- The 20Y050 supply from the Static Inverter is in a normal lineup
- A fault occurs on the 20Y050 Panel that results in an excessive current condition (>300 amp setpoint)

The Static Inverter ____(1)____ and the 20Y050 Panel ____(2)____.

A. (1) deenergizes when the input breaker (CB1) trips on overcurrent
(2) deenergizes

B. (1) receives a shutdown signal that opens both breakers (CB1 and CB2)
(2) deenergizes

C. (1) Static Switch swaps to the Alternate Source
(2) remains energized while the fault clears

D. (1) Static Switch is prevented from transferring to the Alternate Source
(2) remains energized while the fault clears

Answer Key		
Question # 8 RO		
Choice		Basis or Justification
Correct:	C	The Static Inverter is current limited. If a fault develops it will automatically transfer to the Alternate Source which can supply the larger current necessary to clear the fault and then transfer back to normal DC supply when fault clears.
Distracters:	A	The Static Switch will transfer to alternate source in order to maintain 20Y050 panel energized.
	B	The Static Switch will transfer to alternate source in order to maintain 20Y050 panel energized.
	D	The Static Switch will transfer to the alternate source in order to maintain 20Y050 panel energized.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☒ Previous NRC Exam: (PB 2007) ☒ Other Exam Bank: (PB 2010 Cert)	
Reference(s):	ARC-220 F-5		
Learning Objective:	PLOT-5058-5c		
K/A System:	262002 – Uninterruptible Power Supply (A.C./D.C.)	Importance:	RO / SRO 3.1 / 3.4
K/A Statement: K4.01 – Knowledge of Uninterruptable Power Supply (A.C. / D.C.) design feature(s) and/or interlocks which provide for the following: Transfer from preferred power to alternate power supplies.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

9. A fire occurred in the Main Control Room requiring evacuation. The following conditions exist on Unit 2:

- The crew is executing SE-10 “Plant Shutdown from the Alternative Shutdown Panels”
- The URO is performing SE-10 Sheet 2 and SE-10, Attachment 9 to establish control at the HPCI Alternative Shutdown Panel
- The HPCI Gland Seal Condenser Vac Pump (20K002) will NOT start
- The HPCI Gland Seal Condenser Cond Pump (20P028) will NOT start

For the above conditions what is the operational implication on continued operation of HPCI?

HPCI operation:

A. may continue. The HPCI room airborne contamination levels will not rise.

B. may continue. The HPCI room airborne contamination levels will rise.

C. must NOT continue due to the excessive HPCI room airborne contamination levels.

D. must NOT continue due to the potential to damage the HPCI turbine shaft seals.

Answer Key		
Question # 9 RO		
Choice		Basis or Justification
Correct:	B	Correct – SE-10, Att 9 and FSAR sec 6.4.1 identify that HPCI operation may continue without gland seal condenser condensate and vacuum pump(s). Knowledge of steam turbines and steam supply to HPCI turbine is required for candidate to determine the impact of continued operation without gland seal condensate pump.
Distracters:	A	Incorrect – Shaft sealing will NOT function normally as the steam will leak into the surrounding room vice being condensed by the gland seal steam condenser sub-system. Plausible because the candidate may not understand how turbine seal steam functions via design steam leakage out through seals.
	C	Incorrect – HPCI operation is permitted to continue without Gland Seal condenser system, as identified in SE-10, Att 9. Plausible because the candidate may not know this fact but may deduce the impact of the failure on airborne contamination levels.
	D	Incorrect – HPCI operation is permitted to continue without Gland Seal condenser system, as identified in SE-10, Att 9. Plausible because the candidate may not know this fact.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	SE-10, Att 9, UFSAR para 6.4.1		
Learning Objective:	PLOT 5023 4b		
K/A System:	206000 HPCI	Importance:	RO / SRO 2.8 / 2.9
K/A Statement: K5.02 - Knowledge of the operational implications of the following concepts as they apply to HIGH PRESSURE COOLANT INJECTION SYSTEM : Turbine shaft sealing			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

10. Per SO 14.1.A-2(3) "Core Spray System Alignment for Automatic or Manual Operation", which of the following methods must be used to verify the Core Spray System is adequately filled and vented?

(1) Verifying Core Spray Discharge Pressure is $\geq$ 50 psig

(2) Verifying "A(B) CORE SPRAY LINE VENT ACCUMULATOR LOW LEVEL" alarm is clear

A. 1 ONLY

B. 2 ONLY

C. 1 OR 2

D. 1 AND 2

Answer Key		
Question # 10 RO		
Choice		Basis or Justification
Correct:	D	CORRECT – As per SO 14.1.A-2, Core Spray System Alignment for Automatic or Manual Operation, verifying C/S discharge pressure (both locally and in the MCR in conjunction with verifying the Line Vent Accumulator Low Level alarm is clear is required verification that the system is filled and vented.
Distracters:	B	INCORRECT – SO 14.1.A-2, Core Spray System Alignment for Automatic or Manual Operation, verifying C/S discharge pressure in conjunction with verifying the Line Vent Accumulator Low Level alarm is clear is required.
	C	INCORRECT – SO 14.1.A-2, Core Spray System Alignment for Automatic or Manual Operation, verifying C/S discharge pressure in conjunction with verifying the Line Vent Accumulator Low Level alarm is clear is required.
	A	INCORRECT – SO 14.1.A-2, Core Spray System Alignment for Automatic or Manual Operation, verifying C/S discharge pressure in conjunction with verifying the Line Vent Accumulator Low Level alarm is clear is required.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(14)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	SO 14A.1.A, ARC 224 A-4		
Learning Objective:	PLOT5014 – 4e		
K/A System:	209001 LPCS	Importance:	RO / SRO 2.5 / 2.5
K/A Statement: K5.05 - Knowledge of the operational implications of the following concepts as they apply to LOW PRESSURE CORE SPRAY SYSTEM : System Venting			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

11. Under NORMAL conditions, (eg: torus cooling for HPCI testing, Shutdown Cooling operations), HPSW is applied to RHR heat exchanger in order to ___(1)___; during transient operations (LPCI mode), per T-101 BASES, HPSW is applied to RHR heat exchanger in order to ___(2)___.

A. (1) minimize radioactive leakage
(2) rapidly remove decay heat

B. (1) minimize radioactive leakage
(2) minimize radioactive leakage

C. (1) minimize vibration of RHR heat exchanger tubes
(2) rapidly remove decay heat

D. (1) minimize vibration of RHR heat exchanger tubes
(2) minimize radioactive leakage

Answer Key		
Question # 11 RO		
Choice		Basis or Justification
Correct:	A	CORRECT – Under normal conditions, HPSW is applied to RHR Hx to minimize radioactive leakage to the environment. Per procedure T-101 "RPV Control", HPSW needs to be applied to the in-service RHR heat exchanger as soon as possible to promote rapid removal of decay heat.
Distractors:	B	INCORRECT – See discussion above. Plausible if candidate does not know T-101 BASES regarding HPSW operations.
	C	INCORRECT – See discussion above. Plausible if candidate does not know T-101 BASES regarding HPSW operations.
	D	INCORRECT – See discussion above. Plausible if candidate does not know T-101 BASES regarding HPSW operations.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(8)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank ()	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	T-101 Bases, Design Basis Document P-S-09	
Learning Objective:	PLOT 1560 Obj 9	
K/A System	203000 RHR/LPCI: Injection Mode	Importance: RO / SRO 3.0 / 3.1
K/A Statement	K6.10 - Knowledge of the effect that a loss or malfunction of the following will have on the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) : Component cooling water systems	
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:	**NONE**	

12. Unit 2 was manually scrammed due to a leak in the torus.

Torus level is 10 feet and lowering.

Unless otherwise directed by TRIP procedures, RCIC must be secured at:

A. 9.5 feet, to prevent direct pressurization of the torus.

B. 9.5 feet, to prevent exceeding the pump vortex limit.

C. 6 feet, to prevent direct pressurization of the torus.

D. 6 feet, to prevent exceeding the pump vortex limit.

Answer Key		
Question # 12 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - T-102, Step T/L-16, RCIC is secured if it is aligned to the Torus in order to prevent vortexing. This limit is to be adhered to unless TRIP procedures direct the use of RCIC regardless of the limit.
Distracters:	A	INCORRECT - This is the level and reason for securing HPCI under these conditions. RCIC is not secured at this torus level because the energy the RCIC turbine exhaust can add to the containment is small and the turbine would likely trip on high exhaust pressure should elevated containment pressure occur. Plausible if candidate confuses HPCI and RCIC limitations.
	B	INCORRECT - This is the level for securing HPCI to prevent direct pressurization of the torus. RCIC does not get secured until 6 feet torus level. Plausible if candidate confuses HPCI and RCIC limitations.
	C	INCORRECT - This is the correct level for securing RCIC, but incorrect reason. RCIC is secured at 6 feet torus level due to vortexing and not because of direct pressurization of the torus.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(7)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank ()	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	T-102 Sh 2 and T-102 Bases	
Learning Objective:	PLOT 5013 E/O 10q	
K/A System:	217000 – RCIC	Importance: RO / SRO 3.5 / 3.5
K/A Statement: K6.03 - Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC): Suppression pool water supply		
REQUIRED MATERIALS:	None	
Notes and Comments:		

13. Unit 2 is in MODE 4, twenty-four hours after shutdown, following extended full power operation.

- 2B RHR pump is operating in the Shutdown Cooling Mode.
- Reactor Coolant temperature is 135 degrees F on a very slow downward trend.
- No Reactor Recirculation pumps are in service.
- Reactor water level is being maintained at +30 inches.
- MSIVs are shut.

Which one of the following describes the Reactor Coolant temperature response if the operator secures the 2B RHR pump? (Assume no additional operator action is taken.)

Reactor Coolant temperature will:

A. Lower until equilibrium is reached with ambient drywell temperature.

B. Lower until equal to HPSW temperature in the RHR heat exchanger.

C. Rise until bulk boiling occurs, and reactor pressure rises above atmospheric pressure.

D. Rise until bulk boiling occurs, with reactor pressure steady at atmospheric pressure.

Answer Key		
Question # 13 RO		
Choice		Basis or Justification
Correct:	C	CORRECT - Decay heat will cause RPV coolant temperature to rise and eventually reach boiling. Reactor pressure will increase above atmospheric pressure (NOTE: Even if examinee assumes RPV head vents are open pressure will still increase since the head vents are on a 1" line and are designed for removal of non-condensibles at power or air removal for refueling or hydro test conditions. There is industry OE that confirms that bulk boiling of coolant due to lack of shutdown cooling will result in going greater than 212 F and pressurizing the RPV with the vents open).
Distractors:	A	INCORRECT - With the RHR pump tripped there is no longer shutdown cooling flow from the reactor vessel to the RHR heat exchanger. Plausible if candidate has misconception regarding decay heat being absorbed by drywell cooling system.
	B	INCORRECT - With the RHR pump tripped there is no longer shutdown cooling flow from the reactor vessel to the RHR heat exchanger. Plausible if candidate has misconception regarding natural circulation flow via RHR piping.
	D	INCORRECT - Reactor pressure will increase above atmospheric. Plausible if candidate believes head vent will relieve sufficient energy to prevent pressure/temperature rise.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(14)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank (4266)	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	ON-125, GP-12		
Learning Objective:	PLOT5010 – 9.k.6		
K/A System:	205000 Shutdown Cooling	Importance:	RO / SRO 3.7 / 3.7
K/A Statement: A1.06 - Ability to predict and/or monitor changes in parameters associated with operating the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) controls including: Reactor temperatures (moderator, vessel, flange)			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

14. Given the following:

- Unit 2 is operating at 85% power when a design basis LOCA occurs.
- The output breaker on 125VDC battery charger 2BD003-1 trips open.
- Prior to tripping, charger 2BD003-1 was supplying the Division II 250 VDC bus.

Assuming no operator action, how will the plant respond to this event?

The Division II <u>250 VDC</u> bus will:

A. remain powered at rated voltage supplied by battery charger 2BD003-2.

B. remain powered at rated voltage supplied by the 2B station battery ONLY

C. immediately de-energize until battery charger 2BD003-2 is placed in service.

D. remain powered at rated voltage supplied by the 2B station battery AND the in-service 2D charger

Answer Key		
Question # 14 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - when the output breaker for charger 2BD003-1 trips, the charger no longer supplies power to the Division II 250 VDC bus. The bus loads would then be supplied by the 2B and 2D batteries. The batteries are designed to supply loads during a DBA for 2 hours.
Distractors:	A	INCORRECT - charger 2BD003-2 must be manually placed in service...only one charger can be in service at a time. The question stem states "assuming no operator actions.
	B	INCORRECT - when the output breaker for charger 2BD003-1 trips, the charger no longer supplies power to the Division II 250 VDC bus. The bus loads would then be supplied by BOTH the 2B and 2D batteries.
	C	INCORRECT - the battery will fully support all loads for approximately 2 hours with no battery charger; the bus will remain energized.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam (2007) ☐ Other Exam Bank	
Reference(s):	PLOT 5057, print E-26		
Learning Objective:	PLOT-5057-7a		
K/A System	263000 DC Electrical Distribution	Importance:	RO / SRO 2.5 / 2.8
K/A Statement A1.01 - Ability to predict and/or monitor changes in parameters associated with operating the D.C. ELECTRICAL DISTRIBUTION controls including: Battery charging/discharging rate			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

15. The plant electrical system is in a normal configuration.

The Transmission System Operator reports that supply grid voltage to the 2SU Offsite Source is 220 kV.

This will result in ___(1)___ voltage on the 4kV buses, and requires use of ___(2)___ to mitigate the consequences of this condition.

A. (1) under
(2) SE-16 "Grid Emergency"

B. (1) under
(2) AO 50.1 "Response to Main Generator Perturbation caused by Grid Disturbance"

C. (1) over
(2) SE-16 "Grid Emergency"

D. (1) over
(2) AO 50.1 "Response to Main Generator Perturbation caused by Grid Disturbance"

Answer Key		
Question # 15 RO		
Choice		Basis or Justification
Correct:	A	CORRECT- SE-16 Entry Condition 1.2 identifies <225kV on 2SU as requiring entry into the procedure. Per SE-16 Bases, "If voltages are below the values listed above and a LOCA occurs, the 4 kV buses may transfer to the Emergency Diesel Generators due to grid undervoltage."
Distracters:	B	INCORRECT- Part (1) is correct, but part (2) is incorrect - plausible since AO 50.1 relates to grid disturbances, but is associated with Main Generator perturbations.
	C	INCORRECT- Part (1) is incorrect, but part (2) is correct - plausible because candidate needs to recognize that 220kV is LOW for the supply to 2SU.
	D	INCORRECT- parts (1), (2) are incorrect - plausible since AO 50.1 relates to grid disturbances, but is associated with Main Generator perturbations AND candidate needs to recognize that 220kV is LOW for the supply to 2SU.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank ()	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	SE-16, Grid Emergency, and SE-16 Bases	
Learning Objective:	PLOT 5053 E/O 10i	
K/A System:	262001 – AC Electrical Distribution	Importance: RO / SRO 3.1 / 3.4

K/A Statement:
A2.09 - Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:

Exceeding voltage limitations

REQUIRED MATERIALS:	None
Notes and Comments:	

16. The following conditions exist on Unit 2:

- A reactor startup is in progress
- Critical data has just been completed
- The "B" and "E" WRNM channels simultaneously fail downscale and are displaying a Critical Self Test Failure

The plant will respond with an ___(1)___ and the crew should respond with ___(2)___.

A. (1) alarm ONLY; no rod blocks or scram signals
(2) applicable Alarm Response Cards

B. (1) alarm and rod block ONLY; no scram signals
(2) applicable Alarm Response Cards and SO 62.7.A-2 "Receipt of Rod Blocks"

C. (1) alarm, rod block, AND half scram ONLY
(2) applicable Alarm Response Cards, SO 62.7.A-2 "Receipt of Rod Blocks", and GP-11E, "Reactor Protection System – Scram and ARI Reset"

D. (1) alarm, rod block, AND full scram
(2) T-100 "Scram"

Answer Key		
Question # 16 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - Critical self test failure is a "trip" signal. One in each trip system will generate a full scram, annunciators for WRNM and RPS, and a control rod block. WRNM "B" is RPS B. WRNM "E" is RPS A. RPS Logic for WRNM is 1 out of 4 taken twice. Rod Block, RPS Scram, and Alarm logics are all satisfied.
Distracters:	A	INCORRECT - Full Scram is expected – Plausible if candidate does not fully understand trip functions and/or logic scheme.
	B	INCORRECT -Full Scram is expected – Plausible if candidate does not fully understand trip functions and/or logic scheme.
	C	INCORRECT -Full Scram is expected – Plausible if candidate does not fully understand trip functions and/or logic scheme.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(6)

Source Documentation			
Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank	
Reference(s):	ARC-211 B-1 and C-1		
Learning Objective:	PLOT-5060C-3b, -5a, -6a		
K/A System:	215003 – Intermediate Range Monitor System	Importance:	RO / SRO 3.7 / 3.8
K/A Statement: A2.04 - 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: up scale or down scale trips			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

17. The following conditions exist on Unit 2 following a LOCA:

Parameter:	Time = 0 sec	Time = 60 sec	Time = 200 sec
RPV Level	-60 inches	-165 inches	-195 inches
RPV Pressure	850 psig	850 psig	850 psig
Drywell Pressure	1.4 psig	2.0 psig	4.5 psig
2A RHR Pump	OFF	RUNNING	RUNNING
2A, 2B CS Pumps	OFF	RUNNING	RUNNING

- Other than scram actions NO other operator actions have been taken
- NO other ECCS pumps are operating

Based on the latest conditions, which statement below describes the expected RPV pressure response? RPV pressure:

A. WILL remain steady.

B. SHOULD be lowering.

C. WILL lower 105 seconds after RPV level reaches -160 inches

D. WILL lower 9 minutes after RPV level reaches -160 inches

Answer Key		
Question # 17 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - ADS initiation conditions are met with 2 psig drywell pressure and -160 inches RPV level with ECCS injection available – this is followed by a 105 second timer to allow for level recovery or operator intervention. Since NO procedure actions have been taken other than scram actions, the ADS inhibit switches have NOT been manipulated. ADS should have initiated but has failed to do so as indicated by RPV pressure steady at 850 psig.
Distractors:	A	INCORRECT - Plausible if candidate does not know specific ADS initiation criteria.
	C	INCORRECT - ADS initiation conditions are met with 2 psig drywell pressure and -160 inches RPV level with ECCS injection available – this is followed by a 105 second timer to allow for level recovery or operator intervention. By the given timeline, more than 105 seconds have already elapsed. Plausible if candidate does not know specific ADS initiation criteria.
	D	INCORRECT -ADS initiation conditions are met with 2 psig drywell pressure and -160 inches RPV level with ECCS injection available – this is followed by a 105 second timer to allow for level recovery or operator intervention. Nine minute timer is associated with LOW RPV level and nominal Drywell pressure, this indicates possible steam line break outside the drywell. Plausible if candidate does not know specific ADS initiation criteria.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank	
Reference(s):	M-1-S-52, Sheets 2 and 3		
Learning Objective:	PLOT-5001G-9.k.4		
K/A System	218000 – Automatic Depressurization System	Importance:	RO / SRO 4.2 / 4.3
K/A Statement A3.08 – Ability to monitor automatic operations of the AUTOMATIC DEPRESSURIZATION SYSTEM including: Reactor Pressure			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

18. The E-1 Emergency Diesel Generator is started in accordance with SO 52A.1.B, “Diesel Generator Operations”.

The Operator can check for normal field flash by observing E-1 EDG___(1)___ and that the E-1 EDG is at rated speed by observing ___(2)___:

A. (1) voltage between 4.16 and 4.40 kV
   (2) alarm 001 “G-4 E1 DIESEL RUNNING” AND frequency between 58.8 and 61.2 Hz

B. (1) frequency between 58.8 and 61.2 Hz
   (2) alarm 001 “G-4 E1 DIESEL RUNNING” ONLY

C. (1) alarm 001 “G-4 E1 DIESEL RUNNING” ONLY
   (2) frequency between 58.8 and 61.2 Hz

D. (1) alarm 001 “G-4 E1 DIESEL RUNNING” AND frequency between 58.8 and 61.2 Hz
   (2) alarm 001 “E-1 DIESEL GEN NOT RESET”

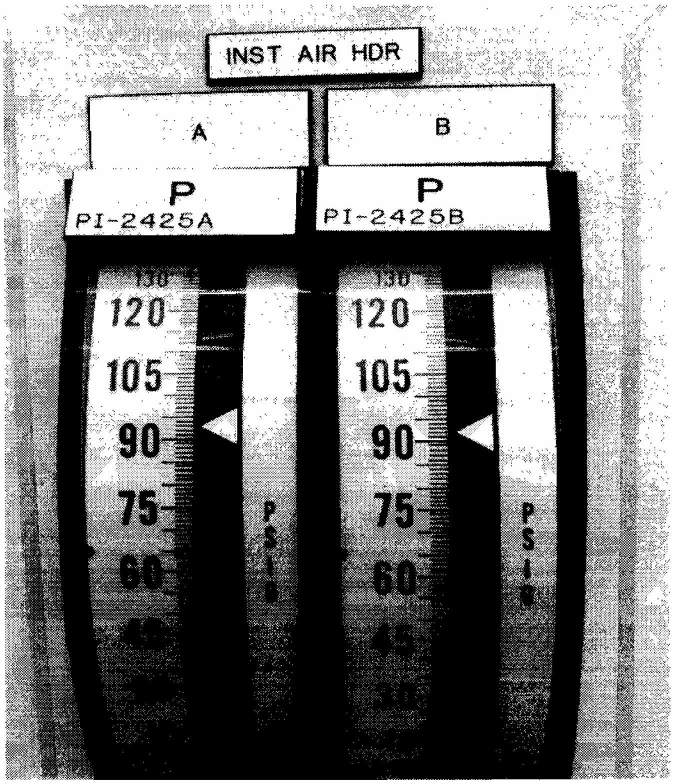
Answer Key		
Question # 18 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - Field flashing will result in EDG terminal voltage of approx. 4kV. If the field does not flash there is no terminal voltage generated. EDG rated speed can be verified by receipt of MCR alarm 001 "G-4 E1 DIESEL RUNNING" AND observing EDG frequency between 58.8 and 61.2 Hz.
Distractors:	B	INCORRECT - (1) Field flash is NOT related to the speed (frequency) of the EDG. . (2) Plausible because receipt of MCR alarm 001 "G-4 E1 DIESEL RUNNING" occurs at 855 RPM, but is NOT the rated EDG speed.
	C	INCORRECT - (1) Field flash starts at the LSS (250 rpm). Plausible because receipt of MCR alarm 001 "G-4 E1 DIESEL RUNNING" occurs at 855 RPM. (2) Correct
	D	INCORRECT – Plausible if candidate confuses alarm 001 "E-1 DIESEL GEN NOT RESET" as being related to normal EDG start sequence. Alarm is actually received if EDG trips. EDG rated speed can be verified by receipt of MCR alarm 001 "G-4 E1 DIESEL RUNNING" AND observing EDG frequency between 58.8 and 61.2 Hz.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(8)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	SO 52A.1.B EDG Operations		
Learning Objective:	PLOT5052-3d		
K/A System:	264000 Emergency Diesel Generators	Importance:	RO / SRO 3.0 / 3.1
K/A Statement: A3.01 - Ability to monitor automatic operations of the EMERGENCY GENERATORS (DIESEL/JET) including: Automatic starting of compressor and emergency generator			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

19. Unit 2 is operating at 100% power with the following conditions present:

- Instrument Air Header pressure as read in the Main Control Room on PI-2425A and B located on panel 20C12 is as follows:



Based on the above, Instrument Air Header Pressure is ___(1)___ and procedure ___(2)___ will provide direction for correcting the condition.

A. (1) Low
(2) SO 36B.8.A-2 "Instrument Air System Routine Inspection"

B. (1) Low
(2) ON-119 "Loss of Instrument Air"

C. (1) High
(2) SO 36B.8.A-2 "Instrument Air System Routine Inspection"

D. (1) High
(2) SO 36B.1.A-2 "Unit 2A and B Instrument Air System Startup"

Answer Key		
Question # 19 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - Instrument Air Header pressure is low. ON-119 will provide direction to address the IA header pressure condition. ON-119 entry symptom is air header pressure <97 psig.
Distracters:	A	INCORRECT - Instrument Air Header pressure is low, however ON-119 will provide direction to address the IA header pressure condition, not 36B.8.A-2 “Instrument Air System Routine Inspection”
	C	INCORRECT - Instrument Air Header pressure is low. ON-119 will provide direction to address the IA header pressure condition, not SO 36B.8.A-2 “Instrument Air System Routine Inspection”.
	D	INCORRECT - Instrument Air Header pressure is low, however ON-119 will provide direction to address the IA header pressure condition, not SO 36B.1.A-2 “Unit 2A and B Instrument Air System Startup”

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation		
Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank: ()
Reference(s):	ON-119, ARC 216 D-3	
Learning Objective:	PLOT-5036-9j	
K/A System:	300000 Instrument Air	Importance: RO / SRO 2.6 / 2.7
K/A Statement:	A4.01 - Ability to manually operate and/or monitor in the control room: Pressure gauges	
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		

20. Unit 2 reactor startup is in progress.

- RPV pressure is 450 psig with 3 bypass valves open.
- The 2C RFPT is being placed in service using SO 6C.1.A-2 "C Reactor Feedwater Pump Startup with Vessel Level Control Established through AO-8091".
- MSC SELECT is lit for the 2C RFPT on Panel 20C005A.
- 2C RFPT is on turning gear.

In accordance with procedure SO 6C.1.A-2, pressing and releasing the RFPT "AUTO START" pushbutton at this time will raise RFPT speed to the_____(1)_____ and _____(2)_____be aborted by pushing any speed "LOWER" or "RAISE" pushbutton.

A. (1) minimum governor control speed of approximately 400 to 600 rpm
(2) cannot

B. (1) Low Speed Stop setting of approximately 2600 to 2900 rpm
(2) can

C. (1) minimum governor control speed of approximately 400 to 600 rpm
(2) can

D. (1) Low Speed Stop setting of approximately 2600 to 2900 rpm
(2) cannot

Answer Key		
Question # 20 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - When the "AUTO START" pushbutton is depressed then the RFPT will ramp to the Low Speed Stop (LSS) setting of 2600 to 2900 rpm. The auto start can be aborted by pushing any speed LOWER or RAISE pushbutton and the turbine speed will be controlled at the speed the turbine is at when the button was pushed.
Distractors:	A	INCORRECT – Plausible due to speed range of 400-600 rpm is the minimum governor control speed achieved by depressing the "SLOW" or "FAST RAISE" pushbuttons. The auto start can be aborted by pushing any speed LOWER or RAISE pushbutton and the turbine speed will be controlled at the speed the turbine is at when the button was pushed
	C	INCORRECT – Plausible due to speed range of 400-600 rpm is the minimum governor control speed achieved by depressing the "SLOW" or "FAST RAISE" pushbuttons.
	D	INCORRECT - The auto start <u>can</u> be aborted by pushing any speed LOWER or RAISE pushbutton and the turbine speed will be controlled at the speed the turbine is at when the button was pushed.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam (2008 NRC) ☐ Other Exam Bank	
Reference(s):	SO 6C.1.A-2		
Learning Objective:	PLOT-5006-4c		
K/A System	259002 – Reactor Water Level Control	Importance:	RO / SRO 3.7 / 3.6
K/A Statement A4.02 – Ability to manually operate and/or monitor in the control room: All individual component controllers in the automatic mode.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

21. Which of the following are design functions or features of the Emergency Diesel Generator (EDG) and Auxiliary system(s)?

1. Support safe shutdown load requirements for <u>BOTH</u> units during simultaneous DBA accidents.

2. Support safe shutdown load requirements for a <u>SINGLE</u> unit during LOCA with a simultaneous Loss of Off-Site Power.

3. Allow for failure of <u>ONE</u> EDG.

4. Provide sufficient fuel for 14 days of continuous EDG operation at Design Basis Event conditions.

A. 1 and 3

B. 2 and 4

C. 2 and 3

D. 1 and 4

Answer Key		
Question # 21 RO		
Choice		Basis or Justification
Correct:	C	CORRECT - Design Basis for EDG (and Auxiliary) System is to ensure that sufficient power is available to provide for the functioning of required emergency safeguard and selected non-safeguard systems for safe shutdown of both reactor units assuming a Loss of Coolant Accident (LOCA) in one unit, a Loss of Offsite Power (LOOP), and failure of one standby diesel generator.
Distractors:	A	INCORRECT - Design Basis for EDG and Auxiliary does NOT allow for simultaneous LOCA accidents. One EDG failure is allowed. Plausible if candidate does not recall these specific design features.
	B	INCORRECT - Sufficient fuel is provided for 7 days operation. 14 days is plausible because this is TS LCO allowed action time for having one EDG out of service.
	D	INCORRECT - Basis and plausibility previously explained.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
Memory			10CFR55.41(b)(8)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	DBD P-S-07	
Learning Objective:	PLOT- 5052 Obj 1	
K/A System:	264000 EDGs	Importance: RO / SRO 3.9 / 4.0
K/A Statement:	2.1.27 - Conduct of Operations: Knowledge of system purpose and / or function.	
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		

22. Unit 2 was at 100% power. A low RPV level transient occurred. The following conditions exist:

- Reactor power: 55%
- RPV pressure is 1000 psig
- RPV level is -75 inches and steady
- 'A'SBLC Pump is injecting into the RPV
- HPCI and RCIC are injecting into the RPV
- ALL Individual Scram Test Switches at Panel 20C016 were momentarily placed in the SCRAM position and returned to the UP position
- T-220 ,"Driving Control Rods During Failure to Scram" has been directed
- All Full Core Display Blue Scram Lights are NOT lit

For the above conditions which one of the following Equipment Operator actions must be performed to cause a reactor shutdown?

A. Lineup SBLC Tank to the RWCU Precoat Tank per T-212, "RWCU System SBLC Injection"

B. Lift leads to defeat ARI initiation logic and install jumpers to defeat RPS scram signals per T-216, "Control Rod Insertion by Manual Scram or Individual Scram Test Switches"

C. Remove group scram solenoid fuses per T-213, "Scram Solenoid Deenergization"

D. Close HV-2-3-56 "Charging Water Header Block Valve to HCUs" per T-246, "Maximizing CRD Flow to the Reactor Vessel"

Answer Key		
Question # 22 RO		
Choice		Basis or Justification
Correct:	C	CORRECT - An electric ATWS exists. T-213, "Scram Solenoid Deenergization" is required to be performed. The first part of T-213 is to place all Individual Scram Test Switches in the SCRAM position. Since this was already completed the next step is to remove group scram solenoid fuses to insert control rods.
Distractors:	A	INCORRECT - T-212, "RWCU System SBLC Injection" is NOT required due to SBLC already injecting into the RPV.
	B	INCORRECT - T-216, "Control Rod Insertion by Manual Scram or Individual Scram Test Switches" is required to be performed for a hydraulic ATWS. This is an electric ATWS.
	D	INCORRECT - Closing HV-2-3-56 "Charging Water Header Block Valve to HCUs" per T-246, "Maximizing CRD Flow to the Reactor Vessel" at 1000 psig RPV pressure will have no impact on driving control rods. .

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(12)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	T-101, T-213	
Learning Objective:	PLOT-1560 Obj 13	
K/A System:	212000 RPS	Importance: RO / SRO 3.8 / 4.0
K/A Statement: 2.4.35 Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.		
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		

23. Unit 2 scrammed due to low RPV level. The following conditions exist:

- RCIC auto started to restore level, which reached a maximum at +35 inches
- RCIC is now in manual control with the flow controller dialed low (0 gpm)
- RPV level is -10 inches and lowering slowly
- RPV pressure is 940 psig, controlled by EHC
- RCIC discharge pressure is 660 psig
- RCIC turbine speed is 2800 rpm
- RCIC indicated flow is 0 gpm
- Torus and CST levels are normal

With no further operator action, what is the result of leaving RCIC in its current configuration?

RCIC will ____________________.

A. trip on turbine overspeed

B. pump CST water to the Torus

C. suffer exhaust check valve damage

D. trip on high turbine exhaust pressure

Answer Key		
Question # 23 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - Based on the given conditions, RCIC is running with the minimum flow valve open. Since RCIC suction is lined up to the CST and the minimum flow discharge is to the torus, CST water will be pumped to the torus.
Distractors:	A	INCORRECT - RCIC will trip on overspeed under certain conditions if the controller is in AUTO, i.e. in CST-to-CST mode and MO-23-24 (common return to the CST) closed due to high Drywell pressure or HPCI suction swap from the CST to the Torus. With the controller in MANUAL none of the conditions that lead to an overspeed event are present.
	C	INCORRECT - Exhaust check valve damage is not a concern above 2200 rpm.
	D	INCORRECT - RCIC will not trip on high turbine exhaust pressure under the given conditions. RCIC is designed to run on min flow for extended periods.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank ()	☒ Previous NRC Exam: (2009 NRC) ☐ Other Exam Bank: ()	
Reference(s):	M-359 Sheet 1, SO 13.1.C		
Learning Objective:	PLOT-5013-9.k.7		
K/A System:	217000 – Reactor Core Isolation Cooling System	Importance:	RO / SRO 3.5 / 3.5
K/A Statement:	A4.11 – Ability to manually operate and/or monitor in the control room: Condensate storage tank level		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

24. A reactor startup from cold conditions is in progress.
RPV pressure is being raised to 150 psig per GP-2, "Normal Plant Start-up."

While monitoring nuclear instrumentation it is expected that withdrawal of control rods from position 36 to 48 will result in:

A. little or no indicated power change due to low control rod worth

B. little or no indicated power change due to high control rod worth

C. a substantial rise in indicated power due to relative proximity to neutron detectors

D. a substantial rise in indicated power due to not yet establishing positive pressure control with bypass valves.

Answer Key		
Question # 24 RO		
Choice		Basis or Justification
Correct:	A	CORRECT – Control rod worth is low from core positions 36 to 48 as described in GP-2 "Plant Startup".
Distracters:	B	INCORRECT - Plausible because control rod worth is low, not high, from core positions 36 to 48 as described in GP-2 "Plant Startup".
	C	INCORRECT - Plausible because neutron detector proximity does have an effect on count rate but only at control rod notch locations 16 through 22.
	D	INCORRECT - Plausible because the candidate could determine that pressure changes will cause power to rise, however, there is no significant effect at this low RPV pressure with control rods being moved from position 36 to 48.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(1)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	GP-2		
Learning Objective:	PLOT-5060C Obj 11		
K/A System:	215003 – Intermediate Range Monitor System	Importance:	RO / SRO 3.7 / 3.7

K/A Statement:
A1.02 - Ability to predict and/or monitor changes in parameters associated with operating the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM controls including:

Reactor power indication response to rod position changes

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

25. Given the following:

- Unit 2 was initially operating at 100% power
- A complete loss of Instrument Air occurred
- T-261 "Placing The Backup Instrument Nitrogen Supply From CAD Tank In Service" has been implemented as directed by T-101 "RPV Control"

Based on these conditions, which Main Steam Isolation Valves (MSIVs), if any, have a long-term pneumatic supply?

A. Inboard ONLY

B. Outboard ONLY

C. BOTH the inboard AND outboard

D. NEITHER the inboard NOR outboard

Answer Key		
Question # 25 RO		
Choice		Basis or Justification
Correct:	A	The inboard MSIVs are supplied with Instrument N2 from both the 'A' and 'B' Instrument N2 headers; the CAD tank (T-261) backs up the 'B' Instrument N2 header. Instrument Air supplies the outboard MSIVs. Therefore, there is a long-term pneumatic source to the inboard MSIVs but not the outboard MSIVs.
Distractors:	B	The outboard MSIVs are supplied by Instrument Air.
	C	The outboard MSIVs are supplied by Instrument Air.
	D	The inboard MSIVs are supplied by Instrument N2.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
Memory			10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam (2008 NRC) ☐ Other Exam Bank	
Reference(s):	ON-119; M-333; M-351; M-372 sht1; T-261		
Learning Objective:	PLOT-5001A-7b		
K/A System	300000 Instrument Air	Importance:	RO / SRO 3.1 / 3.2
K/A Statement K1.05 - Knowledge of the connections and / or cause effect relationships between INSTRUMENT AIR SYSTEM and the following: Main Steam Isolation Valve air			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

26. Unit 2 is operating at 100% power when the Digital Feedwater Control System (DFCS) experiences a loss of one main steam flow input due to failure of the “A” Main Steam Line Flow Transmitter (DPT-2-6-51A).

Which one of the following identifies (1) the expected DFCS response, if any, and (2) what action the operator should take?

A. (1) Lowers feedwater flow to match the lower steam flow signal.
(2) Enter OT-100 “Reactor Low level”

B. (1) Automatically transfers to single element control.
(2) Verify reactor level is being maintained by DFCS per ARC 201 H-1 FEEDWATER FIELD INSTRUMENT TROUBLE.

C. (1) Automatically transfers to single element control.
(2) Manually transfer DFCS back to three-element control IAW SO 6C.1.D-2, “Reactor Feedwater Automatic Level Control”.

D. (1) Remains in three element control.
(2) Manually transfer DFCS to single-element control IAW SO 6C.1.D-2, “Reactor Feedwater Automatic Level Control”.

Answer Key		
Question # 26 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - as described in SO 6C.1.D-2, the DFCS will automatically default to single element control upon loss of a steam flow signal. ARC 201 H-1 directs the operator to verify water level is being controlled by DFCS.
Distracters:	A	INCORRECT - Plausible if candidate does not know that the DFCS will automatically shift to single element control on loss of a steam flow input and RPV level will remain the same.
	C	INCORRECT - as described in SO 6C.1.D-2, the DFCS will automatically default to single element control upon loss of a steam flow signal, however, the system will NOT allow transfer back to 3-element with a failed steam flow input.
	D	INCORRECT -Plausible if candidate does not know that the DFCS will automatically shift to single element control on loss of a steam flow input.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	SO 6C.1.D-2, ARC 201 H-1		
Learning Objective:	PLOT 5006-7i		
K/A System:	259002 Reactor Water Level Control	Importance:	RO / SRO 3.3 / 3.4

K/A Statement:

A2.01 - 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 any number of main steam flow inputs

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

27. A Unit 2 startup is in progress with the following plant conditions:

- Reactor power is 25%.
- Generator output is 200 MWe.
- Annunciator TURBINE STOP VLV. CLOSURE & CONTROL VLV FAST CLOSURE SCRAM BYPASS (210 A-2) is lit.
- A relay failure causes the Power-to-Load Unbalance lockout to actuate.
- The POWER LOAD UNBALANCE TRIP (206 B-1) annunciator goes into alarm.

Based on the above conditions, which one of the following describes the expected plant response?

A. Reactor scram ONLY.

B. Generator lockout and turbine trip ONLY.

C. Generator lockout, turbine trip and reactor scram.

D. The turbine remains online; the reactor does NOT scram.

Answer Key		
Question # 27 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - If the PLU circuit energizes, a generator lockout and turbine trip will occur. Since reactor power is < 29.5% RTP (turbine 1st stage pressure is < 138.4 psig, equiv to 28.9% RTP), a reactor scram will not occur as a result of the TSV/TCV closure. The turbine bypass valves will rapidly open, preventing a scram from high reactor pressure/neutron flux. The end result will be the reactor at 25% power with the turbine-generator off-line.
Distractors:	A	INCORRECT - The reactor does not automatically scram.
	C	INCORRECT - The reactor does not automatically scram.
	D	INCORRECT - The PLU circuit will produce a generator lockout/turbine trip.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam (2007) ☐ Other Exam Bank	
Reference(s):	GP-2, ARC 206 B-1, TS Bases 3.3.1.1		
Learning Objective:	PLOT5001B – 5f		
K/A System	245000 Main Turbine Gen. / Aux.	Importance:	RO / SRO 3.4 / 3.5
K/A Statement K1.08 - Knowledge of the physical connections and/or cause- effect relationships between MAIN TURBINE GENERATOR AND AUXILIARY SYSTEMS and the following: Reactor/turbine pressure control system			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

28. Unit 2 Backup Scram Valves (SV-2-3-140A and SV-2-3-140B) are powered from ____(1)____ and are normally ____(2)____.

A. (1) Safety-Related DC
   (2) de-energized

B. (1) Safety-Related DC
   (2) energized

C. (1) 120 VAC RPS
   (2) de-energized

D. (1) 120 VAC RPS
   (2) energized

Answer Key		
Question # 28 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - The Backup Scram Valves are powered from 125 VDC panels 2PPA (Div. I) and 2PPB (Div. II), respectively. They are normally de-energized and energize to function.
Distracters:	B	INCORRECT - Power supply is correct; the Backup Scram Valves are normally de-energized.
	C	INCORRECT - Power supply is incorrect.
	D	INCORRECT - Power supply is incorrect; the Backup Scram Valves are normally de-energized.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam: (PB 2009) ☐ Other Exam Bank: ()	
Reference(s):	E-26 sheet 1, M-1-S-54 sheet 8		
Learning Objective:	PLOT-5003A-2c		
K/A System:	201001 – CRD Hydraulic	Importance:	RO / SRO 3.5 / 3.6
K/A Statement: K2.03 – Knowledge of electrical power supplies to the following: Backup SCRAM valve solenoids.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

29. Given a constant input of contaminated water to the Unit 3 RB Floor Drain Sump AND a failure of both associated sump pumps, contamination levels in the room will:

A. rise because the sump will overflow to the room floor.

B. not be affected because the sump is sealed and excess input will backup to the source.

C. not be affected because the sump will overflow directly to the Waste Collector Tank before the top of the Floor Drain Sump is reached.

D. not be affected because the sump will overflow directly to the RB Equipment Drain Sump before the top of the Floor Drain Sump is reached.

Answer Key		
Question # 29 RO		
Choice		Basis or Justification
Correct:	D	Correct – The Reactor Building (RB) floor drain sump will overflow to the equipment sump before allowing contaminated water to overflow into the sump room.
Distractors:	A	Incorrect, Plausible…however the Reactor Building (RB) floor drain sump will overflow to the equipment sump before allowing contaminated water to overflow into the sump room.
	B	Incorrect, Plausible…however the sumps are not sealed and would overflow into the room if the overflow to the Equipment Sump did not exist.
	C	Incorrect, Plausible…however the overflow will not go directly to the Waste Collector Tank, will overflow to the equipment sump. Equipment Sump Pumps will then pump it over to the Waste Collector Tank.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(13)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	M-369 sheet 1		
Learning Objective:	PLOT5020 - 6d		
K/A System:	268000 Radwaste	Importance:	RO / SRO 2.7 / 2.8
K/A Statement:	K3.04 - Knowledge of the effect that a loss or malfunction of the RADWASTE will have on following: Drain sumps		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

30. In the event of a demand signal failure, Recirculation Pump minimum and maximum speed is limited by:

    A. Mechanical stops on the Scoop Tube ONLY

    B. Mechanical stops on the Jordan positioner ONLY

    C. Scoop Tube Lockup circuitry AND Mechanical stops on the Scoop Tube

    D. Scoop Tube Lockup circuitry AND Mechanical stops on the Jordan Positioner

Answer Key		
Question # 30 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - Recirc Pump speed is limited by scoop tube lockup circuit and mechanical stops on the Jordan positioner.
Distracters:	A	INCORRECT - No such mechanical limiter - plausible because there is a mechanical limit on the scoop tube positioner.
	B	INCORRECT - Incomplete answer - plausible because Jordan Positioner mechanical stops are part of the limiting equipment, but the scoop tube lockup circuit also effectively limits speed excursions.
	C	INCORRECT - Partially correct answer – No mechanical stops on the scoop tube - plausible because scoop tube lockup circuit is part of the limiting equipment, along with the Jordan Positioner mechanical stops.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(6)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	PLOT 5002, Pg 42 NE-00292 (Jordan Positioner Specification)		
Learning Objective:	PLOT 5002-3t		
K/A System:	202002 Recirculation Flow Control	Importance:	RO / SRO 2.9 / 2.9
K/A Statement: K4.07 - Knowledge of RECIRCULATION FLOW CONTROL SYSTEM design feature(s) and/or interlocks which provide for the following: Minimum and maximum pump speed setpoints			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

31. Fuel handling activities are being conducted in the Unit 2 Spent Fuel Pool in preparation for the upcoming refuel outage. The following conditions occur:

- A spent fuel bundle is moving to a new pool location and is currently over an area of empty fuel storage racks
- Fuel pool level has lowered by 1.5 feet for no known reason
- The Fuel Floor Area Radiation Monitor (ARM) is alarming
- The Main Control Room has entered T-103 "Secondary Containment Control"
- A GP-15 Evacuation of the Refuel Floor has been directed

Per FH-74 "Actions in Response to an Unexpected Loss of Fuel Pool, Reactor Cavity, or Equipment Storage Pool Water Inventory", prior to leaving the Refuel Floor and securing the Refueling Bridge the spent fuel bundle must:

A. be placed in its new designated storage location

B. be placed in its original storage location

C. be placed in the nearest storage location

D. remain in its present suspended location

Answer Key		
Question # 31 RO		
Choice		Basis or Justification
Correct:	C	CORRECT – Per FH-74 "Actions in Response to an Unexpected Loss of Fuel Pool, Reactor Cavity, or Equipment Storage Pool Water Inventory", prior to leaving the Refuel Floor and securing the Refueling Bridge the spent fuel bundle must be placed in the nearest available underwater storage location if time is vital. The ARM alarming and GP-15 evacuation make time vital.
Distracters:	A	INCORRECT - Per FH-74 "Actions in Response to an Unexpected Loss of Fuel Pool, Reactor Cavity, or Equipment Storage Pool Water Inventory", this action is only performed if radiological conditions permit, which is not the case since the ARM is alarming.
	B	INCORRECT - Per FH-74 "Actions in Response to an Unexpected Loss of Fuel Pool, Reactor Cavity, or Equipment Storage Pool Water Inventory", this action is only performed if radiological conditions permit, which is not the case since the ARM is alarming.
	D	INCORRECT - Per FH-74 "Actions in Response to an Unexpected Loss of Fuel Pool, Reactor Cavity, or Equipment Storage Pool Water Inventory", this action is not an option. Even if time is vital and no storage location is available, at a minimum the bundle would be lowered as low as possible before leaving the Refueling Bridge.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(12)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	FH-74		
Learning Objective:	PLOT 5019-9.k.2		
K/A System:	234000 Fuel Handling Equipment	Importance:	RO / SRO 2.9 / 3.4

K/A Statement:

K5.03 - Knowledge of the operational implications of the following concepts as they apply to FUEL HANDLING EQUIPMENT : Water as a shield against radiation

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

32. Which of the following design features ensure reactor vessel water level remains above the top of the fuel during a DBA Main Steam Line (MSL) break accident outside Primary Containment?

A. MSL Flow Restrictors ONLY

B. Main Steam Isolation Valves ONLY

C. EITHER MSL Flow Restrictors OR Main Steam Isolation Valves

D. BOTH MSL Flow Restrictors AND Main Steam Line Isolation Valves

Answer Key		
Question # 32 RO		
Choice		Basis or Justification
Correct:	D	Correct – per UFSAR Ch04, Sec 4.1, the MSL flow restrictors limit steam flow during the time required for MSIVs to close, ensuring RPV level remains above TAF, thus protecting the fuel barrier. The MSL flow restrictors are an Engineered Safety Feature.
Distractors:	A	Incorrect – see above. Plausible as the flow restrictors are part of the protection scheme.
	B	Incorrect – see above. Plausible as the MSIVs are part of the protection scheme.
	C	Incorrect – see above. Plausible as the flow restrictors and the MSIVs are each part of the protection scheme, but neither is sufficient alone.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(3)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	UFSAR Ch 04, Sec 4.1 and 4.5 and Ch 14, Sec 14.6.5		
Learning Objective:	PLOT 5001A-3a, b		
K/A System:	290002 Reactor Vessel Internals	Importance:	RO / SRO 2.9 / 3.1

K/A Statement:

K6.20 - Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR VESSEL INTERNALS : Main steam system

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	MSL Flow Restrictors are an Engineered Safety Feature.

33. Given the following:

- Unit 2 is operating at full power.
- The 2B Steam Jet Air Ejector (SJAE) was placed in service using SO 8A.6.A-2, “Placing the Standby SJAE in Service and Placing the In Service SJAE in Standby”.
- Ten minutes later the URO notes that FI-4020 (lower indication) “Off-Gas System Flow” on Panel 20C007A is reading 120 scfm and steady.

This value of Off-Gas flow is ____(1)____ than normal and will result in ____(2)____ Main Condenser vacuum.

A. (1) higher
(2) improving

B. (1) higher
(2) degrading

C. (1) lower
(2) improving

D. (1) lower
(2) degrading

Answer Key		
Question ID# 33 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - Based on the Routine Inspection, the expected range for Off-Gas System Flow is 20-45 scfm. 104 scfm is well above the expected range and based on the ACMP for Unit 2 (Elevated Main Condenser Air In-Leakage) condenser vacuum will be degrading.
Distractors:	A	INCORRECT -104 scfm is above the expected range and will correspond to degrading (not improving) condenser vacuum.
	C	INCORRECT -The normal range of off-gas flow is 20-45 scfm.
	D	INCORRECT -The normal range of off-gas flow is 20-45 scfm.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			N/A

Source Documentation		
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☒ Other Exam Bank (2008 PB Cert)
Reference(s):	SO 8A.6.A Placing Standby SJAE in Service SO 8.8.A-2 Off-Gas System Routine Inspection	
Learning Objective:	PLOT5008-9.k.7	
Knowledge/Ability K/A	271000 Off-gas	Importance: RO / SRO 3.1 / 3.1

(Description of K&A, from catalog)

A1.08 - Ability to predict and/or monitor changes in parameters associated with operating the OFFGAS SYSTEM controls including: System flow

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

34. Unit 2 was operating at full power when the following transient occurred:

- 'C' Reactor Feedwater Pump tripped.
- Feedwater flow is 13.0 E6 lbm/hr and rising slowly
- A and B RFP speed are rising slowly
- RPV level is +16 inches and lowering slowly.
- Reactor Power is 98% and steady.

Based on the above plant conditions, the Reactor Operator must immediately:

A. run both Recirculation Pumps manually back to 30% per ARC 214 B-3 (G-3) “A(B) RECIRC FLOW LIMIT”.

B. run both Recirculation Pumps manually back to 45% per ARC 214 B-3 (G-3) “A(B) RECIRC FLOW LIMIT”.

C. lower power in accordance with GP-5, Power Operations, until water level is restored.

D. perform a plant shutdown in accordance with GP-4, Manual Reactor Scram.

Answer Key		
Question # 34 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - RPV level 17" with a RFP less than 20% flow should result in Recirc runback to 45%, which has failed as evidenced by power being steady at 98%. Operator needs to manually initiate runback of Recirc Pumps to 45% speed.
Distractors:	A	INCORRECT - Runback is required, but to 45% not 30%. Plausible if candidate confuses runback setpoint necessary for condition.
	C	INCORRECT - Runback has failed as discussed above. Plausible because a GP-9 IS directed for an OT-100 (Low Reactor Level) condition. GP-5 power reduction cannot be performed fast enough to preclude scram on low level.
	D	INCORRECT - Runback has failed as discussed above. Plausible because failing to perform the runback may result in a scram on low level, but the runback is designed to preclude this scram so should be initiated FIRST.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	OT-100 Reactor Low Level, ARC 214 B-3		
Learning Objective:	PLOT-5006 Obj 3i		
K/A System:	259001 Reactor Feedwater	Importance:	RO / SRO 3.7 / 3.7
K/A Statement:	A2.01 - Ability to (a) predict the impacts of the following on the REACTOR FEEDWATER SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Pump trip		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

35. Unit 3 is operating at 70% power with the following conditions:

- Elevated Main Steam Line Radiation levels due to a suspected fuel clad leak.
- A steam leak develops in the HPCI Room that cannot be isolated.
- Reactor Building ventilation exhaust RIS-3-17-452A, B, C and D are reading 20 mr/hr.
- Refueling Floor ventilation exhaust RIS-3-17-458A, B, C and D are reading 8 mr/hr.

Which one of the following describes the response, if any, of the Reactor Building Ventilation System to the above conditions?

A. ONLY Reactor Building ventilation isolates.

B. ONLY Refueling Floor ventilation isolates.

C. Both Reactor Building and Refueling Floor ventilation isolates.

D. Neither Reactor Building nor Refueling Floor ventilation isolates.

Answer Key		
Question # 35 RO		
Choice		Basis or Justification
Correct:	C	CORRECT - Both Reactor Building and Refuel Floor Ventilation isolate (Group 3 signal) when either Reactor Building ventilation exhaust RIS-3-17-452A or C AND B or D are reading ≥ 16 mr/hr OR Refueling Floor ventilation exhaust RIS-3-17-452A or C AND B or D are reading ≥ 16 mr/hr.
Distractors:	A	INCORRECT - Both Reactor Building and Refuel Floor Vent isolates. Plausible if candidate believes ONLY RB will isolate due to higher Reactor Building Hi Rad condition.
	B	INCORRECT - Plausible if candidate believes that Reactor Building and Refueling Floor ventilation hi radiation setpoints are different.
	D	INCORRECT - Both Reactor Building and Refuel Floor Ventilation isolate (Group 3 signal) when either Reactor Building ventilation exhaust RIS-3-17-452A or C AND B or D are reading ≥ 16 mr/hr OR Refueling Floor ventilation exhaust RIS-3-17-452A or C AND B or D are reading ≥ 16 mr/hr.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(9)

Source Documentation			
Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	ARC 318 D-4, TS Table 3.3.6.1-1		
Learning Objective:	PLOT5040B-3a		
K/A System:	288000 Plant Ventilation	Importance:	RO / SRO 3.8 / 3.8
K/A Statement:	A3.01 - Ability to monitor automatic operations of the PLANT VENTILATION SYSTEMS including: Isolation/initiation signals		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

36. The following conditions are present on Unit 2 following a LOCA:

- Recirc Pumps are tripped
- Reactor level is -25 inches and lowering
- Reactor pressure is 850 psig and lowering
- Drywell pressure is 8 psig and rising
- Drywell temperature is 250 degrees F and rising
- Torus level is 19 feet and rising
- DWCW return header pressure is 26 psig
- Drywell cooling fans are tripped
- The "B" Loop of RHR is NOT available
- SYSTEM I RHR CONTAINMENT SPRAY SELECT IN MANUAL OVERRIDE (224 D-2) is in alarm
- Performance of T-204 "Initiation of Containment Sprays Using RHR" has just been directed.

Based on the above conditions, containment Spray logic ____(1)____ spray initiation. Procedurally the above conditions allow ____(2)____.

NOTE: T-223 Figure 1 "DWCW Saturation Curve" is PROVIDED ON THE NEXT PAGE.

A. (1) permits
   (2) spraying the Torus ONLY per T-204 "Initiation of Containment Sprays Using RHR"

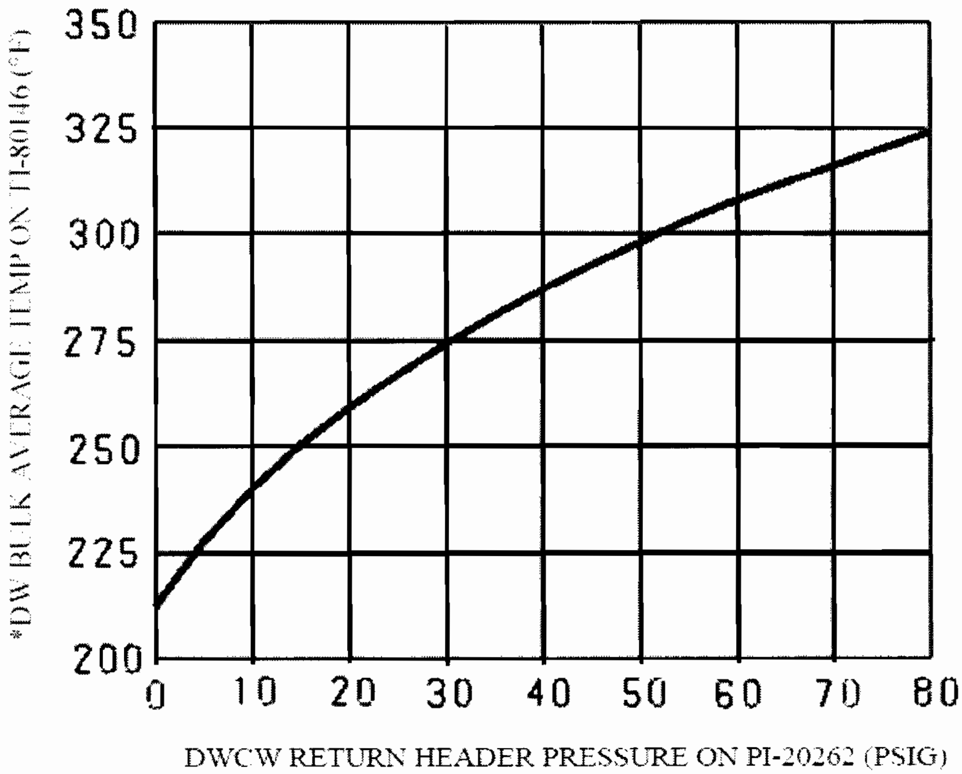
B. (1) permits
   (2) spraying the Drywell and Torus per T-204 "Initiation of Containment Sprays Using RHR"

C. (1) does NOT permit
   (2) restoring Drywell Cooling per T-223 "Drywell Cooler Fan Bypass"

D. (1) does NOT permit
   (2) spraying the containment per T-205 "Initiation of Containment Sprays using HPSW"

FIGURE 1

DRYWELL CHILLED WATER (DWCW) SATURATION CURVE



* IF TI-80146 is out of service,
THEN use RT-O-40C-530-2 to determine DW Bulk Average Temperature.

Answer Key		
Question # 36 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - Per T-102 “Primary Containment Control” with torus level at 19 feet, drywell spray is not permitted due to covering the vacuum breakers (torus spray is not allowed if torus level ≥ 21 feet).
Distractors:	B	INCORRECT - Torus (but not Drywell) sprays are permitted. Plausible because applicant may NOT recognize that with torus level at 19 feet, drywell spray is not permitted due to covering vacuum breakers (torus spray is not allowed if torus level ≥ 21 feet).
	C	INCORRECT - logic to spray is satisfied. Plausible if candidate does not understand logic inputs.
	D	INCORRECT - logic to spray is satisfied. Plausible if candidate does not understand logic inputs.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: ☐ Other Exam Bank: ()	
Reference(s):	ARC-224 D-2; T-102		
Learning Objective:	PLOT-5010-4s		
K/A System:	230000 – RHR/LPCI: Torus/Suppression Pool Spray Mode	Importance:	RO / SRO 3.6 / 3.3
K/A Statement: A4.09 – Ability to manually operate and/or monitor in the control room: Indicating lights and alarms.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

37. Unit 2 is operating at 100% power

- Drywell Pressure unexpectedly rises to 1.2 psig and is trending up.
- OT-101, "High Drywell Pressure" has been entered.

The operating crew must IMMEDIATELY:

A. perform GP-3, "Normal Plant Shutdown".

B. perform GP-4, "Manual Reactor Scram".

C. scram and enter T-101, "RPV Control" ONLY.

D. scram and enter T-101 "RPV Control" AND T-102 "Primary Containment Control".

Answer Key		
Question # 37 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - A GP-4 Manual Scram is required at 1.2 psig in Drywell.
Distractors:	A	INCORRECT - Not required unless both seals on a Recirc Pump fail. However, requirement to scram at 1.2 psig still applies.
	C	INCORRECT - T-101 is not required to be entered until drywell pressure reaches 2.0 psig.
	D	INCORRECT - T-101 and T-102 are not required to be entered until drywell pressure reaches 2.0 psig.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(10)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☐ Previous NRC Exam: ☐ Other Exam Bank: ()	
Reference(s):	OT-101		
Learning Objective:	PLOT1540-6		
K/A System:	223001 Primary CTMT and Aux.	Importance:	RO / SRO 4.6 / 4.4
K/A Statement:	2.4.49 - Emergency Procedures / Plan: Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

38. Unit 2 is at 100% power when the 2A RPS M/G Set output breakers spuriously trip.

What effect does this malfunction have on the '2A' Rod Block Monitor (RBM) AND associated Operator Display Assembly (ODA)?

A. De-energize the '2A' RBM AND associated ODA

B. De-energize the '2A' RBM ODA ONLY.

C. De-energize '2A' RBM ONLY

D. <u>NEITHER</u> '2A' RBM <u>OR</u> associated ODA will de-energize.

Answer Key		
Question # 38 RO		
Choice		Basis or Justification
Correct:	C	CORRECT – Loss of 2A RPS bus de-energizes the 2A RBM, but the associated ODA remained powered because power is fed from 120 V uninterruptible power (20Y50 panel) which is powered from either emergency power or DC backup. Loss of the 2A RPS bus will not impact this supply.
Distractors:	A	INCORRECT - Plausible if candidate does not understand above described power supply arrangement.
	B	INCORRECT - Plausible if candidate does not understand above described power supply arrangement.
	D	INCORRECT - Plausible if candidate does not understand above described power supply arrangement.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(6)

Source Documentation		
Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	PLOT-5060, M-1-S-34 Sht 38	
Learning Objective:	PLOT5060-7b	
K/A System:	215002 Rod Block Monitor	Importance: RO / SRO 3.0 / 3.2
K/A Statement:	K6.01 - Knowledge of the effect that a loss or malfunction of the following will have on the ROD BLOCK MONITOR SYSTEM : RPS	
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		

39. Unit 3 is operating at 100% power.

- The Main Generator automatic voltage regulator is in control.
- A grid disturbance results in steadily lowering grid voltage.

How will the Main Generator initially respond to the above conditions?

MWatts will ____(1)____.
MVars will ____(2)____.
Stator Winding Current will ____(3)____.

A. (1) rise
(2) lower
(3) rise

B. (1) remain steady
(2) rise
(3) rise

C. (1) lower
(2) rise
(3) remain steady

D. (1) remain steady
(2) remain steady
(3) rise

Answer Key

Question # 39 RO

Choice		Basis or Justification
Correct:	B	CORRECT – Lowering Grid Voltage will cause the automatic voltage regulator to raise generator terminal voltage (overexcitation) in an attempt to maintain grid voltage steady. This will result in additional VARS, which raises stator current. MWs remain unchanged.
Distractors:	A	INCORRECT – see explanation above – MWs will not change, MVARs will rise.
	C	INCORRECT – see explanation above – MWs will not change, stator current will rise.
	D	INCORRECT – see explanation above – MVARs will rise.

Psychometrics

Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(4)

Source Documentation

Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	PLORT 12-04D		
Learning Objective:	PLOT-5050 Obj 9k		
K/A System:	700000 Generator Voltage and Electric Grid Disturbances	Importance:	RO / SRO 3.3 / 3.4
K/A Statement:	AK1.02 - Knowledge of the operational implications of the following concepts as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES and the following: Over-excitation.		

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

40. Per T-102 Bases, which one of the following describes (1) the drywell high pressure limit and (2) the consequence of exceeding this limit?

A. (1) 60 psig
(2) inability to operate SRVs

B. (1) 60 psig
(2) loss of containment integrity

C. (1) 62 psig
(2) inability to operate SRVs

D. (1) 62 psig
(2) loss of containment integrity

Answer Key		
Question # 40 RO		
Choice		Basis or Justification
Correct:	A	CORRECT – 60 psig is the PCPL-A limit – as discussed in the Bases, this supports ability to operate SRVs, and is "utilized to ensure the pressure capability of the Primary Containment". (See PCPL-A Bases discussion). If containment pressure is >60 psig, and Instrument Air supplying containment pneumatics at the minimum pressure of 85 psig, then there may not be sufficient differential pressure across the SRV bellows to open the valve.
Distractors:	B	INCORRECT - Plausible as 60 psig is close to the Containment Design pressure of 62 psig.
	C	INCORRECT - Plausible as 60 psig is close to the Containment Design pressure of 62 psig.
	D	INCORRECT - Plausible as 60 psig is close to the Containment Design pressure of 62 psig.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(9)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	T-102 Bases, PCPL-A Bases in T-BAS		
Learning Objective:	PLOT 5007-5a		
K/A System:	295024 – High Drywell Pressure	Importance:	RO / SRO 4.1 / 4.2

K/A Statement:

EK1.01 - Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL PRESSURE : Drywell integrity: Plant-Specific

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

41. The Plant Reactor Operator (PRO) has just received a fire alarm from the Turbine Building. The Fire Brigade has been dispatched.

In accordance with FF-01 “Fire Brigade”, the PRO is required to call for OFFSITE fire fighting support _______________.

A. immediately if the fire spreads into two or more T-300 fire areas

B. immediately if plant safe shutdown systems or ECCS are in jeopardy

C. after 15 minutes if the Incident Commander reports the fire is <u>NOT</u> extinguished

D. after 20 minutes if the Incident Commander reports the fire is <u>NOT</u> under control

Answer Key		
Question # 41 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - per FF-01 "Fire Brigade".
Distractors:	A	INCORRECT - The size of the fire is not defined by FF-01.
	B	INCORRECT - This is a requirement from ON-114 to scram the reactor.
	C	INCORRECT - This is associated with the time limit for performing EAL classifications.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation		
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam (PB 2008) ☐ Other Exam Bank
Reference(s):	FF-01 Notes	
Learning Objective:	PSEG-0214L-03	
K/A System	600000 – Plant Fire On Site	Importance: RO / SRO 2.9 / 3.1
K/A Statement AK1.02 – Knowledge of the operational implications of the following concepts as they apply to Plant Fire On-Site: Fire Fighting.		
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		

42. The following drywell conditions exist on Unit 2 following a small-break LOCA:

- Drywell temperature is 270 degrees F and rising slowly
- Drywell pressure is 8 psig and rising slowly

Which one of the following is correct regarding initiation of Drywell sprays for these conditions?

Drywell Spray Initiation Limit (DWSIL) Curve DW/T-2 is PROVIDED ON THE NEXT PAGE.

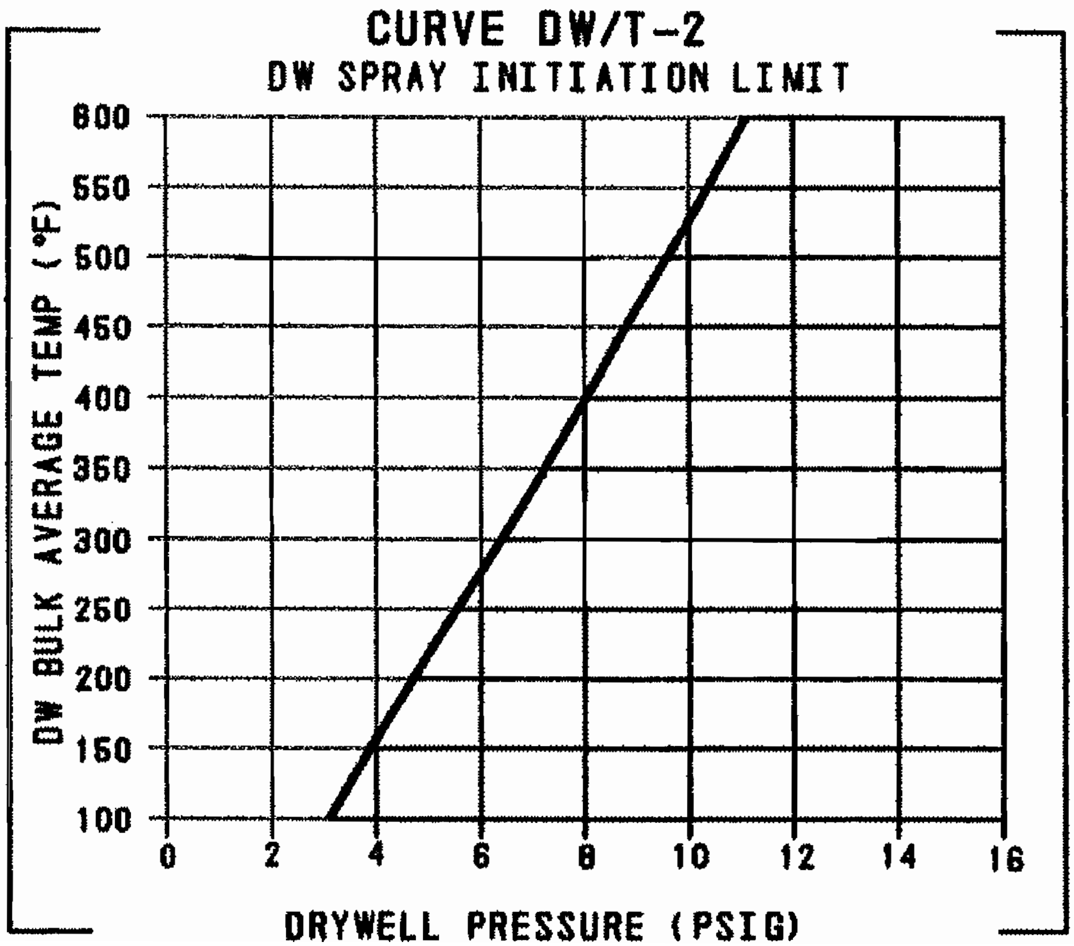
Initiation of drywell sprays in order to control drywell temperature will initially result in a ___(1)___ reduction in drywell pressure due to ___(2)___ cooling of the drywell atmosphere.

A. (1) slow
(2) convective

B. (1) slow
(2) evaporative

C. (1) rapid
(2) convective

D. (1) rapid
(2) evaporative


CURVE DW/T-2
DW SPRAY INITIATION LIMIT
DW BULK AVERAGE TEMP (°F)
600
550
500
450
400
350
300
250
200
150
100
0
2
4
6
8
10
12
14
16
DRYWELL PRESSURE (PSIG)

Answer Key

Question # 42 RO

Choice		Basis or Justification
Correct:	D	CORRECT - Based on the given conditions, drywell atmosphere is super-heated. Per T-102 Bases for step DW/T-13, initiation of sprays will initially result in evaporative cooling and rapid pressure reduction, followed by convective cooling and controllable pressure reduction. Purpose of DWSIL curve limitation is to ensure that even if an evaporative cooling condition exists, the capacity of the Torus to Drywell vacuum breakers is not exceeded.
Distracters:	A	INCORRECT - see above. Plausible if candidate believes that the DWSIL curve is based on preventing conditions that would result in evaporative cooling and rapid pressure reduction.
	B	INCORRECT - see above. Plausible if candidate believes that the conditions would result in evaporative cooling, but that the pressure reduction would be slow, indicating the candidate has a knowledge deficiency in fundamentals of fluid thermodynamics.
	C	INCORRECT - see above. Plausible if candidate believes that the conditions would result in convective cooling, but that the pressure reduction would be rapid, indicating the candidate has a knowledge deficiency in fundamentals of fluid thermodynamics.

Psychometrics

Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(14)

Source Documentation

Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	T-102 Bases, Step DW/T-13	
Learning Objective:	PLOT2102 DBIG – Obj 6	
K/A System:	295028 – High Drywell Temperature	Importance: RO / SRO 3.7 / 4.1

K/A Statement:

EK2.01 – Knowledge of the interrelations between High Drywell Temperature and the following: Drywell Spray: Mark I&II

REQUIRED MATERIALS:	**Steam Tables**
Notes and Comments:	

43. With both Recirculation Pumps running at a speed of approximately 1400 rpm, a sustained loss of Reactor Building Closed Cooling Water (RBCCW) occurs.

In accordance with ON-113 “Loss of RBCCW”, the recirculation pumps _____________________.

A. must be tripped immediately

B. must be tripped within 1 hour

C. may remain running provided CRD seal purge flow is maintained

D. may remain running provided pump temperatures remain within procedural limits

Answer Key

Question # 43 RO

Choice		Basis or Justification
Correct:	D	CORRECT - Per step 2.8 of ON-113, pumps can remain in service if below temperature limits.
Distracters:	A	INCORRECT - This action is not required by ON-113. Plausible because loss of RBCCW could lead to overheated bearings on the Recirc Pumps, necessitating tripping of the pumps.
	B	INCORRECT - Not limited by time in ON-113. Plausible because loss of RBCCW could lead to overheated bearings on the Recirc Pumps, necessitating tripping of the pumps.
	C	INCORRECT - Not directed by ON-113. Plausible if candidate incorrectly believes that seal purge flow provides adequate cooling to recirc pump seals.

Psychometrics

Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation

Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	ON-113	
Learning Objective:	PLOT-DBIG-1550 Obj 2	
K/A System:	295018 – Partial or Complete Loss of Component Cooling Water	Importance: RO / SRO 3.4 / 3.6

K/A Statement:

AK2.02 – Knowledge of the interrelations between Partial or Complete Loss of Component Cooling Water and the following: Plant Operations.

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

44. A transient occurred on Unit 3 that resulted in the following plant parameters:

- Reactor pressure: 900 psig
- Drywell pressure: 18 psig
- Drywell temperature: 235 degrees F
- Torus pressure: 16 psig
- Torus temperature: 145 degrees F
- Torus level: 15 feet

Which one of the following conditions will cause the margin to the Heat Capacity Temperature Limit (HCTL) to be reduced?

A. Torus level lowers

B. RPV pressure lowers

C. Torus temperature lowers

D. Drywell temperature rises

Answer Key		
Question # 44 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - Lowering Torus level will cause the HCTL to be more restrictive.
Distractors:	B	INCORRECT - Lowering RPV pressure will cause the HCTL to be less restrictive.
	C	INCORRECT – A lowering Torus temperature will raise the margin to HCTL.
	D	INCORRECT - Drywell temperature has no effect on HCTL.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(9)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam (2008 NRC) ☐ Other Exam Bank	
Reference(s):	TRIP/SAMP Curves, Table and Limits – Bases		
Learning Objective:	PLOT-2102DBIG-6		
K/A System	295026 – Suppression Pool High Water Temperature	Importance:	RO / SRO 3.5 / 3.7
K/A Statement EK2.06 – Knowledge of the interrelations between Suppression Pool High Water Temperature and the following: Suppression Pool Level.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

45. The Shift Supervisor has decided to abandon the Main Control Room and has entered procedure SE-10 “Alternative Shutdown”.

Prior to leaving the Main Control Room, the reactor is scrammed to:

A. ensure that Drywell pressure does not go above 2 psig

B. facilitate depressurizing the RPV at less than 80°F/hr

C. allow RPV level control with Condensate

D. avoid lifting any SRVs until control is established at the Alternative Shutdown Panel

Answer Key		
Question # 45 RO		
Choice		Basis or Justification
Correct:	B	CORRECT – a main goal of SE-10 "Alternative Shutdown" is to take the RPV to a cold shutdown condition. This cannot be accomplished without first scramming the reactor.
Distractors:	A	INCORRECT – Not a reason for scramming the reactor during performance of SE-10 "Alternative Shutdown". It is anticipated that drywell pressure will rise grater than 2 psig, especially if there is a loss of off-site power, due to lack of drywell cooling.
	C	INCORRECT – Condensate pumps are secured prior to scramming the reactor during performance of SE-10 "Alternative Shutdown". RPV level control will be with HPCI.
	D	INCORRECT – SE-10 strategy includes closing the MSIVs and allowing the SRVs to open on setpoint until the crew can take positive control of SRV operation from the Alternative Shutdown Panel.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(9)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank
Reference(s):	UFSAR Chapter 5	
Learning Objective:	PLOT 1555 DBIG	
K/A System	295016 – Control Room Abandonment	Importance: RO / SRO 4.1 / 4.2
K/A Statement		
AK3.01 – Knowledge of the reasons for the following responses as they apply to CONTROL ROOM ABANDONMENT: Reactor SCRAM		
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		

46. Unit 2 has an ATWS transient in progress.

- RPV level is being maintained in band of -195 inches to -172 inches using HPCI.
- The CRS has assigned injection of 21% of Standby Liquid Control (SBLC) Tank Level as a critical parameter milestone.

When the SBLC milestone is reached, then:

A. RPV level can be raised to +5 to +35 inches and the reactor will remain shutdown under hot standby conditions.

B. RPV pressure can be reduced and the reactor will remain shutdown under hot standby conditions.

C. RPV level can be raised to +5 to +35 inches and the reactor will remain shutdown under all conditions.

D. RPV pressure can be reduced and the reactor will remain shutdown under all conditions.

Answer Key		
Question # 46 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - Per T-117, Step LQ-31, LQ-33 and NOTE #33, 21% of SBLC tank is Hot Shutdown Boron Weight – achieving this milestone permits raising RPV level to +5 to +35 inches, which is desired at this point to promote mixing and distribution of the boron in the RPV.
Distractors:	B	INCORRECT - Per T-101, Step RC/P-14, depressurization during an ATWS is not performed until the ENTIRE SBLC tank has been injected – Plausible if candidate confuses level and pressure guidance.
	C	INCORRECT - Plausible if candidate confuses Hot Shutdown Boron Weight (21% of SBLC Tank) with Cold Shutdown Boron Weight (Entire SBLC Tank Volume)
	D	INCORRECT - Plausible if candidate confuses Hot Shutdown Boron Weight (21% of SBLC Tank) with Cold Shutdown Boron Weight (Entire SBLC Tank Volume)

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(9)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank	
Reference(s):	TRIP/SAMP Curves, Table and Limits – Bases, T-117 and Bases, T-101 and Bases – Definition of "Hot Shutdown Boron Weight"		
Learning Objective:	PLOT-DBIG-2117-6,		
K/A System	295037 SCRAM Conditions Present and Reactor Power Above APRM Downscale or Unknown	Importance:	RO / SRO 3.2 / 3.7
K/A Statement:	EK3.04 - Knowledge of the reasons for the following responses as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : Hot shutdown boron weight		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

47. Unit 3 plant conditions are as follows:

- Mode 5
- Core Shuffle 1 is in progress
- A leaking fuel bundle is dropped in the Spent Fuel Pool
- Refueling Floor ARMs are in alarm
- Reactor Building and Refueling Floor Ventilation Systems isolate
- Standby Gas Treatment System initiates

For the above conditions, which one of the following describes the reason for the Reactor Building and Refueling Floor Ventilation Systems isolations?

A. Prevents an off-site radiation release

B. Provides a filtered and elevated release

C. Maintains radiation exposure to station personnel ALARA

D. Prevents ductwork failure by routing the release through hardened ducts

Answer Key		
Question # 47 RO		
Choice		Basis or Justification
Correct:	B	CORRECT – Aligning the release through the SBGT System provides filtration and elevates the release through the main stack versus the vent stack
Distractors:	A	INCORRECT – This does not prevent a release but lowers the radioactivity of the release and elevates it as described above.
	C	INCORRECT – The specified condition is related to radiation alarms. The radiation dose to station personnel is not changed by the isolation, however, the severity of the release to the public is minimized.
	D	INCORRECT – This distractor is based on a procedural caution about how SBGT is aligned, but is not the basis for the isolation.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(9)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☒ Other Exam Bank: (LORT)	
Reference(s):	UFSAR Chapter 5		
Learning Objective:	PLOT-5007G-12		
K/A System:	295023 Refueling Accident	Importance:	RO / SRO 3.3 / 3.6
K/A Statement: AK3.03 - Knowledge of the reasons for the following responses as they apply to REFUELING ACCIDENTS : Ventilation isolation			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

48. Unit 2 is operating at 100% power.

EHC Logic fails such that Load Set fails towards 0%.

Which one of the following describes the EHC System, turbine, and reactor pressure response?

Control Valves will __(1)__,
Reactor pressure will initially __(2)__,
Bypass Valves will __(3)__.

A. (1) close
(2) lower
(3) open

B. (1) open
(2) lower
(3) remain closed

C. (1) open
(2) rise
(3) open

D. (1) close
(2) rise
(3) open

Answer Key		
Question # 48 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - Load set signal enters a low value gate, causing control valves to close. With the reactor at rated power, pressure will initially rise and bypass valves will open.
Distractors:	A	INCORRECT – Reactor pressure will initially rise on Control Valve closure, not lower.
	B	INCORRECT – All 3 parts of this distractor are opposite to the real system response.
	C	INCORRECT – Control Valve closure will occur, not opening.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(4)

Source Documentation		
Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank:
Reference(s):	PLOT-5001DL; SO 1B.1.A	
Learning Objective:	PLOT-5001DL Obj 6a	
K/A System:	295025 High Reactor Pressure	Importance: RO / SRO 3.8 / 3.8
K/A Statement:	EA1.02 - Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE: Reactor/turbine pressure regulating system	
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:	Hybrid of ILT and LORT bank questions referenced above	

49. Unit 2 is on line operating at 25% power with both unit auxiliary buses being supplied by the main generator.

- The Plant Reactor Operator transfers loads on the #1 Unit Aux bus to the S/U feed (#11 breaker shut) using procedure SO 53.A-2 "Transferring Unit 2 Aux loads from Unit Auxiliary Transformer to Startup Feed Buses".

- Prior to transferring the #2 Unit Aux bus a Main Generator lockout occurs on generator Differential Overcurrent.

Assuming no further operator action, based on the above conditions, what is the status of the following Main Generator components?

1. Generator output breakers will ________.
2. Exciter field breaker will _________.
2. Voltage regulator will __________.

A. remain closed,
open,
transfer from manual to auto

B. open,
remain closed,
transfer from auto to manual

C. open,
open,
transfer from auto to manual

D. remain closed,
remain closed,
transfer from manual to auto

Answer Key		
Question # 49 RO		
Choice		Basis or Justification
Correct:	C	CORRECT – on a main generator lockout trip, both output breakers will open, the exciter field breaker will open, and the voltage regulator will transfer from auto to manual. In the stem of this question, having the unit initially at 25% power with the #1 Aux Bus transferred to a Startup Feed, is there to sway the candidate to thinking that this condition affects main generator trip response. It does not.
Distractors:	A	INCORRECT – see C above
	B	INCORRECT – see C above
	D	INCORRECT – see C above

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(x)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	ARC 220 B-1 2 Gen Relays		
Learning Objective:	PLOT-5050 Obj 3		
K/A System:	295005 Main Turbine Generator Trip	Importance:	RO / SRO 2.7 / 2.8
K/A Statement:	AA1.04 - Ability to operate and/or monitor the following as they apply to MAIN TURBINE GENERATOR TRIP: Main generator controls		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

50. A reactor startup and power ascension is in progress on Unit 3. Reactor power is 18%.

The Turbine Generator has been synchronized to the grid and loaded when the following transient occurs:

- The running EHC pump trips.
- The standby EHC pump fails to start.
- The Main Turbine trips on low EHC pressure.

Based on the above conditions, which one of the following is correct regarding pressure control and plant response?

A. Six Turbine Bypass valves will open and remain open to control pressure and NO reactor scram is expected to occur.

B. Six Turbine Bypass valves open for several minutes to control pressure and then the reactor will scram on high pressure.

C. Reactor scrams IMMEDIATELY on high pressure/power and NO Turbine Bypass valves open due to the loss of EHC hydraulics.

D. Reactor scrams IMMEDIATELY on the turbine trip and Turbine Bypass valves will open for a short time following the scram.

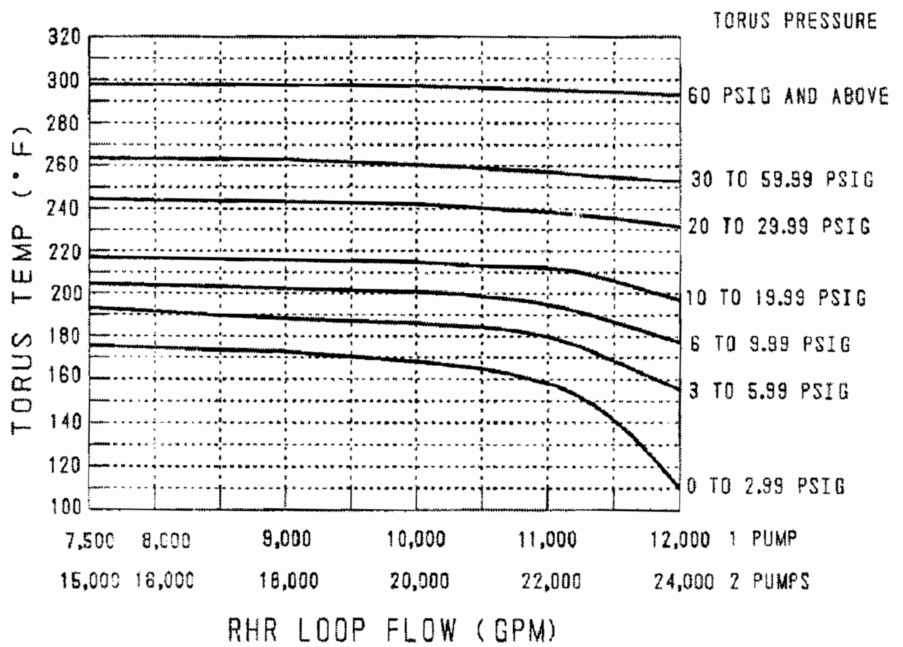
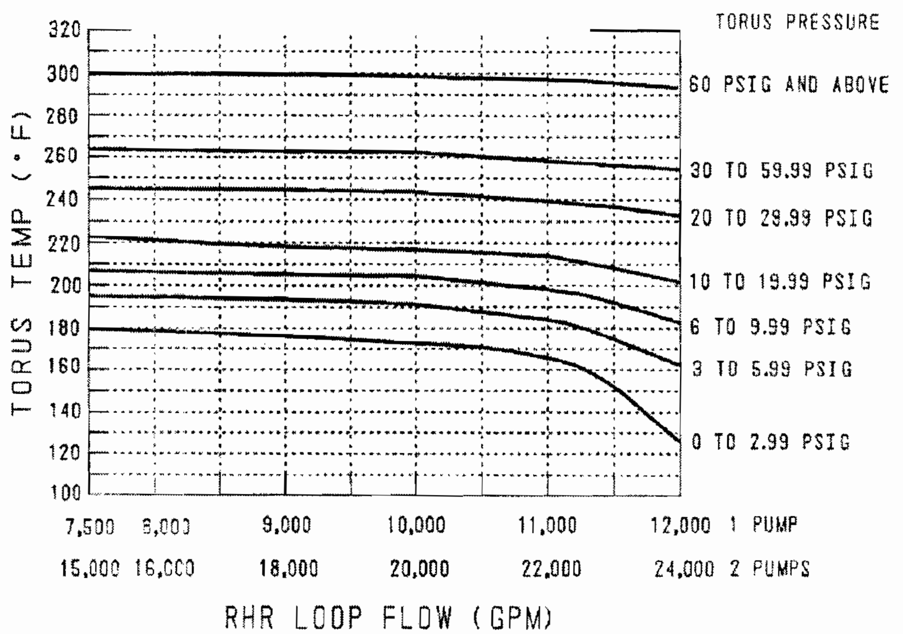
Answer Key		
Question # 50 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - Scram on turbine trip is bypassed at this power level. 6 BPVs are expected to open for 18% power. BPVs have separate accumulators to allow opening for some time without EHC fluid pressure. When accumulator pressure gets low the BPVs will close and reactor pressure will begin to rise to the high pressure scram setpoint.
Distractors:	A	INCORRECT - BPVs accumulators will eventually run out due to design valve actuator leakage.
	C	INCORRECT - With bypass valve operation, an immediate reactor scram is not expected at this power level.
	D	INCORRECT - Scram on turbine trip is bypassed at this power level.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation				
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank		☒ Previous NRC Exam (PB 2002) ☐ Other Exam Bank	
Reference(s):	ARC 206 C-5			
Learning Objective:	PLOT5001B – 5f			
K/A System	295006 SCRAM		Importance:	RO / SRO 3.7 / 3.7
K/A Statement	AA1.03 - Ability to operate and/or monitor the following as they apply to SCRAM : Reactor/turbine pressure regulating system			
REQUIRED MATERIALS:	**NONE**			
Notes and Comments:				

51. Using the figures on the next page, which of the following sets of conditions allow safe operation of a loop of RHR in the LPCI mode at <u>all</u> flow rates?

	Torus Level	Torus Pressure	Torus Temperature
A.	11 feet	9 psig	200 deg F
B.	12 feet	5 psig	195 deg F
C.	13 feet	11 psig	220 deg F
D.	14 feet	7 psig	180 deg F

TORUS LEVEL	RHR
10.5 FEET TO 12.29 FEET	
12.3 FEET TO 14.49 FEET	

Answer Key		
Question # 51 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - This meet the criteria of the RHR NPSH curves for two-pump operation at all flow rates, as shown on T-102, Sheet 3.
Distractors:	A	INCORRECT - This does not meet the criteria of the RHR NPSH curves for two-pump operation at all flow rates, as shown on T-102, Sheet 3. Operation is in the unsafe region of the curve when flow is above ~20,000 gpm. Plausible if candidate plots incorrectly.
	B	INCORRECT - This does not meet the criteria of the RHR NPSH curves for two-pump operation at all flow rates, as shown on T-102, Sheet 3. Operation is in the unsafe region of the curve at all flow rates. Plausible if candidate plots incorrectly.
	C	INCORRECT - This does not meet the criteria of the RHR NPSH curves for two-pump operation at all flow rates, as shown on T-102, Sheet 3. Operation is in the unsafe region of the curve when flow is above ~17,000 gpm. Plausible if candidate plots incorrectly.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(5)

Source Documentation			
Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	T-102 Sheet 3 (embedded in question)		
Learning Objective:	PLOT-2000 Obj 11C		
K/A System:	295030 Low Suppression Pool Water Level	Importance:	RO / SRO 3.9 / 3.9
K/A Statement:	EA2.02 - Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL: Suppression pool temperature		
REQUIRED MATERIALS:	**None**		
Notes and Comments:			

52. Unit 2 was operating at 100% power.

- The jet pump mixer for Jet Pump '11' becomes displaced.

This failure will cause a sudden RISE in:

A. Core Plate Flow

B. DP on Jet Pump '12'

C. 'A' Recirc Loop Drive Flow

D. 'B' Recirc Pump Speed

Answer Key		
Question # 52 RO		
Choice		Basis or Justification
Correct:	C	CORRECT – Jet Pump 11 is in the 'A' Recirc Loop
Distractors:	A	INCORRECT - Core Plate flow will LOWER due to drop in core flow
	B	INCORRECT – Jet Pump 12 shares a riser with JP 11, so its DP will LOWER
	D	INCORRECT - Failed Jet Pump is not in this loop. "B" Recirc Speed will be unaffected.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(2)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	ON-100		
Learning Objective:	PLOT-1550 DBIG Obj 4		
K/A System:	295001 Partial or Complete Loss of Forced Core Flow Circulation	Importance:	RO / SRO 3.0 / 3.1
K/A Statement:	AA2.04 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : Individual jet pump flows		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

53. Unit 2 is experiencing a loss of Instrument Air transient.

Per procedure ON-119 “Loss of Instrument Air”, the Backup Instrument Air Compressor 2DK001 will automatically start AND the Backup Air Control Valve (AO-80250D) will automatically open at ___(1)___ to supply the ___(2)___ Instrument Air header.

A. (1) 80 psig
(2) A ONLY

B. (1) 90 psig
(2) B ONLY

C. (1) 80 psig
(2) A and B

D. (1) 90 psig
(2) A and B

Answer Key

Question # 53 RO

Choice		Basis or Justification
Correct:	B	CORRECT - Per ON-119 Note on page 3, the Backup Instrument Air Compressor 2DK001 and AO-80250D will open when both the 'A' and 'B' Instrument Air receiver pressures drop to 90 psig, and will supply the "B" header ONLY.
Distractors:	A	INCORRECT – 80 psig is a plausible distractor based on ON-119 referencing 80 psig as pressure to check instrument air dryer operation.
	C	INCORRECT – 80 psig is a plausible distractor based on ON-119 referencing 80 psig as pressure to check instrument air dryer operation and a block valve is normally closed which prevents feeding the 'A' header.
	D	INCORRECT – 80 psig is a plausible distractor based the fact that a block valve is normally closed which prevents feeding the 'A' header.

Psychometrics

Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(4)

Source Documentation

Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank
Reference(s):	ON-119	
Learning Objective:	PLOT-5036-4a	
K/A System	295019 Partial or Total Loss of Inst. Air	Importance: RO / SRO 3.5 / 3.6

K/A Statement

AA2.01 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR: Instrument air system pressure

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

54. Per T-104 “Radioactivity Release Control” Bases, the ____(1)____ ventilation system will NOT be restarted if T-200 “Primary Containment Venting” is in progress due to ____(2)____?

A. (1) PEARL Building
(2) Radioactive Samples being handled here

B. (1) Radwaste Building
(2) Ventilation intake location

C. (1) PEARL Building
(2) Ventilation intake location

D. (1) Radwaste Building
(2) Radioactive Samples being handled here

Answer Key		
Question # 54 RO		
Choice		Basis or Justification
Correct:	B	CORRECT – T-104 Bases, Step RR-6 directs NOT restarting Radwaste Building ventilation if T-200 is in progress due to several of the vent paths having the potential of discharging radioactive materials into the vicinity of the Radwaste Building ventilation intake.
Distracters:	A	INCORRECT – PEARL Building ventilation is restarted, specifically because of radioactive sample handling.
	C	INCORRECT – PEARL Building ventilation is restarted, because of radioactive sample handling.
	D	INCORRECT – T-104 Bases, Step RR-6 directs NOT restarting Radwaste Building ventilation if T-200 is in progress due to several of the vent paths having the potential of discharging radioactive materials into the vicinity of the Radwaste Building ventilation intake, NOT because of sampling.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	T-104 Bases		
Learning Objective:	PLOT-1560-9		
K/A System:	295038 High Off-site Release Rate	Importance:	RO / SRO 3.7 / 4.7
K/A Statement: 2.4.6 - Emergency Procedures/Plan: Knowledge of EOP mitigation strategies.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

55. Unit 2 was in Mode 3, with Shutdown Cooling in service, preparing for a refueling outage when the station experienced a loss of all AC power (Station Blackout).

The following conditions exist on Unit 2:

Instrument	Reading
• Fuel Zone Range on LR-2-2-3-110B (Panel 20C003-02)	+ 10 inches
• Wide Range on LR-2-2-3-110A (Panel 20C004C)	+ 20 inches
• Narrow Range on LI-2-6-094B (Panel 20C005)	0 inches
• Wide Range on LI-2-2-3-85A (Panel 20C005)	-15 inches

Using the SE-11 Attachment C "Instrument List" ATTACHED SEPERATELY, determine which of the following statements is true.

Actual reactor water level:

A. cannot be determined

B. is +20 inches

C. is 0 inches

D. is -15 inches

Answer Key		
Question # 55 RO		
Choice		Basis or Justification
Correct:	D	CORRECT – LI-2-2-3-85A is a post-accident monitoring instrument and per SE-11 Attachment C "Instrument List", is powered by DC following a loss of offsite power and will continue to accurately indicate reactor water level.
Distractors:	A	INCORRECT – RPV level CAN be determined. LI-2-2-3-85A is a post-accident monitoring instrument and per SE-11 Attachment C "Instrument List", is powered by DC following a loss of offsite power and will continue to accurately indicate reactor water level.
	B	INCORRECT – LR-2-2-3-110A is NOT a post-accident monitoring instrument and per SE-11 Attachment C "Instrument List", is not powered by DC following a loss of offsite power.
	C	INCORRECT – While Narrow Range LI-2-6-094B is powered by DC following a loss of offsite power, its range is 0 inches to +60 inches and is indicating at minimum value due to actual reactor water level being < 0 inches.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank ()	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	SE-11 Attachment C	
Learning Objective:	PLOT 1556 Obj 2.b	
K/A System:	295021 Loss of Shutdown Cooling	Importance: RO / SRO 3.7 / 3.9
K/A Statement:	2.4.3 - Emergency Procedures / Plan: Ability to identify post-accident instrumentation.	
REQUIRED MATERIALS:	**SE-11 Attachment C**	
Notes and Comments:		

56. Due to a loss of DC power, the Unit 2 RCIC system is being operated locally, using SE-13.1-2, "RCIC Manual Operations on Loss of 125/250VDC Bus 2DA-W-A ".

For these conditions, speed control of the RCIC turbine is obtained by local operation of:

A. MO-2-13-16, Steam Isol Valve

B. HO-2-13-4495, Inlet Control Valve

C. MO-2-13C-4487, RCIC Turbine Trip Throttle Valve

D. the EGM Control Box Bias Speed Setting Potentiometer

Answer Key		
Question # 56 RO		
Choice		Basis or Justification
Correct:	C	CORRECT - as described in first NOTE of SE13.1.
Distractors:	A	INCORRECT – Plausible because this component is in the RCIC turbine steam flow path.
	B	INCORRECT - Plausible because this component is in the RCIC turbine steam flow path.
	D	INCORRECT - Plausible because the potentiometer exists and is used for routine overspeed testing, but is not used by SE 13.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(7)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	SE-13.1-2		
Learning Objective:	PLOT5013-9h		
K/A System:	295004 Partial or Complete Loss of DC Pwr	Importance:	RO / SRO 4.4 / 4.0
K/A Statement:	2.1.30 - Conduct of Operations: Ability to locate and operate components, including local controls.		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

57. Unit 2 is operating at 100% power with the electric plant in a normal lineup when the SU-25 breaker trips.

Which one of the following describes the effect of the SU-25 breaker trip on Unit 2?

A fast transfer to their alternate sources will occur for 4 kV busses ___(1)___ and a Group II ___(2)___ half isolation will occur.

A. (1) E12 and E32
   (2) Inboard

B. (1) E12 and E32.
   (2) Outboard

A. (1) E22 and E42
   (2) Inboard

B. (1) E22 and E42.
   (2) Outboard

Answer Key		
Question # 57 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - In a 'normal' lineup, E12 and E32 are powered #2SU bus, which is energized via the SU-25 breaker. On trip of SU-25, these buses will fast-transfer. An Inboard half-isolation occurs due to loss of 20Y033, which loses power when the E12 bus de-energizes momentarily. Since alternate off-site power is available, EDGs do NOT start.
Distractors:	B	INCORRECT - Plausible because the candidate could believe an outboard isolation occurs. An Inboard half-isolation occurs due to loss of 20Y033, which loses power when the E12 bus de-energizes momentarily
	C	INCORRECT - Plausible because the candidate could believe that E22 and E42 could be feed from #2 SU bus. They are feed normally from either 343 SU or #3SU.
	D	INCORRECT - Plausible because the candidate could believe an outboard isolation occurs. An Inboard half-isolation occurs due to loss of 20Y033, which loses power when the E12 bus de-energizes momentarily. Also, Plausible because the candidate could believe that E22 and E42 could be feed from #2 SU bus. They are feed normally from either 343 SU or #3SU.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	SO 53.7.Q, GP-8.C		
Learning Objective:	PLOT5054-7b		
K/A System:	295003 Partial or Complete Loss of AC	Importance:	RO / SRO 3.5 / 3.7
K/A Statement:	AA2.04 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : System lineups		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

58. T-117, “Level/Power Control” requires level to be restored and maintained above -195 inches indicated.

Which one of the following identifies the basis for this value of indicated level?

Maintaining level above this value maintains peak clad temperatures below ___(1)___ degrees F by the ___(2)___ method of ACC.

A. (1) 1500
(2) Steam Cooling

B. (1) 1500
(2) Spray Cooling

C. (1) 1800
(2) Steam Cooling

D. (1) 1800
(2) Spray Cooling

Answer Key		
Question # 58 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - as described in T-117 basis, ACC is assured by steam cooling down to -195 inches RPV level WITH INJECTION with clad temp not to exceed 1500 degrees F.
Distractors:	B	INCORRECT - Conditions for Spray Cooling can NOT be relied upon in T-117 because Core Spray design bases assumes the reactor is shutdown. Plausible because Spray Cooling can be used to establish ACC under other conditions, and 1500 degrees F is the Steam Cooling clad temp maintained in T-117.
	C	INCORRECT - 1800 degrees F is the Zero Injection Clad Temp for Steam Cooling used in T-111. Plausible because this method can used to establish ACC, but NOT during ATWS conditions and T-117.
	D	INCORRECT - Conditions for Spray Cooling can NOT be relied upon in T-117 because Core Spray design bases assumes the reactor is shutdown. Plausible because Spray Cooling can be used to establish ACC under other conditions. Plausible because Spray Cooling can be used to establish ACC under other conditions, and as previously described 1800 degrees F can be used to establish ACC during T-111 conditions.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	T-117 Basis, T-BAS		
Learning Objective:	PLOT 2117DBIG - 6		
K/A System:	295031 Reactor Low Water Level	Importance:	RO / SRO 4.0 / 4.3
K/A Statement:	EK3.04 - Knowledge of the reasons for the following responses as they apply to REACTOR LOW WATER LEVEL: Steam cooling		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

59. Unit 2 was operating at 100% power when an inadvertent Grp II / Grp III PCIS Isolation occurred due to multiple instrument failures.

Assuming NO SCRAM ACTIONS and NO OTHER OPERATOR ACTIONS for 30 minutes, which of the following, if any, is (are) available to initiate a controlled RPV depressurization per T-101 "RPV Control"?

A. Manual operation of SRVs

B. Manual operation of Bypass Valves

C. Both SRVs and Bypass Valves

D. Neither SRVs or Bypass Valves

Answer Key		
Question # 59 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - On a Group 3 isolation eventually (approx 20 minutes) the Inboard MSIVs will close due to their accumulators bleeding down, rendering the Bypass Valves unable to support pressure control. However, the (ADS) SRVs can be operated manually due to the pneumatic supply accumulators.
Distractors:	B	INCORRECT – On a Group 3 isolation eventually (approx 20 minutes) the Inboard MSIVs will close due to their accumulators bleeding down. Plausible if candidate does not know that Inboard MSIVs will close due to loss of Instrument Nitrogen.
	C	INCORRECT - On a Group 3 isolation eventually (approx 20 minutes) the Inboard MSIVs will close due to their accumulators bleeding down. However, the (ADS) SRVs can be operated manually due to the pneumatic supply accumulators. Plausible if candidate does not know that Inboard MSIVs will close due to loss of Instrument Nitrogen.
	D	INCORRECT - On a Group 3 isolation eventually (approx 20 minutes) the Inboard MSIVs will close due to their accumulators bleeding down. However, the (ADS) SRVs can be operated manually due to the pneumatic supply accumulators. Plausible if candidate does not know ADS SRV accumulator supply will support ADS SRV operation.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(x)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	T-101 Bases, Step RC/P-4		
Learning Objective:	PLOT-5001A-5w		
K/A System:	295020 Inadvertent Cont. Isolation	Importance:	RO / SRO 3.7 / 3.9
K/A Statement: AK1.01 - Knowledge of the operational implications of the following concepts as they apply to INADVERTENT CONTAINMENT ISOLATION : Loss of normal heat sink			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

60. Which of the following are the correct Unit 2 and Unit 3 High Reactor Building Main Steam Tunnel Temperature setpoints for the Group 1 Isolation?

	Unit 2	Unit 3
A.	200°F	200°F
B.	200°F	230°F
C.	230°F	200°F
D.	230°F	230°F

Answer Key		
Question # 60 RO		
Choice		Basis or Justification
Correct:	C	CORRECT - Per Tech Spec U2(3) Table 3.3.6.1-1 the High Reactor Building Main Steam Tunnel Temperature setpoints for the Group 1 Isolation are 230°F for Unit 2 and 200°F for Unit 3.
Distractors:	A	INCORRECT – Unit 2 setpoint temperature is too low. Should be 230°F.
	B	INCORRECT – The answers are reversed for both units.
	D	INCORRECT – The Unit 3 setpoint temperature is too high.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(7)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	Tech Spec U2(3) Tables 3.3.6.1-1		
Learning Objective:	PLOT-5007G obj 11		
K/A System:	295032 High Secondary Containment Area Temperature	Importance:	RO / SRO 3.6 / 3.8
K/A Statement: EK2.04 - Knowledge of the interrelations between HIGH SECONDARY CONTAINMENT AREA TEMPERATURE and the following: PCIS/NSSSS			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:	This Question verifies candidate knowledge of a difference in setpoints between Units 2 and 3 for same function.		

61. Unit 2 is at 8% power with reactor startup in progress.

- RPV pressure is at 165 psig for HPCI/RCIC testing.
- 2B CRD pump is out of service (unavailable)
- The 2A CRD pump trips an electrical fault.
- Charging header pressure is 100 psig and dropping.

Why does ON-107, “Loss of CRD Regulating Function”, direct a Reactor scram if accumulator trouble alarms occur on withdrawn rods in this condition?

A. To ensure all control rods are fully inserted before overheating can affect the mechanism seals and impact scram times.

B. To ensure rods can be inserted since normal rod insert and withdrawal functions are inoperable.

C. To ensure control rods can be inserted before the HCU accumulators depressurize and cannot complete the scram.

D. In anticipation of tripping both Reactor Recirculation Pumps due to loss of seal cooling.

Answer Key

Question # 61 RO

Choice		Basis or Justification
Correct:	C	CORRECT - per ON-107 Bases
Distractors:	A	INCORRECT - This is NOT the bases for scram at this point. Plausible because cooling is lost and high CRD Temps can have impact on scram time.
	B	INCORRECT - This is NOT the bases for scram at this point. Plausible because this is a concern for CR functionality, but NOT scram basis.
	D	INCORRECT - This is NOT the bases for scram at this point. Plausible because seal cooling is lost and seals will heat up, but scram will not significantly mitigate this effect.

Psychometrics

Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(6)

Source Documentation

Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	ON-107	
Learning Objective:	PLOT1550 - 4	
K/A System:	295022 Loss of CRD Pumps	Importance: RO / SRO 3.7 / 3.9

K/A Statement: AK3.01 - Knowledge of the reasons for the following responses as they apply to LOSS OF CRD PUMPS: Reactor SCRAM

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

62. Unit 2 is at 40% power during a normal Plant Startup.

OT-106, "Condenser Low Vacuum" procedure is in progress due to a vacuum leak.

IF condenser vacuum reaches __(1)__ , THEN GP-4, "Manual Reactor Scram" will be performed in anticipation of the RPS automatic Reactor Scram at __(2)__ .

A. (1) 25.4 inches hg
(2) 20.0 inches hg

B. (1) 24.0 inches hg
(2) 23.0 inches hg

C. (1) 23.0 inches hg
(2) 20.0 inches hg

D. (1) 25.4 inches hg
(2) 23.0 inches hg

Answer Key		
Question # 62 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - OT-106 directs a manual scram at 24.0 inches hg. The RPS scram setpoint is 23.0 inches hg.
Distracters:	A	INCORRECT - Plausible because 25.4 inches hg is the "COND LO VAC" alarm (206 D-2) setpoint. The Main Turbine and RFP Turbine Trip setpoint is 20 inches hg.
	C	INCORRECT -Plausible because the RPS Scram Setpoint is 23 inches hg. The Main Turbine and RFP Turbine Trip setpoint is 20 inches hg.
	D	INCORRECT - Plausible because OT-106 directs a manual scram at 25.4 inches hg if power is above BPV capability and unable to maintain load greater than 300 MWe. The RPS Scram Setpoint is 23 inches hg.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	OT-106 Low Condenser Vacuum		
Learning Objective:	PLOT 1540 DBIG Obj 2		
K/A System:	295002 Loss of Main Condenser Vac	Importance:	RO / SRO 3.4 / 3.5
K/A Statement:	AA1.03 - Ability to operate and/or monitor the following as they apply to LOSS OF MAIN CONDENSER VACUUM : RPS		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

63. Unit 2 is in MODE 2 with a heat up in progress.

- Vessel level is being maintained by the Control Rod Drive Hydraulic System and the Reactor Water Cleanup System.
- The URO observes RPV level slowly lowering.
- The crew enters OT-100, “Reactor Low Level”.

For the above conditions, which of the following actions is required?

Throttle:

A. open CV-2-12-55 “RWCU Dump Flow”

B. closed CV-2-12-55 “RWCU Dump Flow”

C. open MO-2-12-68 "RWCU Outlet Valve”

D. closed MO-2-12-68 "RWCU Outlet Valve”

Answer Key

Question # 63 RO

Choice		Basis or Justification
Correct:	B	CORRECT – Since RPV level is lowering, the crew has 2 choices for recovering level, either raising CRD system flow (not a listed option), or reduce RWCU dump flow (blowdown flow). The way to reduce dump flow is to throttle closed CV-2-2-55.
Distracters:	A	INCORRECT - The way to reduce dump flow is to throttle closed CV-2-2-55, NOT open the valve. This would make the RPV level change worse.
	C	INCORRECT – Throttling open the MO-2-12-68, RWCU return to the RPV, while the system is in the dump (blowdown) mode of operation will not change the dump flow rate which must be reduced in order to stop the lowering RPV level.
	D	INCORRECT - Plausible since the candidate has to realize that the MO-2-12-68, RWCU return to the RPV, is normally fully closed while in the dump (blowdown) mode of operation. Dump flow rate must be reduced in order to stop the lowering RPV level.

Psychometrics

Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(10)

Source Documentation

Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	OT-100, SO 12.1.A-2	
Learning Objective:	PLOT 5012 Obj 9e	
K/A System:	295009 Low Reactor Water Level	Importance: RO / SRO 2.9 / 2.9
K/A Statement:	AA2.03 - Ability to determine and/or interpret the following as they apply to LOW REACTOR WATER LEVEL: Reactor water cleanup blowdown rate	
REQUIRED MATERIALS:	**None**	
Notes and Comments:		

64. The following drywell conditions exist on Unit 2 following a small-break LOCA:

- A Torus-to-Drywell Vacuum Breaker is stuck open
- Drywell and Torus Sprays cannot be placed in service
- Drywell pressure is 10 psig and rising 1 psig per minute
- Torus pressure is 10 psig and rising 1 psig per minute
- Torus Level is 15 feet and steady

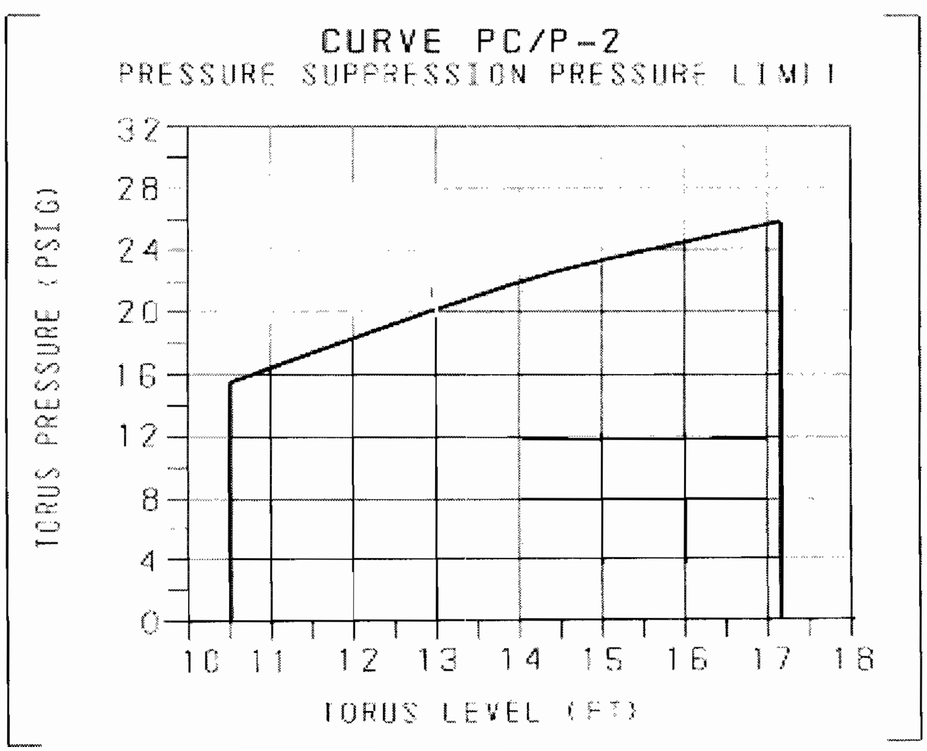
Based on the above conditions, and using the curve provided below, an Emergency Blowdown is ______.

A. required IMMEDIATELY

B. required in 14 minutes

C. required in 10 minutes

D. <u>NOT</u> required if the 2 inch Drywell Vent can be established.



Answer Key		
Question # 64 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - Torus pressure will reach 24 psig in 14 minutes – this will plot on the UNSAFE side of PC/P-2 curve, requiring a blowdown. Candidate must calculate and apply the trend to the curve and know that the area ABOVE the curve is UNSAFE and requires a blowdown.
Distracters:	A	INCORRECT – It will take Torus pressure 14 minutes to reach 24 psig which will plot on the UNSAFE side of PC/P-2 curve. Presently, Torus pressure is on SAFE side of the curve.
	C	INCORRECT – 10 minutes is too soon. Torus pressure will reach 24 psig in 14 minutes – 10 minutes will still plot on the SAFE side of PC/P-2 curve, NOT requiring a blowdown.
	D	INCORRECT – plausible if the Candidate does not recognize that the 2 inch drywell vent path will be isolated on a Group 3 signal of drywell pressure $\geq$ 2 psig.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(9)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	T-102 Bases, Curve PS/P-1 (embedded in this question)		
Learning Objective:	PLOT2102 DBIG – Obj 6		
K/A System:	295010 – High Drywell Pressure	Importance:	RO / SRO 4.2 / 4.2
K/A Statement: 2.4.47 - Emergency Procedures / Plan: Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.			
REQUIRED MATERIALS:			
Notes and Comments:			

65. A scram occurred on Unit 2.

The following conditions currently exist:

- RPV pressure is 940 psig.
- The 2A CRD Pump is in service.
- The scram discharge volume is drained.
- 211 E-2, "CRD ACCUMULATOR LO PRESS/HI LEVEL" alarm is annunciating for 3 control rods that are at position 06.
- An EO reports that depressing the affected accumulator local Accumulator Trouble pushbutton on Panel 2AC078 results in the light remaining energized.

Which one of the following is correct regarding the ability to insert the 3 control rods using Individual Scram Test switches?

Control rods will ____________,
CRD ACCUMULATOR LO PRESS/HI LEVEL alarm is due to ____________.

A. insert, low gas pressure on accumulators.

B. insert, high water level on accumulators.

C. NOT insert, low gas pressure on accumulators.

D. NOT insert, high water level on accumulators.

Answer Key		
Question # 65 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - Control rods will insert due to both reactor pressure ≥ 940 psig and the CRD Charging Water available. Alarm response for 211 E-2 provides direction for local operator checks. Locally depressing the affected accumulator local Accumulator Trouble pushbutton and the light remaining energized is indication of low HCU accumulator pressure. System knowledge plus knowledge of the NOTES in the ARC and T-216 proc are required to be integrated in order to answer the question.
Distractors:	B	INCORRECT - Rods will insert, but alarm is not caused by water in accumulator - Plausible if candidate does not know how local accumulator alarm pushbutton indication works (depress pushbutton, if light goes out, water issue, if light remains illuminated, gas issue)
	C	INCORRECT - Rods WILL insert – see discussion above. Plausible if candidate does not know that 940 psig reactor pressure and /or CRD charging water pressure is acceptable for control rod insertion.
	D	INCORRECT - Rods WILL insert – see discussion above. Plausible if candidate does not know how local accumulator alarm pushbutton indication works.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(6)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank ()	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	T-216-2, ARC 211 E-2		
Learning Objective:	PLOT5003A-8c		
K/A System:	295015 Incomplete SCRAM	Importance:	RO / SRO 4.2 / 4.0
K/A Statement: 2.4.50 - Emergency Procedures / Plan: Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

66. According to OP-AA-101-111, "Roles and Responsibilities of On-Shift Personnel," which one of the following is an activity that a Licensed Reactor Operator will perform?

A. Authorize fire protection impairment permits.

B. Coordinate plant activities with the Load Dispatcher.

C. Maintain oversight during transient conditions.

D. Review non-licensed operator rounds each shift.

Answer Key		
Question # 66 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - Coordinate plant activities with the Load Dispatcher is an RO activity per OP-AA-101-111, "Roles and Responsibilities of On-Shift Personnel.
Distractors:	A	INCORRECT - This is an SRO duty, specifically a duty for the Field Supervisor per OP-AA-101-111, "Roles and Responsibilities of On-Shift Personnel.
	C	INCORRECT - This is a primary duty of an STA/SRO per OP-AA-101-111, "Roles and Responsibilities of On-Shift Personnel. .
	D	INCORRECT - This is Field Supervisor duty per OP-AA-101-111, "Roles and Responsibilities of On-Shift Personnel.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank ()	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	OP-AA-101-111		
Learning Objective:	PLOT1529 Obj 1d		
K/A System:	G 2.1 – Conduct of Operations	Importance:	RO / SRO 3.4 / 4.1
K/A Statement: 2.1.8- Ability to coordinate personnel activities outside the control room.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

67. According to HU-AA-104-101, "Procedure Use and Adherence", when a conflict arises between a standard procedure and a site-specific procedure, which procedure prevails?

A. The standard procedure prevails.

B. The site-specific procedure prevails.

C. The standard procedure prevails except when the site-specific procedure directs actions that ensure compliance with regulatory requirements.

D. The site-specific procedure prevails except when the standard procedure directs actions that ensure compliance with regulatory requirements.

Answer Key		
Question # 67 RO		
Choice		Basis or Justification
Correct:	C	CORRECT - as stated in HU-AA-104-101, "Whenever a conflict arises between a standard procedure and a site-specific procedure, then the standard procedure shall prevail except when the site-specific procedure directs actions that ensure compliance with regulatory requirements".
Distracters:	A	INCORRECT - plausible since the exception makes the rule.
	B	INCORRECT - plausible if the candidate believes site-specific procedure will always overrule.
	D	INCORRECT - plausible if the candidate believes site-specific procedure will typically overrule.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	3.0	3	10CFR55.41(b)(10)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam: (PB 2007) ☐ Other Exam Bank: ()	
Reference(s):	HU-AA-104-101		
Learning Objective:	PLOT-1570-8		
K/A System:	G 2.1 Conduct of Operations	Importance:	RO / SRO 4.6 / 4.6
K/A Statement: G2.1.20 - Ability to interpret and execute procedure steps.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

68. Unit 2 is operating at 100% power when the following events occur (all times are in seconds):

- T=0 - REACTOR HI-LO WATER LEVEL (210 H-2) alarms
- T=5 - URO attempts manual control of reactor water level
- T=15 - REACTOR WATER HI LEVEL TRIP (206 C-1) alarms
  - A RFPT TRIP (201 G-4) alarms
  - B RFPT TRIP (201 H-4) alarms
  - C RFPT TRIP (201 J-4) alarms
  - Reactor level indicates +48 inches
  - Reactor pressure is 1028 psig
  - Reactor power is 100%
- T=20 - Reactor level indicates -5 inches
  - Reactor pressure is 1028 psig
  - Reactor power is 100%

What actions are required for these conditions?

A. Perform GP-4 “Manual Reactor Scram”.

B. Trip the Main Turbine and enter T-100 “Scram”.

C. Scram the Reactor and enter T-100 “Scram”.

D. Scram the Reactor and enter T-101 “RPV Control”.

Answer Key		
Question # 68 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - The given conditions indicate the main turbine did not trip on high reactor level as expected (which would have caused a reactor scram). Since the feedwater pumps tripped and RPV level has lowered below the scram setpoint of +1 inch, an ATWS condition has occurred. This is an entry condition for T-101: "scram condition with power above 4% or unknown".
Distracters:	A	INCORRECT - The prerequisite for GP-4 states "plant conditions require a manual scram and sufficient time is available to perform pre-scram actions." There is insufficient time to perform GP-4 under these conditions. In addition, since a scram should have occurred, the operator is required to manually scram the reactor (place the mode switch in shutdown).
	B	INCORRECT - This would rely on the Rector Protection System to scram the reactor, which violates the "Reactivity Management" Operations Fundamental (do not rely on the reactor protection system to protect the reactor during reactivity events). Since a scram should have occurred, the operator must manually scram the reactor (place the mode switch in shutdown). Plausible since the main turbine should have tripped on a high reactor water level.
	C	INCORRECT - Plausible since OT-110 "RPV High Level" directs entering T-100 if a scram condition occurs. However, a T-101 entry condition exists since the reactor did not automatically scram as expected. This overrides OT-110 direction.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	3.0	3	10CFR55.41(b)(10)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam: (PB 2011) ☐ Other Exam Bank: ()	
Reference(s):	ARC-206 C-1; OT-110; GP-4; T-101		
Learning Objective:	PLOT-1529-2		
K/A System:	G 2.2 Equipment Control	Importance:	RO / SRO 4.2 / 4.4
K/A Statement: G2.2.44 - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

69. GP-26, “Coordination of HCU, CRB, CRD, DBG, and PIP Work During a Refueling Outage” limits the number of HCUs that can be blocked.

This is because high Cooling Water pressure may result in Control Rods ________.

A. Drifting IN ONLY

B. Drifting OUT ONLY

C. Drifting IN OR OUT

D. Scramming.

Answer Key		
Question # 69 RO		
Choice		Basis or Justification
Correct:	C	CORRECT – Per guidance in GP-26 based on SEN 264, this limit is based on Industry Experience which has shown that excessive cooling water pressure can cause rods to drift either IN or OUT.
Distractors:	A	INCORRECT – plausible as it is partially correct.
	B	INCORRECT – plausible as it is partially correct.
	D	INCORRECT – plausible if the candidate does not know that OPEX has demonstrated this phenomenon.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam () ☐ Other Exam Bank	
Reference(s):	GP-26, SEN-264, Unplanned Control Rod Withdrawals While Shutdown		
Learning Objective:	PLOT 5003A Obj 9a		
K/A System	G 2.2 Equipment Control	Importance:	RO / SRO 2.6 / 3.9
K/A Statement	2.2.18 Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:	This relates to Industry OPEX, including Exelon Fleet OPEX.		

70. Unit 2 is operating at 100% power when a steam leak occurs in the Reactor Building.

- The Reactor Building exhaust duct radiation monitors reach the PCIS Group III setpoint.
- All systems operate as designed EXCEPT that both SBGT filter inlet dampers fail to open.

Which one of the following would result from this event? (ASSUME NO OPERATOR ACTION)

A. Higher release rates through the Main Stack due to fission products not being adequately filtered.

B. An unfiltered ground-level radioactive release due to the Reactor Building not being maintained at negative pressure.

C. Higher release rates through the Unit 2 Vent Stack due to forced flow from the Reactor Building.

D. A monitored ground-level radioactive release due to the Reactor Building not being maintained at negative pressure.

Answer Key		
Question # 70 RO		
Choice		Basis or Justification
Correct:	B	CORRECT - The Group III PCIS isolation will trip and isolate Reactor Building ventilation. The failed filter inlet dampers will prevent SBGT from maintaining Reactor Building negative pressure. This will result in an unmonitored and unfiltered ground-level release.
Distractors:	A	INCORRECT -SBGT would not be exhausting Reactor Building air to the Main Stack.
	C	INCORRECT -Reactor Building ventilation dampers close on a PCIS Group III isolation and isolate the Reactor Building from the Vent Stack.
	D	INCORRECT -The release would not be through a <u>monitored</u> path.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam (PB 2008) ☐ Other Exam Bank	
Reference(s):	T-103 Bases (step SCC-2)		
Learning Objective:	PLOT-5009A-6b		
K/A System	G 2.3 Radiation Control	Importance:	RO / SRO 3.4 / 3.8
K/A Statement G2.3.14 – Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

71. Which one of the following requires entry into ON-124 "Fuel Floor and Fuel Handling Problems"?

A. New Fuel Assembly is dropped with no apparent damage.

B. Refueling Floor Vent Exhaust Hi Radiation (218 A-1) alarms.

C. An irradiated LPRM Detector is dropped in the ISFSI Cask Handling Area.

D. Count Rate doubles as the fifth (5^{th}) fuel assembly is loaded near a WRNM.

Answer Key		
Question # 71 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - ON-124 requires entry and action for any dropped new fuel assembly.
Distracters:	B	INCORRECT -Although this condition obviously requires action, it is not an entry condition into ON-124.
	C	INCORRECT -ON-124 entry is required for a fuel assembly or single fuel rod dropped or damaged, but not for an LPRM detector.
	D	INCORRECT -ON-124 entry would only be required if the count rate had doubled two times between CCTAS steps.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank:	
Reference(s):	ON-124		
Learning Objective:	PLOT-PBIG-1550-2		
K/A System:	G 2.3 Radiation Control	Importance:	RO / SRO 3.4 / 3.8
K/A Statement: G2.3.13 – 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..			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

72. According to T-BAS (INTRO) "Introduction to TRIPs and SAMPs - Bases", TRIP and SAMP procedures provide operators with ___(1)___ instructions to manage critical plant parameters ___(2)___ the design basis of the plant.

A. (1) symptom-based
   (2) within

B. (1) symptom-based
   (2) beyond

C. (1) rule-based
   (2) within

D. (1) rule-based
   (2) beyond

Answer Key

Question # 72 RO

Choice		Basis or Justification
Correct:	B	CORRECT - as discussed in T-BAS (INTRO) documentation, TRIPS are symptom-based, and no risk or probability threshold is assigned. Every effort has been made to address any mechanistically possible condition.
Distracters:	A	INCORRECT - TRIPS are not bounded by Design Basis Analysis Events - plausible since the candidate may incorrectly believe the TRIPS protect against DBA accidents and SAMPS are for beyond-DBA scenarios.
	C	INCORRECT - TRIPS are NOT rule-based, and are NOT bounded by DBA analysis. Plausible since "rule-based" is a common term associated with Human Performance activities, and sounds similar to "Event Based or Symptom Based" and since the candidate may incorrectly believe the TRIPS protect against DBA accidents and SAMPS are for beyond-DBA scenarios.
	D	INCORRECT -TRIPS are NOT rule-based. Plausible since "rule-based" is a common term associated with Human Performance activities, and sounds similar to "Event Based or Symptom Based".

Psychometrics

Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation

Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	T-BAS (INTRO)	
Learning Objective:	PLOT 2000 DBIG Obj 3	
K/A System:	G 2.4 Emergency Procedures / Plan	Importance: RO / SRO 3.3 / 4.0
K/A Statement: G2.4.18 – Knowledge of the specific bases for EOPs.		
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		

73. An ATWS is in progress on Unit 2. Per T-117 “Level/Power Control”, a priority action is to inhibit ADS.

This is done to prevent ____________________.

A. core damage due to large irregular neutron flux oscillations

B. exceeding 110 degrees F Torus temperature before boron is injected

C. potential loss of, or inaccuracies in, RPV level instrumentation

D. substantial fuel damage due to a large reactor power excursion

Answer Key		
Question # 73 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - The ADS safety function is inhibited to give priority to other systems (i.e., provide additional time for SLC, RPS, etc. to perform their safety functions). From T-117 Bases: ADS initiation would complicate efforts to maintain RPV level within required level ranges. FURTHER, rapid and uncontrolled injection of large volumes of relatively cold, un-borated water from low pressure injection systems may occur. With the reactor either critical or shutdown on boron alone, the positive reactivity addition due to boron dilution and temperature reduction may result in a reactor power excursion large enough to cause substantial fuel damage. ADS is inhibited to prevent this from happening.
Distractors:	A	INCORRECT -ADS initiation would not cause large irregular neutron flux oscillations...it would cause a rapid reduction in reactor power due to voids.
	B	INCORRECT -During an ATWS Torus temperature may exceed 110 degrees F before boron injection anyway due to SRV operation...this is not the reason for inhibiting ADS.
	C	INCORRECT -Depressurization due to ADS initiation must also be accompanied by elevated Drywell temperature for this to occur...this is not the reason for inhibiting ADS.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(5)

Source Documentation		
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam: (2008 RO) ☐ Other Exam Bank: ()
Reference(s):	T-117 Bases	
Learning Objective:	PLOT-2117-6	
K/A System	G 2.4 Emergency Procedures / Plan	Importance: RO / SRO 3.6 / 4.4
K/A Statement G2.4.22 – Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.		
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:	**NONE**	

74. Unit 2 is operating at 100%.

"A RECIRC PUMP SEAL STAGE 2 HI FLOW" (Panel 214, A-1) alarm is received.

The following Reactor Recirculation Pump A" Seal parameters are reported:

- First Stage Seal (Seal Cavity #1) pressure: 1000 psig
- Second Stage Seal (Seal Cavity #2) pressure: 700 psig

Which one of the following is correct based on the above indications?

A. #1 Seal is degraded.

B. #2 Seal is degraded.

C. #1 Seal pressure breakdown device is clogged.

D. #2 Seal pressure breakdown device is clogged.

Answer Key		
Question # 74 RO		
Choice		Basis or Justification
Correct:	A	CORRECT - higher than normal second stage cavity pressure can be the result of either: (a) partial failure of the first stage seal, or (b) clogged second stage leak off line. Since the second stage seal hi flow annunciator is alarming, cause (b) can be eliminated; a partial failure of the first stage seal is the cause of elevated pressure in the second stage cavity. If the first stage seal were completely failed, then both cavity pressures would be equal.
Distractors:	B	INCORRECT - a failed second stage seal would cause a seal stage 2 low flow alarm since flow would bypass the bleed off line (and flow sensing switch) and be diverted out the failed seal. Plausible because candidate may misunderstand Recirc Seal construction.
	C	INCORRECT - a clogged first stage pressure breakdown device (PBD) would cause a higher dP between the first and second stage cavities; second stage cavity pressure would drop, and the low flow annunciator could be received (but not high flow). Plausible because candidate may misunderstand Recirc Seal construction.
	D	INCORRECT - a clogged second stage pressure breakdown device would reduce flow in the bleed off line (past the flow sensing switch) and possibly cause a low flow alarm. Plausible because candidate may misunderstand Recirc Seal construction.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH			10CFR55.41(b)(7)

Source Documentation		
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank ()	☐ Previous NRC Exam: ☒ Other Exam Bank: (PB LORT)
Reference(s):	ARC 214 A-1	
Learning Objective:	PLOT 5002 Obj 9.k.5	
K/A System	G 2.4 Emergency Procedures / Plan	Importance: RO / SRO 4.0 / 4.6
K/A Statement:	2.4.21 Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.	
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:	**NONE**	

75. In accordance with procedure FF-01 “Fire Brigade”, if off-site fire departments are called to support the Fire Brigade, which of the following work groups, besides Security, can be used to perform security escort duties?

1. Operations
2. Maintenance
3. Radiation Protection

A. 1 ONLY

B. 1 and 3 ONLY

C. 2 ONLY

D. 1, 2, 3

Answer Key		
Question # 75 RO		
Choice		Basis or Justification
Correct:	D	CORRECT - Per FF-01, Fire Brigade, "The Control Room should request other work groups on site to provide escorts." This is based on Ops and Security not having staffing required. Ops and Security are NOT precluded from escort duties.
Distractors:	A	INCORRECT - any individual with Vital Area access permission can provide access escort. Plausible because Security and Operations are the work groups most closely associated with fire brigade and security activities.
	B	INCORRECT - any individual with Vital Area access permission can provide access escort. Plausible because Security and Operations and the work groups most closely associated with fire brigade and security activities, RP is another group with frequent escort-type duty assignments.
	C	INCORRECT - any individual with Vital Area access permission can provide access escort. Plausible because Security is most closely linked with Vital Area access control.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CFR55.41(b)(10)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank ()	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	FF-01	
Learning Objective:	PLOT 1565 Obj 2	
K/A System	G 2.1 Conduct of Operations	Importance: RO / SRO 2.5 / 3.2
K/A Statement		
G2.1.13 - Knowledge of facility requirements for controlling vital / controlled access.		
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:	**NONE**	

76. Unit 2 is in a refueling outage. The following conditions exist:

- The reactor head is removed.
- The fuel pool gates are removed.
- Inspections are in progress using the Reactor Cavity Work Platform (RCWP).

A loss of Fuel Pool/RPV cooling occurs causing:

- RPV temperature to rise to 142°F.
- RPV level on LT-70 to indicate 474".

Which one of the following shows (1) actual RPV level and (2) the action required for these conditions? (Refer to Attachment 3 of GP-6 on the next page)

(1) Actual RPV level is ___________.
(2) Required action for this condition is ___________.

A. (1) +467"
(2) evacuate the RCWP per GP-6, "Refuel Operations".

B. (1) +467"
(2) add water with Condensate Transfer per GP-6, "Refueling Operations".

C. (1) +481"
(2) maintain RPV level between +480 to +488 inches per GP-6, Refueling Operations".

D. (1) +481"
(2) lower RPV level and maintain RPV level between +470 and +477 inches per GP-6, "Refueling Operations".

ATTACHMENT 3

LT-70 CORRECTION TABLE FOR +474"

The purpose of this Attachment is to provide the Operator with the proper INDICATED level value in order to maintain ACTUAL RPV level at +474". This is necessary to compensate for temperature effects on indicated Reactor level when Reactor water temperature is above or below calibrated conditions (80°F).

TEMP °F	IND. LEVEL	TEMP °F	IND. LEVEL
70	474.6	116	470.4
72	474.5	118	470.2
74	474.4	120	470.0
76	474.3	122	469.7
78	474.1	124	469.4
80	474.0	126	469.2
82	473.8	128	468.9
84	473.7	130	468.7
86	473.5	132	468.4
88	473.3	134	468.1
90	473.2	136	467.8
92	473.0	138	467.5
94	472.8	140	467.3
96	472.6	142	467.0
98	472.4	144	466.7
100	472.2	146	466.4
102	472.0	148	466.1
104	471.8	150	465.8
106	471.6	152	465.5
108	471.4	154	465.2
110	471.1	156	464.9
112	470.9	158	464.6
114	470.7	160	464.2

Example: IF Reactor water temperature is 120°F, THEN INDICATED Reactor level should be maintained at +470.0" in order to maintain ACTUAL RPV level at +474".

Answer Key		
Question # 76 SRO		
Choice		Basis or Justification
Correct:	D	Correct – RPV level per Attachment 3 is high and must be lowered to the band of +470 to +477" per step 5.4.18 of GP-6.
Distractors:	A	Incorrect – RPV level per Attachment 3 is high, the distractor is plausible because if RPV level were +467" the RCWP would need to be evacuated.
	B	Incorrect – RPV level per Attachment 3 is high, the distractor is plausible because if RPV level were +467" water would need to be added to restore the level to band.
	C	Incorrect – RPV level is high, but the RPV level band per GP-6 is +470 for +477 inches.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(7)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank
Reference(s):	GP-6, "Refuel Operations".	
Learning Objective:	PLOT 1530 Obj 4	
K/A System	295023 Refueling Accidents	Importance: SRO 3.7
K/A Statement AA2.02 - Ability to determine and/or interpret the following as they apply to REFUELING ACCIDENTS : Fuel pool level		
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		

77. An ATWS is in progress on Unit 2.

RPV water level was intentionally lowered per T-117 “Level/Power Control.”

The following conditions currently exist:

- Reactor power is 6%
- 1 SRV is stuck open
- RPV level is -200 inches and rising
- EHC is controlling RPV pressure at 950 psig
- Torus temperature is 175 degrees F and rising
- RHR loop ‘A’ is in Torus cooling; ‘B’ loop is unavailable
- Torus pressure is 6 psig and slowly rising
- Torus level is 15 feet and stable
- HPCI is injecting at 5000 gpm

Which one of the following describes the required action and the reason for taking the action?

Refer to the portions of T-102 “Primary Containment Control” AND T-117 “Level/Power Control” provided on the NEXT TWO PAGES.

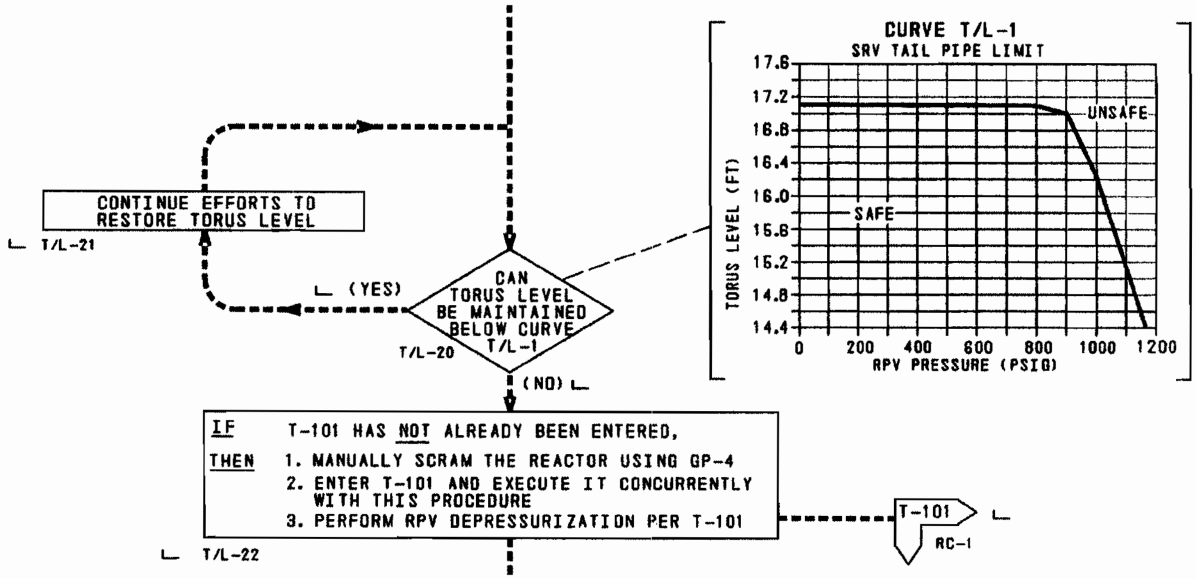
A. Reduce RPV pressure to less than 900 psig in order to maintain on the safe side of T/L-1 “SRV Tail Pipe Limit.”

B. Perform Emergency Blowdown per T-112 due to inability to maintain RPV level above -195 inches.

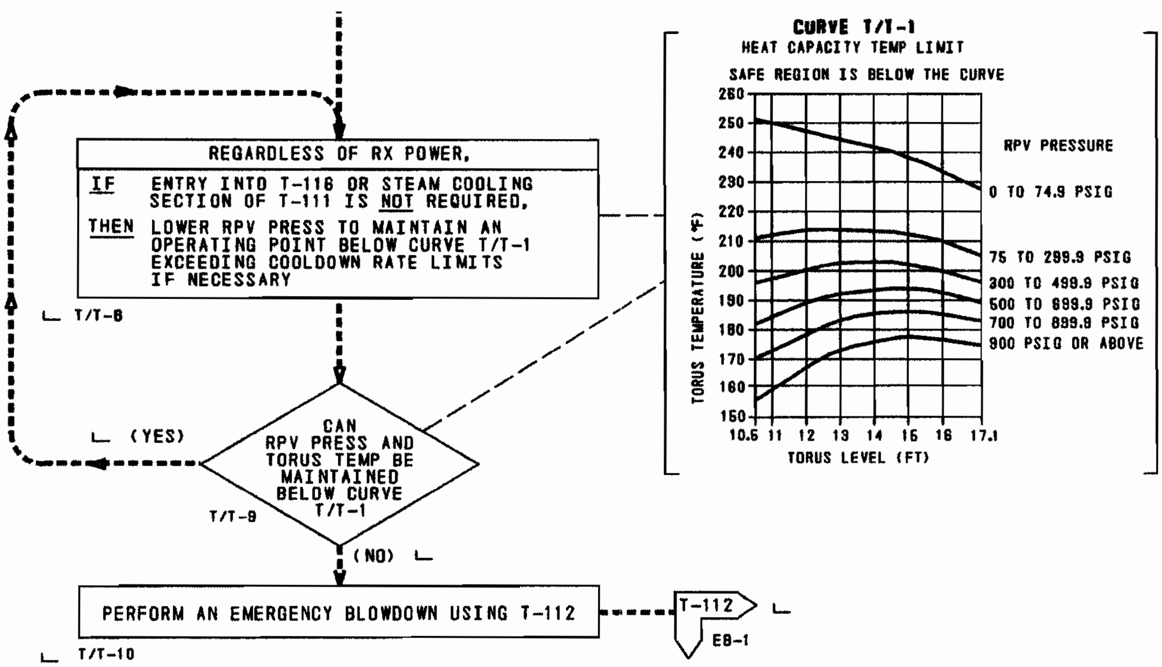
C. Reduce RPV pressure to less than 900 psig in order to maintain on the safe side of T/T-1 “Heat Capacity Temperature Limit.”

D. Perform Emergency Blowdown per T-112 due to being on the unsafe side of T/T-1 “Heat Capacity Temperature Limit.”

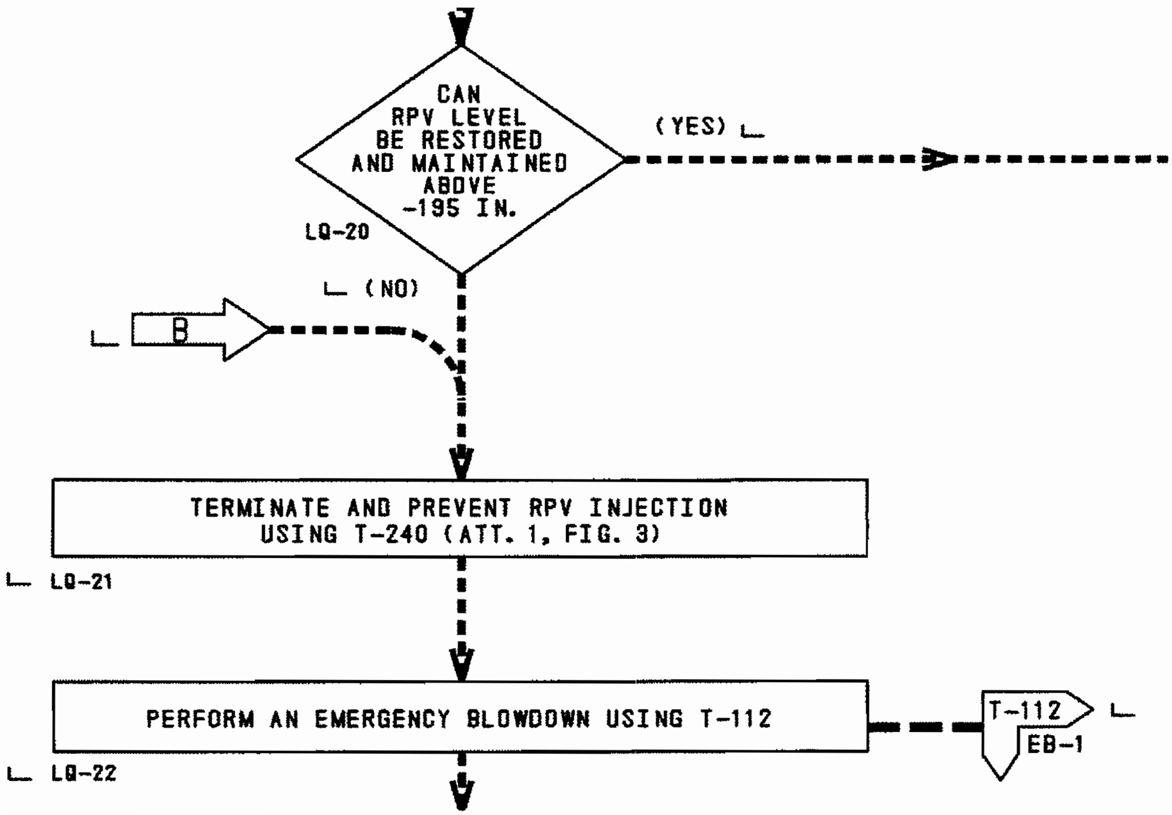
T-102 "Primary Containment Control"
"SRV Tail Pipe Limit" Curve



T-102 "Primary Containment Control"
"Heat Capacity Temperature Limit" Curve



T-117 "Level/Power Control"



Answer Key		
Question # 77 SRO		
Choice		Basis or Justification
Correct:	C	Torus temperature is ~3 degrees F from HCTL and rising. If Torus temperature cannot be maintained on the safe side of HCTL, T-102 T/T-8 directs maintaining RPV pressure on the safe side of HCTL.
Distractors:	A	Torus level is high but 1.6 feet away from T/L-1 limit and level is stable. Reducing pressure for the purposes of maintaining this curve is not warranted.
	B	While RPV Level is below -195 inches, it is only 5 inches below band and is rising due to HPCI injection. The criterion for T-117 LQ-20 is whether or not level can be restored and maintained above -195 inches, which it can. Therefore, T-112 is not warranted under these conditions.
	D	Operation is on the SAFE side of the HCTL curve.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation		
Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam (PB 2008) ☐ Other Exam Bank
Reference(s):	T-102 and Bases	
Learning Objective:	PLOT-PBIG-2102-5a	
K/A System	295030 – Low Suppression Pool Water Level / 5	Importance: SRO 3.9
K/A Statement EA2.03 – Ability to determine and/or interpret the following as they apply to Low Suppression Pool Water Level: Reactor Pressure.		
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		

78. Unit 2 was operating at 90% power with the OPRM System inoperable when the '2B' Recirc pump tripped. The following conditions currently exist:

- A loop flow (FI-2-2-3-092B) is 46 Mlbm/hr
- B loop flow (FI-2-2-3-092A) is 5 Mlbm/hr
- Indicated Core Flow (FR-2-2-3-095 black pen) is 51 Mlbm/hr
- APRMs are oscillating between 48 and 51% in 4-5 second random intervals

Which one of the following is correct for these conditions?

AO 60A.1-2 "PBAPS Backup Stability Solution Power Flow Operation Map" is <u>PROVIDED ON THE NEXT PAGE</u>.

The plant is operating in ____(1)____.
The required action is to ____(2)____.

A. (1) Region 1
(2) scram the reactor and enter T-100 "Scram" due to being in Region 1

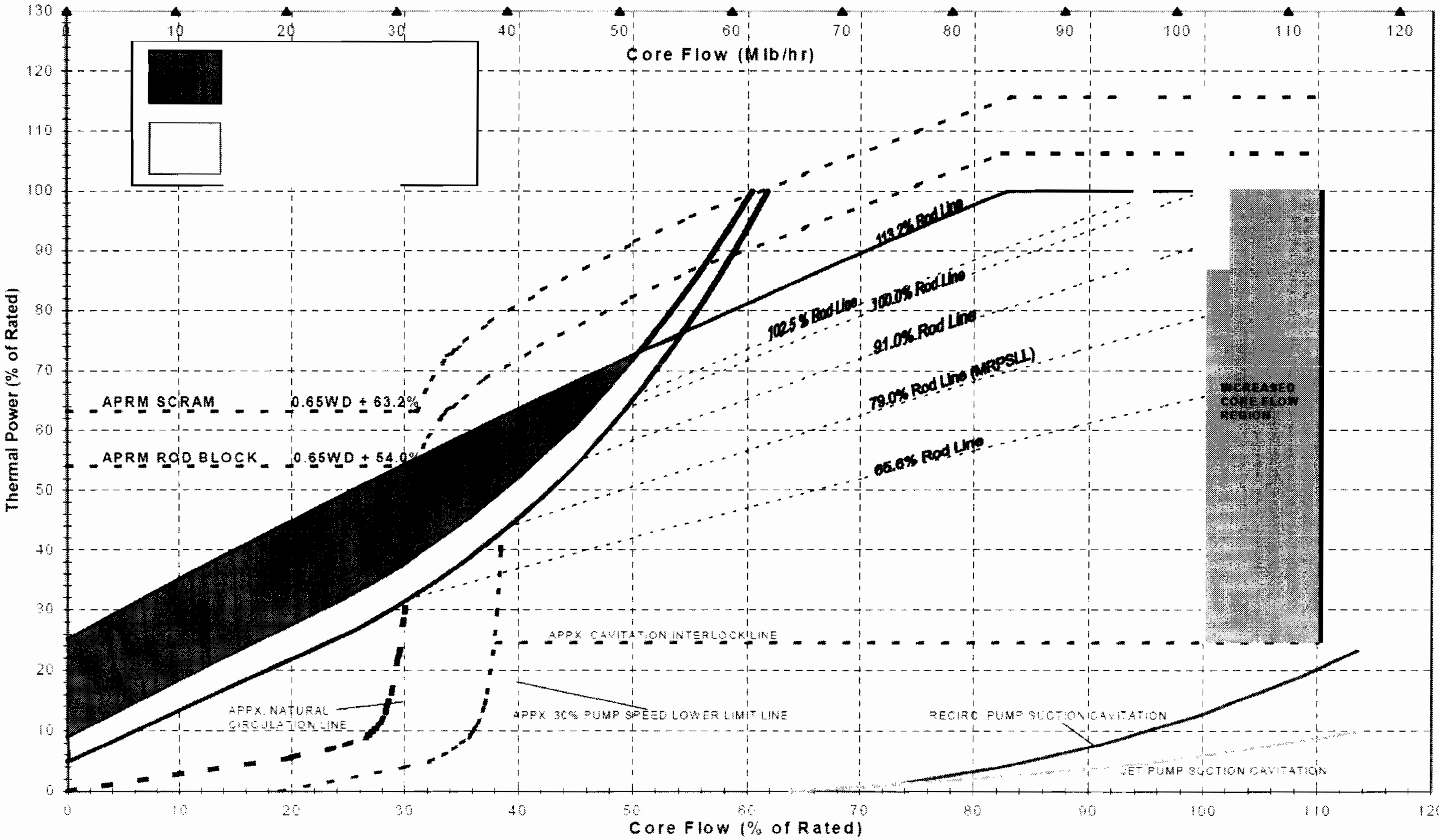
B. (1) Region 2
(2) insert all GP-9-2 control rods per GP-9-2 "Fast Reactor Power Reduction"

C. (1) Region 2
(2) exit Region 2 by raising '2A' Recirc pump speed using SO 2A.1.D-2 "Operation of the Recirc Pump Speed Control System"

D. (1) the normal operating region
(2) perform the follow-up actions of OT-112 "Unexpected/Unexplained Change in Core Flow"

ATTACHMENT 1

PBAPS BACKUP STABILITY SOLUTION POWER FLOW OPERATION MAP



Answer Key		
Question # 78 SRO		
Choice		Basis or Justification
Correct:	B	The calculation of core flow 51-2(5) = 41 Mlbm/hr / 102.5 Mlbm/hr = 40% (alternatively, 41 Mlbm/hr can be found on the upper 'x' axis). Plotting 41 Mlbm/hr vs. 48-51% power shows the reactor is operating in Region 2. All GP-9-2 rods must be inserted since the 2B Recirc pump tripped.
Distractors:	A	If a core flow calculation and/or plotting error is made, the applicant could believe the reactor is operating in Region 1.
	D	If a core flow calculation error is made, the applicant could believe the reactor is operating in the normal operating region.
	C	Plotting in Region 2 is correct, however, raising recirc pump speed would not be a correct action if operating in Region 2 with indications of THI.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation			
Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam: (PB 2011) ☐ Other Exam Bank: ()	
Reference(s):	OT-112; AO 60A.1-2		
Learning Objective:	PLOT-PBIG-1540-3, -4		
K/A System:	295001 – Partial or Complete Loss of Forced Core Flow Circulation	Importance:	SRO 3.2
K/A Statement:			
AA2.02 – Ability to determine and/or interpret the following as they apply to Partial or Complete Loss of Forced Core Flow Circulation: Neutron Monitoring			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:	It is the SRO's job function to determine the operating point on the Power-to-Flow map (or Backup Stability Solution Power Flow Operation Map), which is an "immediate operator action" of OT-112.		

79. Unit 2 is in Mode 3.

- "A" loop of RHR is in Shutdown Cooling using the 2A RHR Pump
- RPV pressure unexpectedly rises to 90 psig and stabilizes.
- Alarm 224 C-1 "SYSTEM I HI REAC PRESS SHUTDOWN COOLING ISOLATED" is received.

For the above conditions, which one of the following describes the effect on Shutdown Cooling system valves ___(1)___ and what action(s) is/are required to be taken ___(2)___?

MO-2-10-17 is the "Shutdown Cooling Outboard Valve"
MO-2-10-18 is the "Shutdown Cooling Inboard Valve"
MO-2-10-25A is the "A RHR Loop Inboard Discharge Valve"

A. (1) MO-2-10-17 AND MO-2-10-18 close ONLY.
   (2) Direct high pressure signal defeated IAW ON-125, "Loss or Unavailability of Shutdown Cooling".

B. (1) MO-2-10-17 AND MO-2-10-18 AND MO-2-10-25A close.
   (2) Direct Rx water level raised to > +50" IAW GP-12, "Core Cooling Procedure".

C. (1) MO-2-10-17 AND MO-2-10-18 close ONLY.
   (2) Direct that Alternate Decay Heat Removal Systems be placed in service IAW ON-125, "Loss or Unavailability of Shutdown Cooling".

D. (1) MO-2-10-17 AND MO-2-10-18 AND MO-2-10-25A close.
   (2) Direct a Reactor Recirc Pump to be started IAW GP-12, "Core Cooling Procedure".

Answer Key		
Question # 79 SRO		
Choice		Basis or Justification
Correct:	C	Correct – (1) Correct valves. MO-2-10-17 <u>AND</u> MO-2-10-18 get a close signal (PCIS Group II) .MO-2-10-25A will not get a close signal if RPV press is> 70 psig. (2) ON-125 "Loss of SDC" directs if in MODE 3 > 70 psig to line up Alt Decay Heat Removal system(s).
Distractors:	A	Incorrect – (1) Correct valves. (2) Per ON-125 an Alt Decay HT removal system is required to be placed in service. You can only defeat high pressure signal per ON-125 if RPV pressure is <70 psig.
	B	Incorrect – (1) MO-25 A does not close (isolate) on hi press (>70 psig). (2) Raising reactor level to > 50" is required if in MODE 3 and <70 psig. Not the case here.
	D	Incorrect – (1) MO-25A does NOT close on hi press (>70 psig). (2) Restarting a RX recirc pump is an action required if in MODE 3 and <70 psig.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	ON-125 Loss or Unavailability of Shutdown Cooling		
Learning Objective:	PLOT-5010 Obj 3n		
K/A System:	295021 Loss of Shutdown Cooling	Importance:	SRO 4.1
K/A Statement: 2.4.31 - Emergency Procedures / Plan: Knowledge of annunciator alarms, indications, or response procedures.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

80. Unit 2 was operating at 100% power when a Loss of Instrument Air occurred. The following conditions exist:

80. Unit 2 was operating at 100% power when a Loss of Instrument Air occurred. The following conditions exist:

- SCRAM VALVE PILOT AIR HEADER PRESS HI-LOW (211 D-2) alarms
- A INSTRUMENT AIR HEADER LO PRESS (216 D-3) alarms
- B INSTRUMENT AIR HEADER LO PRESS (216 D-4) alarms
- Scram air header pressure is 50 psig and lowering
- ROD DRIFT (211 D-4) alarms
- The URO reports control rod 22-23 is drifting in

Which one of the following actions is required for these conditions?

A. Scram and enter T-100 “Scram” per ON-119 “Loss of Instrument Air”.

B. Use the EMER IN control switch to insert rod 22-23 to Full-In per ON-121 “Drifting Control Rod”.

C. Scram and enter T-100 “Scram” IF a second control rod drifts per ON-121 “Drifting Control Rod”.

D. Begin a rapid plant shutdown using GP-9-2 “Fast Reactor Power Reduction” per ON-119 “Loss of Instrument Air”.

Answer Key		
Question # 80 SRO		
Choice		Basis or Justification
Correct:	A	Applicant must recognize that ON-119 entry is required based on (interpret) IA System alarms. ON-119 directs a reactor scram if any control rod begins to drift in due to decreasing scram air header pressure. The given conditions indicate that scram air header pressure is lowering.
Distractors:	B	This is the correct action per ON-121 for a drifting control rod only (i.e., NOT due to a loss of instrument air). Entry into ON-119 (and direction to scram) overrides ON-121 actions for a drifting control rod.
	C	This is the correct action per ON-121 for a second drifting control rod, but is overridden by the direction in ON-119 to scram on the first drifting rod.
	D	This is required by ON-119 when instrument air header pressure cannot be stabilized above 75 psig, but is overridden by the requirement to scram if any control rod begins to drift.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH	3.0	3	10CFR55.43(b)(5)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☒ Previous NRC Exam: (PB 2009) ☐ Other Exam Bank: ()	
Reference(s):	ON-119; ON-121		
Learning Objective:	PLOT-DBIG-1550-2		
K/A System:	295019 – Partial or Complete Loss of Instrument Air	Importance:	SRO 4.4
K/A Statement: 2.4.49 – Emergency Procedures / Plan: Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

81. Unit 3 was at 100% power when a steam leak occurred in the Drywell.

- Alarm 310 F-1 "DRYWELL HI PRESS TRIP" was received.
- A full automatic reactor scram occurred due to high Drywell pressure.
- ALL control rods fully inserted EXCEPT for 3 control rods presently at position "24".
- Drywell radiation is presently 90 R/hour.
- Drywell pressure rose to 18 psig and suddenly lowered to 0.4 psig.
- Alarm 310 F-1 "DRYWELL HI PRESS TRIP" was able to be reset.
- Alarm 310 J-3 "HIGH AREA TEMP" was received.
- TRS-3-13-139 point 22 (RB 165' General Area) is reading 100°F and rising.
- Torus temperature is 92°F and slowly rising.

What is the <u>HIGHEST</u> classification for the given conditions?

EP-AA-1007 "Radiological Emergency Plan for Peach Bottom Atomic Power Station – Table PBAPS 3-1 EAL Matrix" is <u>PROVIDED</u> <u>SEPARATELY</u>.

A. MU5

B. MA2

C. FA1

D. FS1

Answer Key		
Question # 81 SRO		
Choice		Basis or Justification
Correct:	D	Correct – Greater than 2 psig in the Drywell (Loss of Reactor Coolant System) and the sudden drop in Drywell pressure with Alarm 310 F-1 "DRYWELL HI PRESS TRIP" reset (Loss of Containment) makes the condition a loss of 2 barriers which results in a Site Area emergency per EAL FS1.
Distractors:	A	Incorrect - The candidate may select EAL MU5 since it is for reactor coolant system leakage while operating. It is related to the >10 gpm unidentified leakage and the >25 gpm identified leakage. Not applicable in this case.
	B	Incorrect – EAL MA2 is for an automatic scram condition failing to shutdown the reactor as indicated by reactor power > 4%. The candidate may select this EAL based on the ATWS (3 control rods not full in). Reactor power cannot be as high as 4% with only 3 control rods out.
	C	Incorrect – The candidate may select EAL FA1 if it determined that only a loss (or potential loss) of reactor coolant system exists. There is also a loss of containment barrier.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank	
Reference(s):	EP-AA-1007 EAL Matrix		
Learning Objective:	PLOT		
K/A System	295024 High Drywell Pressure	Importance:	SRO 4.2
K/A Statement 2.4.40 – Emergency Procedures / Plan: Knowledge of SRO responsibilities in emergency plan implementation.			
REQUIRED MATERIALS:	EP-AA-1007 EAL Matrix		
Notes and Comments:			

82. Unit 2 is at 100% power.

Unit 2 Intake Canal temperature is being monitored per TS 3.7.2.

Previous 24 hours of hourly-recorded temperatures are:

90.2	90.3
90.2	90.2
90.2	90.2
90.2	90.2
90.2	90.3
90.3	90.2
90.2	89.9
89.9	90.2
89.9	90.2
89.8	89.9
89.9	89.9
89.9	90.2

What action is required, if any, to comply with TS 3.7.2 LCO (on next page)?

A. Restore ESW to operable status within 1 hour, or be in MODE 3 in 12 hours and MODE 4 in 36 hours.

B. Continue to monitor Normal Heat Sink temperature <u>AND</u> verify 24 hour average is $\leq$ 90°F.

C. Be in Mode 3 in 12 hours and Mode 4 in 36 hours.

D. No additional actions are required.

3.7 PLANT SYSTEMS

3.7.2 Emergency Service Water (ESW) System and Normal Heat Sink

LCO 3.7.2 Two ESW subsystems and normal heat sink shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ESW subsystem inoperable.	A.1 Restore ESW subsystem to OPERABLE status.	7 days
B. Water temperature of the normal heat sink is > 90°F and ≤ 92°F.	B.1 Verify water temperature of the normal heat sink is ≤ 90°F averaged over the previous 24 hour period.	Once per hour
C. Required Action and associated Completion Time of Condition A or B not met. OR Both ESW subsystems inoperable. OR Normal heat sink inoperable [for reasons other than condition B].	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours

Answer Key		
Question # 82 SRO		
Choice		Basis or Justification
Correct:	C	Correct – TS LCO Cond B applies since stated current reading is > 90°F. Averaging previous 24 hourly readings yields 90.10°F, which is in excess of 90°F. TS 3.7.2 bases states "If the water temperature of the normal heat sink exceeds 90°F when averaged over the previous 24 hour period, Condition C must be entered immediately. Required action is to shutdown IAW condition C.
Distractors:	A	Incorrect – see above for TS LCO discussion – Plausible because candidate could confuse 1 hour in Required Action with once per hour in Completion time per Bases, Condition C must be entered immediately.
	B	Incorrect – see above for TS LCO discussion – Plausible because candidate could incorrectly calculate conditions and incorrectly determine that Condition B applies.
	D	Incorrect – see above for TS LCO discussion – Plausible because candidate could incorrectly determine average temperature as being below 90 F and decide no further action is required.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(2)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank	
Reference(s):	TS 3.7.2 and Bases		
Learning Objective:	PLOT 1858 Obj 1		
K/A System	295018 Partial or Total Loss of CCW	Importance:	SRO 4.7
K/A Statement	2.2.40 - Equipment Control: Ability to apply technical specifications for a system.		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:	At Peach Bottom, ESW provides CCW for a most of the ECCS components that require CCW.		

83. Unit 2 is at rated power.

- A small steam leak has occurred in the Drywell.
- Computer point for DRYWELL TEMP INDICATOR TI-2501 ZONE 4 is invalid.
- PR/TR-4805 "Containment Temp" is reading 131°F.

Referencing RT-O-40C-530-2 "Drywell Temperature Monitoring" <u>PROVIDED ON NEXT PAGE.</u>, calculate approximate Drywell Bulk Average Temperature and determine required actions.

Technical Specification 3.6.1.4 "Drywell Air Temperature" is <u>PROVIDED SEPARATELY</u>

A. Continue to monitor Drywell temperature, no further actions required.

B. Direct standby Drywell Coolers and Drywell Chillers in service IAW ON-120 High Drywell temperature.

C. Restore Drywell Average Air temperature to within T.S. limits in 8 hours or be in MODE 3 in 12 hours.

D. Direct maximizing Drywell Cooling, bypassing DW Fan Trips using T-223 if necessary, IAW T-102, "Primary Containment Control".

6.2 Drywell Temperature Calculations

> **NOTE**
>
> **IF** all temperature points in a given zone on TI-2501 are out of service, **THEN** Drywell Bulk Average Temperature calculation on Data Sheet 1 will be INVALID **AND EITHER** TI-2501 Point 136 **OR** PR/TR-4805 must be used to calculate APPROXIMATE Drywell Bulk Average Temperature for entry into ON-120 and T-102. Refer to Precaution Step 4.2.2 for limitations on T-223, T-102 or SAMP-2 actions with Invalid Drywell Bulk Average Temperature.

6.2.1 **IF** TI-2501 or corresponding PMS computer points have at least 1 valid temperature point in each of Zones 1 through 5, **THEN CALCULATE** Drywell Bulk Average Temperature using calculation on Data Sheet 1. **OTHERWISE, N/A** this step. ______ ______

6.2.2 **IF** TI-2501 or corresponding PMS computer points does **NOT** have at least 1 valid temperature point in each of Zones 1 through 5, **THEN CALCULATE** APPROXIMATE Drywell Bulk Average Temperature as follows. **OTHERWISE, N/A** this step:

1. **RECORD** temperature reading from **EITHER** TI-2501 Point 136 **OR** PR/TR-4805 "Containment Temp" at Panel 20C003-02.

   ______________ ________°F ______ ______
   Instrument Used

2. **ADD** 10°F to temperature recorded in substep 1 above to determine APPROXIMATE Drywell Bulk Average Temperature.

   ________ °F + 10°F = ________ °F ______ ______

6.2.3 **VERIFY** Drywell Bulk Average Temperature is less than 140°F. **R** ______ $\boxed{}$

Answer Key		
Question # 83 SRO		
Choice		Basis or Justification
Correct:	B	CORRECT – Calculated DW temp is 141°F. ON-120 entered with drywell temp above 140°F. ON-120 provides direction to start standby DW coolers and DW Chillers to restore DW temp below 140°F.
Distractors:	A	INCORRECT – Calculated average DW temp is 141°F. Entry into ON-120 is required.
	C	INCORRECT – Calculated average DW temp is 141°F. TS 3.6.1.4 Drywell Air Temp requires DW average air temp to be ≤ 145°F. No TS entry.
	D	INCORRECT – Calculated average DW temp is 141°F. No current entry condition into T-102 exists.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	RT-O-40C-530-2 "Drywell Temperature Monitoring"		
Learning Objective:	PLOT-5040C Obj 10		
K/A System:	295012 High Drywell Temperature	Importance:	SRO 3.9
K/A Statement:	AA2.01 - Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE : Drywell temperature		
REQUIRED MATERIALS:	**Tech Spec 3.6.1.4 Drywell Air Temperature**		
Notes and Comments:			

84. Unit 2 is operating at 100% power when the following conditions occur:

- Torus level is 13.5 feet and steady
- Torus Room level is 120 inches and rising.
- "C" RHR room level is 2 ft. and rising.

What actions are required for these conditions?

A. Use SE-9, "Radioactive Liquid Spill" to lower water level in the RHR room.

B. Perform a GP-3, "Normal Plant Shutdown".

C. Perform a GP-4, "Manual Reactor Scram".

D. Perform a T-112 "Emergency Blowdown".

TABLE SC/L-2

WATER LEVEL-ALARM AND ACTION LEVELS

AREA	ALARM LEVEL	ACTION LEVEL		INDICATION	STATUS
		UNIT 2	UNIT 3		
TORUS ROOM	6 IN.	100 IN.	100 IN.	LI-2(3)919	
SUMP ROOM OR RCIC ROOM OR HPCI ROOM	NONE 6 IN. 6 IN.	1 FT 7 IN. 2 FT 5 IN. 2 FT 2 IN.	1 FT 4 IN. 2 FT 5 IN. 2 FT 2 IN.	LOCAL SIGN LOCAL SIGN LOCAL SIGN	
A RHR ROOM OR C RHR ROOM	6 IN. 6 IN.	2 FT 11 IN. 1 FT 3 IN.	3 FT 5 IN. 3 FT 5 IN.	LOCAL SIGN LOCAL SIGN	
B RHR ROOM OR D RHR ROOM	6 IN. 6 IN.	1 FT 5 IN. 3 FT 4 IN.	3 FT 5 IN. 3 FT 5 IN.	LOCAL SIGN LOCAL SIGN	
A CS ROOM OR C CS ROOM	6 IN. 6 IN.	1 FT 10 IN. 3 FT 6 IN.	3 FT 3 IN. 3 FT 1 IN.	LOCAL SIGN LOCAL SIGN	
B CS ROOM OR D CS ROOM	6 IN. 6 IN.	2 FT 5 IN. 2 FT 3 IN.	2 FT 4 IN. 2 FT 10 IN.	LOCAL SIGN LOCAL SIGN	

Answer Key		
Question # 84 SRO		
Choice		Basis or Justification
Correct:	B	Correct –.A leak form the Torus Room into the RHR Room is not: • Isolable • a primary system • in the same area These condition per T-103 "Secondary Containment Control" require a GP-3 shutdown
Distracters:	A	Incorrect –. Procedure SE-9 "Radioactive Liquid Spill" provides direction to isolate the source of the spill. Direction to control room level is from T-103.
	C	Incorrect –.GP-4 would be performed if the condition was caused by a primary system leak. It is not a primary system leak.
	D	Incorrect – T-112 Emergency Blowdown would be performed if the condition was caused by a primary system leak. It is not a primary system leak.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	T-103 "Secondary Containment Control" and associated bases		
Learning Objective:	PLOT 2103 DBIG Obj 5		
K/A System:	295036 Secondary Containment High Sump/Area Water Level	Importance:	SRO 4.6
K/A Statement: 2.1.20 Ability to interpret and execute procedure steps.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

85. The Unit 3 Reactor fails to scram on high Reactor Pressure. The following conditions exist on Unit 3:

- ARI automatically initiated as designed.
- The URO has taken actions to stabilize RPV level at + 10 inches.
- Reactor pressure peaked at 1150 psig, lowered, and is now stable at 100 psig.

Given the above conditions, which of the following will be most effective (fastest) method of inserting the maximum number of control rods?

A. T-213, “Scram Solenoid De-energization”

B. T-214, “Isolating and Venting the Scram Air Header”

C. T-215, “Control Rod Insertion by Withdraw Line Venting”

D. T-246, “Maximizing CRD Flow to the Reactor Vessel”.

Answer Key		
Question # 85 SRO		
Choice		Basis or Justification
Correct:	D	Correct – The conditions indicate that there is a hydraulic ATWS. T-246 is used for low reactor pressure conditions. With low reactor pressure and maximum CRD flow all control rods should insert into the core.
Distractors:	A	Incorrect – with a hydraulic ATWS T-213 will not be effective.
	B	Incorrect – with a hydraulic ATWS T-214 will not be effective.
	C	Incorrect – T-215 will only allow insertion of one control rod at a time.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank	
Reference(s):	T-246, “Maximizing CRD Flow to the Reactor Vessel”		
Learning Objective:	PLOT 2101 Obj 7q		
K/A System	295015 Incomplete SCRAM	Importance:	SRO 4.1

K/A Statement

2.4.34 – Emergency Procedures / Plan: Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

86. The following conditions exist immediately after a large-break LOCA:

- RPV pressure is 100 psig and dropping.
- All RHR pumps are injecting into the RPV.
- All Core Spray pumps are injecting into the RPV.
- RPV level is -170 inches and rising rapidly.

10 minutes have elapsed since the above (initial) conditions, and no operator actions have been taken.

Which one of the following identifies (1) the ADS response and (2) the action required, if any, for these conditions?

A. (1) ADS initiated
(2) Instrument Nitrogen must be restored to maintain a long term nitrogen supply per T-101, “RPV Control”.

B. (1) ADS initiated
(2) no actions are required. The ADS accumulators will keep the ADS valves open.

C. (1) ADS did not initiate
(2) open all ADS valves per T-112, “Emergency Blowdown”.

D. (1) ADS did not initiate
(2) Instrument Nitrogen must be restored to maintain a long term nitrogen supply per T-101, “RPV Control”.

Answer Key		
Question # 86 SRO		
Choice		Basis or Justification
Correct:	D	Correct – ADS will not initiate. Drywell pressure must be above 2 psig or RPV level must be below -160 inches for 9.5 minutes. Neither of these conditions are present. T-101 "RPV Control", step RC/P-4, directs a nitrogen supply be restored for long term operation of the ADS valves.
Distractors:	A	Incorrect – ADS will not initiate without Drywell pressure above 2 psig or RPV level must be below -160 inches for 9.5 minutes. RPV level will recover with the current injection rate of the RHR and Core Spray systems.
	B	Incorrect – ADS will not initiate without Drywell pressure above 2 psig or RPV level must be below -160 inches for 9.5 minutes. The ADS SRV accumulators do not provide a long term supply of nitrogen.
	C	Incorrect – PRV level is above a level requiring an Emergency Blowdown. The ADS valve position will be changed based on the crews long term ability to control RPV level above -172".

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank	
Reference(s):	T-101 "RPV Control" SO 1G.1.A-2 "SRV and SV System Alignment for Normal Operation"		
Learning Objective:	PLOT-5001G Obj. 10		
K/A System	218000 ADS	Importance:	SRO 3.6
K/A Statement A2.02 – Ability to (a) predict the impacts of the following on the AUTOMATIC DEPRESSURIZATION System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations.: Large break LOCA			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

87. Unit 2 is in Mode 1 at 100% power.

A DC ground has occurred causing alarm “2A DC POWER PANEL LO VOLTAGE” (209 C-3).

The Equipment Operator reports that voltage on 20D21 is 90 VDC.

Based on the above,
(1) what procedure will be used to address this condition, and
(2) what action will be required?

E-26, Sh 1 “125/250VDC System -Unit 2” is PROVIDED SEPARATELY.

A. (1) SO 57B.1-2 ‘125 250 Volt Station Battery Charger Operations’
(2) verify HPCI is operable and restore RCIC to operable status within 14 days.

B. (1) SE-13 ‘Loss of a 125 or 250 VDC Safety Related Bus’
(2) a Tech Spec 3.0.3 shutdown is required.

C. (1) SE-13 ‘Loss of a 125 or 250 VDC Safety Related Bus’
(2) verify RCIC is operable and restore HPCI to operable status within 14 days.

D. (1) SO 57B.1-2 ‘125 250 Volt Station Battery Charger Operations’
(2) a Tech Spec 3.0.3 shutdown is required.

Answer Key		
Question # 87 SRO		
Choice		Basis or Justification
Correct:	B	Correct – 20D21 is the Division I battery. RCIC is powered from the Division I battery. The 'A' Core Spray Loop and the 'A' RHR pump are INOP requiring a Tech Spec 3.0.3 shutdown.
Distractors:	A	Incorrect – 20D21 is the Division I battery. RCIC is powered from the Division I battery. Since 'A' Core Spray loop and 'A' RHR pump are INOP this requires a 3.0.3 shutdown not just a 14 day action statement. SO 57B.1-2 does not resolve the low voltage/ground condition.
	C	Incorrect – 20D21 is the Division I battery. HPCI is powered from Division II.
	D	Incorrect – 20D212 is the Division I battery. HPCI is powered from Division II. SO 57B.1-2 does not resolve the low voltage/ground condition.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(2)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank	
Reference(s):	SE-13, Tech Spec 3.5		
Learning Objective:	PLOT-5057 Obj. 10		
K/A System	263000 DC Electrical Distribution	Importance:	SRO 3.2

K/A Statement

A2.01 – Ability to (a) predict the impacts of the following on the D.C. ELECTRICAL DISTRIBUTION; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Grounds

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

88.
- A Reactor startup is in progress on Unit 2.
- The Reactor Mode Switch is in Startup.
- Control Rods are being withdrawn when Alarm 210 H-5 "24/48 VOLT BUS 2E-2G TROUBLE' is received.
- An Equipment Operator sent to investigate reports that there are 0 volts at panel 2AD045.

Given the above conditions, which one of the following is the correct action with respect to the Reactor Startup?

A section of print E-24, 'Single Line Diagram $\pm$ 24VDC Power System' <u>PROVIDED ON NEXT PAGE.</u>

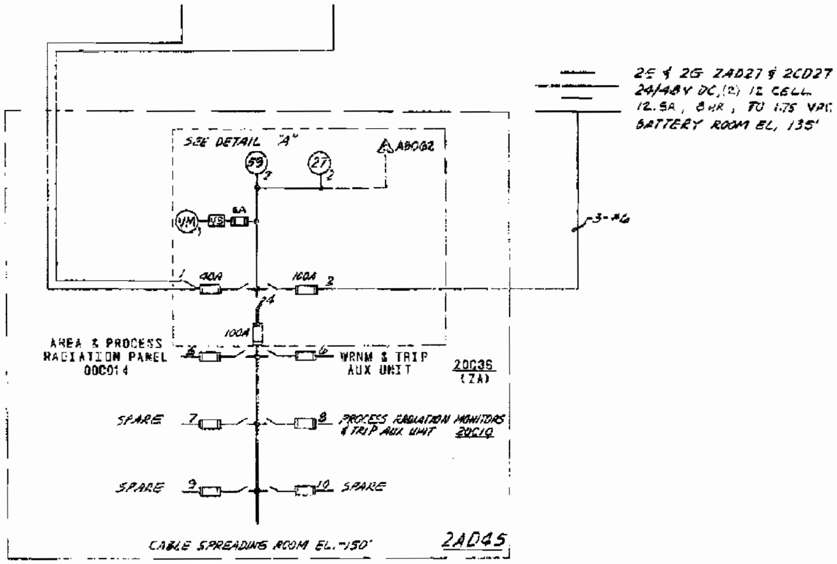
Technical Specification 3.3.1.1 "RPS Instrumentation" is <u>PROVIDED SEPARATELY</u>.

A. Bypass the affected WRNM and continue the startup.

B. Continue rod withdrawal and exit MODE 2 within 12 hours.

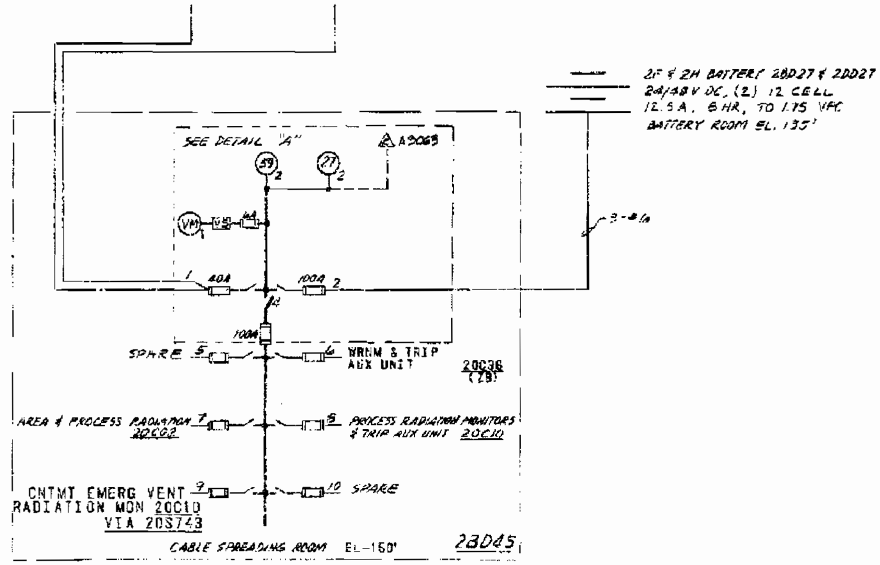
C. Place the associated trip system in trip within 12 hours.

D. Begin a shutdown and be in MODE 3 within 12 hours.



24/48V DC DISTRIBUTION PANEL SYSTEM A

UNIT 2



2F 24/48V DC DISTRIBUTION PANEL SYSTEM B

Answer Key		
Question # 88 SRO		
Choice		Basis or Justification
Correct:	C	Correct – This malfunction will make 4 WRNMs inoperable. Only one can be bypassed. The other 3 WRNMs would produce a control rod block and not allow a continued startup. Tech Spec 3.3.1.1.A.1 or A.2 requires that the trip system be placed in trip within 12 hours.
Distracters:	A	Incorrect – Only one WRNM could be bypassed. The other 3 WRNMs would produce a control rod block and not allow a continued startup.
	B	Incorrect – Control rod withdrawal cannot continue because of the control rod block.
	D	Incorrect – Mode 3 is not required until the completion times of Tech Spec 3.3.1.1.A.1 or A.2 cannot be met.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(2)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	Tech Spec 3.3.1.1 ARC 210 H-5, 24/48 volt bus 2E-2G Trouble E-24 'Single Line Diagram ± 24VDC Power	
Learning Objective:	PLOT 5060C Obj 10.a	
K/A System:	215003 IRM	Importance: SRO 4.3
K/A Statement: 2.4.45 Emergency Procedures / Plan: Prioritize/Interpret annunciator/alarm.		
REQUIRED MATERIALS:	**Tech Spec 3.3.1.1 (Unit 2)**	
Notes and Comments:		

89. Unit 2 is operating at 100% power with both RPS M-G sets in service.

- Annunciator 208 E-1 RPS 'A' M-G SET TROUBLE OR IN TEST alarms.
- Subsequent investigation in the E-12 Room indicates that RPS 'A' M-G Set output circuit breakers AC757A and AC757C have a loss of DC control power.

For an actual undervoltage condition, the 'A' RPS M-G Set output breakers ___(1)___ automatically trip, and based on this condition ___(2)___.

Technical Specification 3.3.8.2 "RPS Electric Power Monitoring" is <u>PROVIDED SEPARATELY</u>.

A. (1) will
(2) no action is required

B. (1) will
(2) DC control power must be restored within 72 hours

C. (1) will <u>NOT</u>
(2) 'A' RPS must be transferred to the alternate source within 1 hour per SO 60F.6.A-2 "Transferring RPS Power Supplies"

D. (1) will <u>NOT</u>
(2) 'A' RPS must be transferred to the alternate source within 72 hours per SO 60F.6.A-2 "Transferring RPS Power Supplies"

Answer Key		
Question # 89 SRO		
Choice		Basis or Justification
Correct:	C	Correct – The loss of DC control power prevents the RPS M-G Set output circuit breakers from functioning. The RPS M-G Set output circuit breakers are in series. With both RPS output circuit breakers unavailable, auto trip capability is lost. Tech Spec 3.3.8.2. Condition B requires 1 hour to remove the RPS M-G Set from service which will first require the A' RPS to be transferred to the alternate source per SO 60F.6.A-2 "Transferring RPS Power Supplies"
Distractors:	A	Incorrect – The loss of DC control power does prevent the RPS M-G Set output circuit breakers from functioning. Action is required for this condition. With both RPS output circuit breakers unavailable, auto trip capability is lost. Tech Spec 3.3.8.2. Condition B requires 1 hour to remove the RPS M-G Set from service which will first require the A' RPS to be transferred to the alternate source per SO 60F.6.A-2 "Transferring RPS Power Supplies"
	B	Incorrect – The loss of DC control power does prevent the RPS M-G Set output circuit breakers from functioning. The RPS M-G Set output circuit breakers are in series. With both RPS output circuit breakers unavailable, auto trip capability is lost. Tech Spec 3.3.8.2. Condition B requires 1 hour to remove the RPS M-G Set from service.
	D	Incorrect – With both RPS output circuit breakers unavailable, auto trip capability is lost. Tech Spec 3.3.8.2. Condition B requires 1 hour to remove the RPS M-G Set from service which will first require the A' RPS to be transferred to the alternate source per SO 60F.6.A-2 "Transferring RPS Power Supplies".

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation			
Source:	☐ New Exam Item ☒ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	TS 3.3.8.2, E-2365		
Learning Objective:	PLOT 5060F Obj 8		
K/A System:	212000 RPS	Importance: SRO 4.0	
K/A Statement: 2.4.50 – Emergency Procedures / Plan: Ability to verify system alarm setpoints and operate controls identified in the alarm response manual			
REQUIRED MATERIALS:	**Tech Spec 3.3.8.2 (Unit 2)**		
Notes and Comments:			

90. The following conditions are present on Unit 2 during an ATWS:

- Both CRD pumps are unavailable
- The CRS directs initiation of SBLC
- The URO performs RRC 11.1-2 “SBLC System Initiation During a Plant Event” and reports the following:
  - SBLC pump discharge pressure is 1400 psig
  - SBLC tank level is 56 percent
  - RWCU is isolated

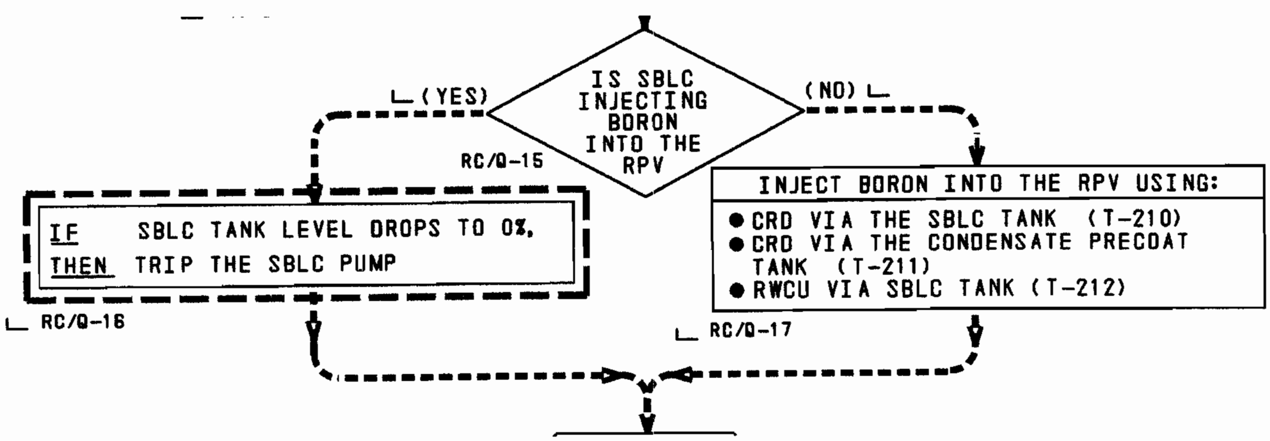
Per T-101 “RPV Control”, which one of the following is correct for these conditions?

A. SBLC is injecting; monitor SBLC tank level per T-101 step RC/Q-16.

B. SBLC is NOT injecting; perform T-210 “CRD System SBLC Injection”.

C. SBLC is NOT injecting; perform T-211 “CRD System Non-enriched Boric Acid and Borax Injection”.

D. SBLC is NOT injecting; perform T-212 “RWCU System SBLC Injection”.



Answer Key		
Question # 90 SRO		
Choice		Basis or Justification
Correct:	D	Based on the given conditions, SBLC is not injecting into the RPV: 1400 psig pump discharge pressure indicates the SBLC pump discharge relief valve is lifting (due to a blocked flow path). T-210 and T-211 cannot be performed without at least one CRD system pump available. Therefore, T-212 is the only option available, which can be implemented even though RWCU is isolated.
Distractors:	A	Execution of T-101 step RC/Q-16 is based on SBLC injecting into the RPV. Based on the given conditions, SBLC is not injecting into the RPV.
	B	The applicant must know that T-210 cannot be performed without at least one CRD system pump available. In other words, use of T-210 requires CRD system piping and an available CRD pump.
	C	The applicant must know that T-211 cannot be performed without at least one CRD system pump available. In other words, use of T-211 requires CRD system piping and an available CRD pump.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☒ Previous NRC Exam: (PB 2009) ☐ Other Exam Bank: ()	
Reference(s):	T-101 and Bases; P&ID M-358, Sheet 1		
Learning Objective:	PLOT-5011-4h		
K/A System:	211000 – Standby Liquid Control	Importance:	SRO 3.4

K/A Statement:

A2.04 – Ability to (a) predict the impacts of the following on the Standby Liquid Control System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Inadequate system flow.

REQUIRED MATERIALS:	**NONE**
Notes and Comments:	

91. Unit 2 was operating at 100% power when a low RPV level transient occurred.

- HPCI initiated on low RPV level and immediately isolated on a steam supply line break.
- RCIC initiated on low RPV level and is injecting at 400 gpm.

For the above condition, determine the effect on Reactor Building Ventilation and the correct follow-up action, if any.

Assume 5 minutes has elapsed since the low level transient occurred.

Reactor Building Ventilation has ___(1)___ and ___(2)___.

A. (1) isolated
(2) direct use of GP 8.B, "PCIS Isolation – Groups II and III" to reset the isolation.

B. (1) isolated
(2) direct use of T-222, "Secondary Containment Ventilation Bypass" to restore Reactor Building ventilation.

C. (1) NOT isolated
(2) no actions are required.

D. (1) NOT isolated
(2) direct alignment of SBGT per SO 9A.1.B, "Standby Gas Treatment System Manual Startup" to provide an elevated release path.

Answer Key		
Question # 91 SRO		
Choice		Basis or Justification
Correct:	B	Correct – The RPV low level condition will cause a GRP III isolation. The GRP III isolation will cause a loss of RB ventilation and a rise of the main steam line temperatures. These temperatures will rise above the alarm setpoint and require entry into T-103 "Secondary Containment Control". This will allow the crew to use T-222 "Secondary Containment Ventilation Bypass". On a low RPV level transient RCIC alone will not provide enough flow to recover RPV level to > +1 inch until 15 to 20 minutes after the scram.
Distractors:	A	Incorrect – with the Group III isolation signal still in with RPV level < +1 inch, GP-8.B, "PCIS Isolation – Groups II and III" could not be used to reset the isolation.
	C	Incorrect – Reactor Building ventilation will isolate on the Group III isolation signal of RPV level < +1 inch.
	D	Incorrect – Reactor Building ventilation will isolate on the Group III isolation signal of RPV level < +1 inch.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam ☐ Other Exam Bank
Reference(s):	T-222 "Secondary Containment Ventilation Bypass" T-103 "Secondary Containment Control"	
Learning Objective:	PLOT 2103 Obj 7	
K/A System	288000 Plant Ventilation	Importance: SRO 3.6
K/A Statement A2.02 - Ability to (a) predict the impacts of the following on the PLANT VENTILATION SYSTEMS ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Low reactor water level		
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		

92. A refueling outage is in progress on Unit 2.

The following conditions exist:

- A core reload is in progress in accordance with FH-6C "Core Component Movement – Core Transfers".
- Core reload verification is in progress in accordance with NF-AA-330-1001 "Core Verification Guideline".

As the refuel Floor SRO you are asked to verify the orientation of a four cell section of the core that is displayed on the following page.

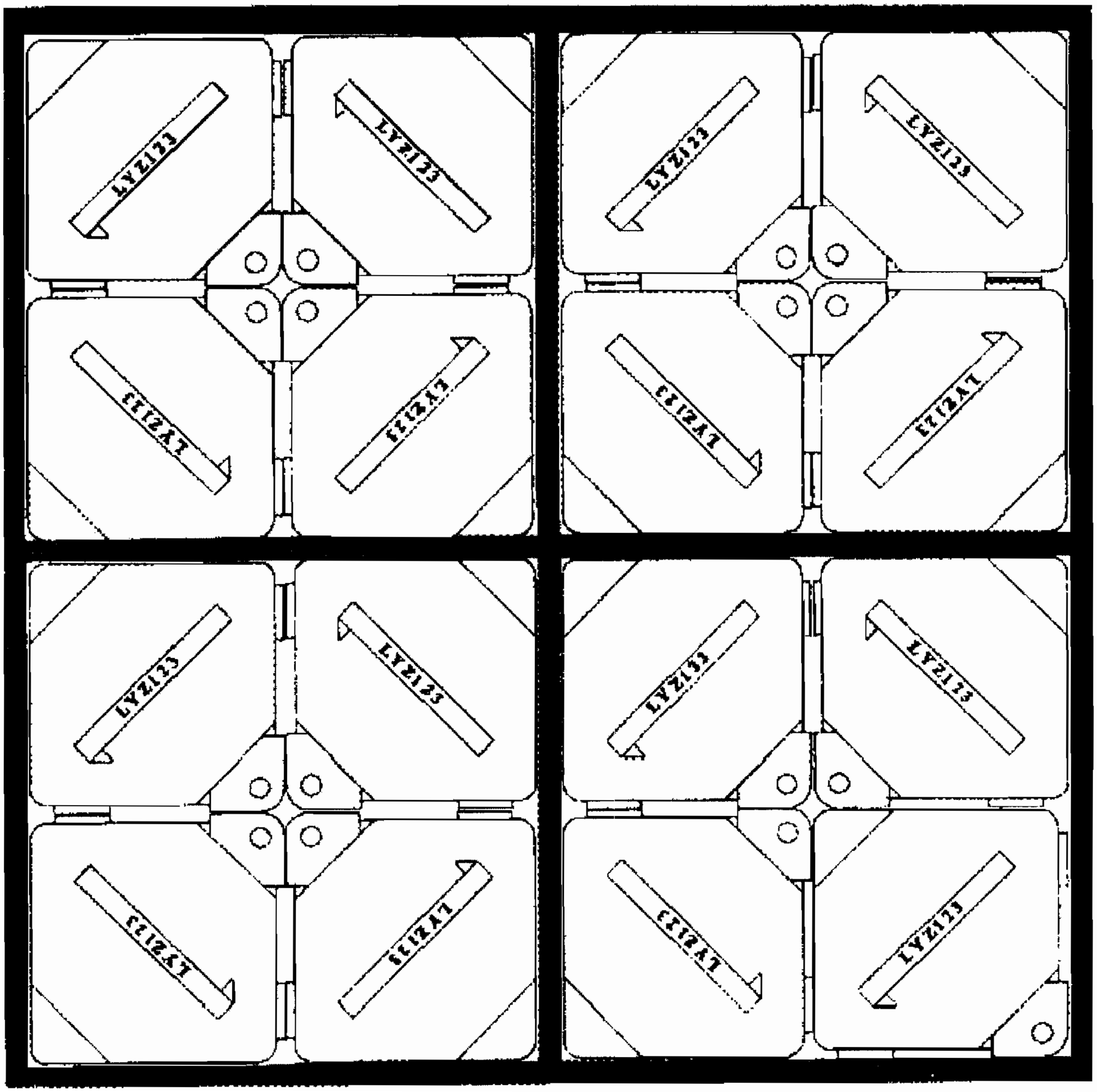
Per NF-AA-330-1001 "Core Verification Guideline" and based on the given fuel cell diagram on the following page, which of the following (1) actions, if any, is required and (2) what is the core reactivity concern, if any?

A. (1) no action required
(2) no issues with the core reload

B. (1) suspend core alterations ONLY
(2) negative reactivity insertion

C. (1) submit a Level 3 Reactivity Management Event ONLY
(2) core thermal limit violation

D. (1) suspend core alterations and submit a Level 3 Reactivity Management Event
(2) overheating of the fuel clad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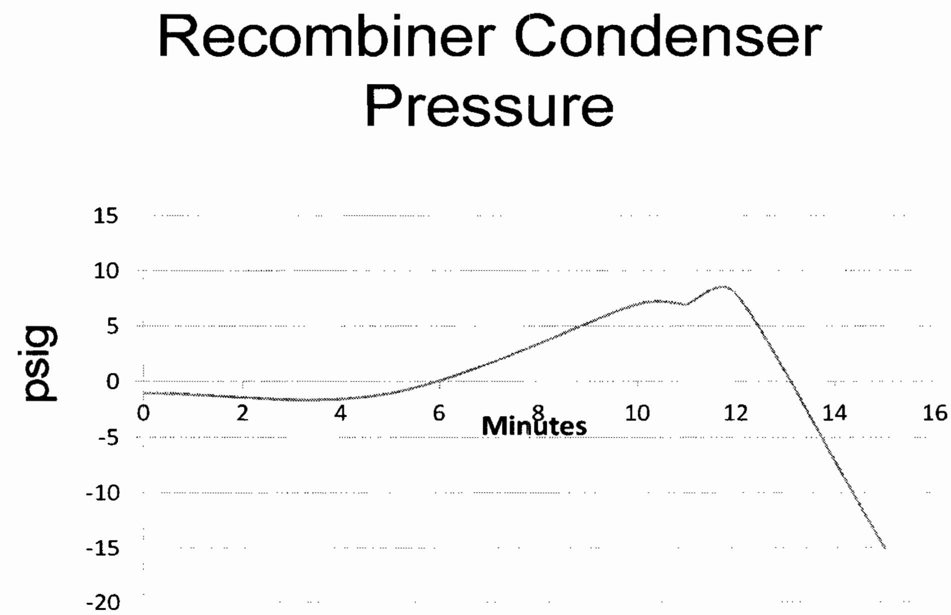
Answer Key		
Question # 92 SRO		
Choice		Basis or Justification
Correct:	D	Correct – The fuel bundle in the lower right hand corner is not oriented correctly (bale handle indicator is pointing away from the control rod). Suspend core alterations IAW FH-6C and initiate a Level 3 Reactivity Management Event IAW NF-AA-330-1001. Positive reactivity insertion, core thermal limit violation, and fuel clad overheating are all concerns of a mis-oriented fuel bundle IAW FASR 14.5 and Appendix J and NF-AA-330-1001.
Distractors:	A	Incorrect – Actions are required. See D above.
	B	Incorrect - Suspend core alterations IAW FH-6C <u>AND</u> initiate a Level 3 Reactivity Management Event IAW NF-AA-330-1001. Negative reactivity insertion is NOT a concern. A core thermal limit violation is a concern of a mis-oriented fuel bundle IAW FASR 14.5 and Appendix J and NF-AA-330-1001.
	C	Incorrect - Suspend core alterations IAW FH-6C <u>AND</u> initiate a Level 3 Reactivity Management Event IAW NF-AA-330-1001. Fuel clad overheating is a concern of a mis-oriented fuel bundle IAW FASR 14.5 and Appendix J and NF-AA-330-1001.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(6 &7)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam () ☐ Other Exam Bank	
Reference(s):	FH-6C “Core Component Movement – Core Transfers” NF-AA-330-1001 “Core Verification Guideline”.		
Learning Objective:	PLOT-1535 Obj 2		
K/A System	234000 Fuel Handling Equipment	Importance:	SRO 3.7
K/A Statement K5.05 - Knowledge of the operational implications of the following concepts as they apply to FUEL HANDLING EQUIPMENT: Fuel orientation			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

93. A loss of cooling to the Off-Gas Recombiner Condenser has occurred.

Using the chart determine the appropriate actions. Assume the loss of cooling began at T = 0.



A. The recycle valve failed to open; open the recycle valve per the ARC and return the Jet Compressors to service using AO 8.1-2, "Recovery from Off-Gas System Isolation".

B. The recycle valve opened and is returning condenser pressure to normal; continue to monitor operations of the Off-Gas system per SO 8.8.A-2, "Off-Gas System Routine Inspection".

C. MO-2990A, "Steam Supply" has isolated; swap Off-Gas Jet Compressors using AO 8.1-2, "Recovery from Off-Gas System Isolation".

D. MO-2990A, "Steam Supply" has isolated; reduce reactor power using GP-9-2, "Fast Reactor Power Reduction".

Answer Key		
Question # 93 SRO		
Choice		Basis or Justification
Correct:	D	CORRECT – The recycle valve opened as indicated by the flat spot on the curve at approx. 7 psig. The rise in pressure indicates that the recycle valve was not enough to control Recombiner Condenser pressure. When Recombiner Pressure reaches 8 psig, MO-2990 isolates. There are no alternate components in the Recombiner System that can be placed in service for this condition. This will cause main condenser vacuum to drop and require entry into OT-106 "Condenser Low Vacuum" and require a power reduction.
Distractors:	A	INCORRECT – The recycle valve did open to try and control pressure as evidenced by the flat spot on the graph. Returning a jet compressor to service will not remedy the problem.
	B	INCORRECT – The recycle valve is not successfully controlling Recombiner pressure as indicated by the rise in system pressure to 8 psig and then the rapid drop as MO-2990 isolated.
	C	INCORRECT – The MO-2990 is isolated but there are no alternate components in the Recombiner System that can be placed in service to restore the system.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(2)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	SO 8.8.A-2 "Off-gas System Routine Inspection" AO 8.1-2 "Recovery from Off-gas System Isolation" OT-106 "Condenser Low Vacuum" GP-9-2 "Fast Reactor Power Reduction"		
Learning Objective:	PLOT 5008 Obj 9d		
K/A System:	271000 Off-gas	Importance:	SRO 4.2
K/A Statement: 2.1.25 – Conduct of Operations: Ability to interpret references materials, such as graphs, curves, tables, etc.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:	none		

94. FH-6C, “Core Component Movement – Core Transfers” is in progress on Unit 3.

Per FH-6C, which of the following activities can continue without SBGT being in compliance with the requirements of Tech Spec 3.6.4.3 “Standby Gas Treatment System”?

A. OPDRVs

B. Core alterations

C. Handling of Fuel Casks in Secondary Containment

D. Movement of recently irradiated fuel assemblies

Answer Key		
Question # 94 SRO		
Choice		Basis or Justification
Correct:	C	Correct - Procedure FH-6C, "Core Component Movement – Core Transfers" lists the activities that require SBGT to be operable. The handling of fuel casks in Secondary Containment can continue without SBGT.
Distractors:	A	Incorrect – OPDRVs are prohibited without SBGT per Tech Spec 3.6.4.3 "Standby Gas Treatment System" and FH-6C.
	B	Incorrect – Core alterations are prohibited by FH-6C, "Core Component Movement – Core Transfers".
	D	Incorrect – Movement of recently irradiated fuel assemblies are prohibited without SBGT per FH-6C, "Core Component Movement – Core Transfers".

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
MEMORY			10CFR55.43(b)(3)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	FH-6C, "Core Component Movement – Core Transfers"		
Learning Objective:	PLOT 5019 Obj 9c		
K/A System:	Generic – Conduct of Operations	Importance:	SRO 3.9
K/A Statement: G 2.1.40 Knowledge of refueling administrative requirements			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

95. Which one of the following activities requires a Temporary Configuration Change (TCC) per CC-AA-112, "Temporary Configuration Changes"?

A. Installation and removal of a jumper in accordance with an approved surveillance test procedure.

B. Changing a Control Room alarm setpoint that is NOT in direct support of a Maintenance Work Order.

C. Installation and removal of Measurement and Test Equipment (M&TE) in accordance with an approved surveillance test procedure.

D. A temporary configuration change included with an Operations Clearance that does NOT affect the system beyond the clearance boundary.

Answer Key		
Question # 95 SRO		
Choice		Basis or Justification
Correct:	B	Per CC-AA-112, this is NOT an excluded activity and therefore requires a TCC.
Distractors:	A	Per CC-AA-112, this is an excluded activity and therefore does NOT require a TCC.
	C	Per CC-AA-112, this is an excluded activity and therefore does NOT require a TCC.
	D	Per CC-AA-112, this is an excluded activity and therefore does NOT require a TCC.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
Memory			10CFR55.43(b)(3)

Source Documentation			
Source:	☐ New Exam Item ☐ Modified Bank Item ☒ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	CC-AA-112		
Learning Objective:	PLOT-1570-19		
K/A System:	Generic – Equipment Control	Importance:	SRO 3.2
K/A Statement: G 2.2.5 Knowledge of the process for making design or operating changes to the facility.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

96. An Equipment Operator needs to enter a locked high radiation area for 15 minutes to manually operate several Primary Containment Isolation Valves to satisfy a Tech Spec required action.

- The dose rate in the work area is 6000 mR/hr.
- The Equipment Operator's present annual TEDE is 800 mR.

What is the highest level of authorization required to complete this task?

A. Unit Supervisor

B. Shift Manager

C. Radiation Protection Manager

D. Plant Manager

Answer Key		
Question # 96 SRO		
Choice		Basis or Justification
Correct:	C	Correct – The EO's TEDE will rise to 2300 mR after completing the task. Per RP-AA-203, the Admin Dose Control Level (ADCL) is 2000 mR. The procedure requires approval of the Work Group Supervisor and Rad Protection Manager to raise the worker's ADCL between 2000 mR and 3000 mR TEDE.
Distractors:	A	Incorrect – While RP-AA-203 requires approval of the Work Group Supervisor, it also requires the Rad Protection Manager to raise the worker's ADCL between 2000 mR and 3000 mR TEDE.
	B	Incorrect – For purposes of dose extension, the Shift Manager would be the equivalent of the Work Group Supervisor. RP-AA-203 also requires the Rad Protection Manager to raise the worker's ADCL between 2000 mR and 3000 mR TEDE.
	D	Incorrect - Plant Mgr approval is required for raising ADCL to between 3000 mR and 4000 mR. Not the case here.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(12)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	RP-AA-203 Exposure Control and Authorization		
Learning Objective:	PLOT-1730 Obj 4		
K/A System:	None	Importance:	SRO 3.7
K/A Statement:	2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions.		
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

97. Refer to the photographs on the following page.

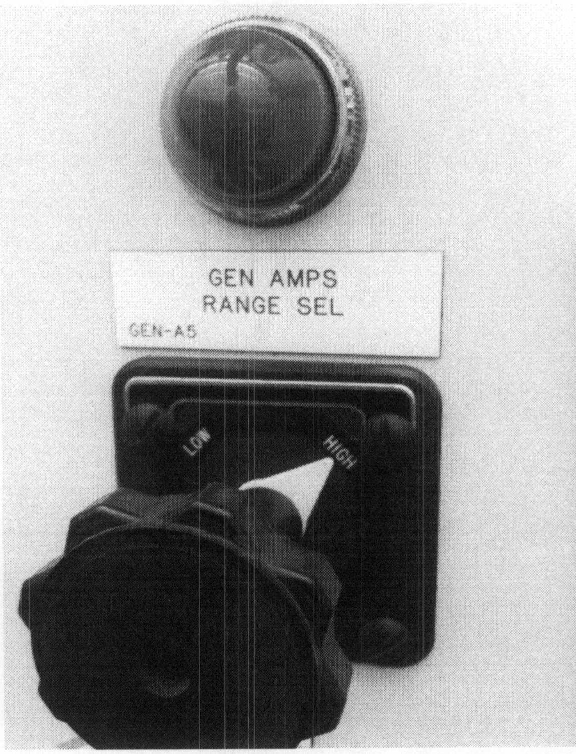
Based on the conditions shown, which one of the following describes (1) the status of the Stator Water Cooling (SWC) System and (2) the required action?

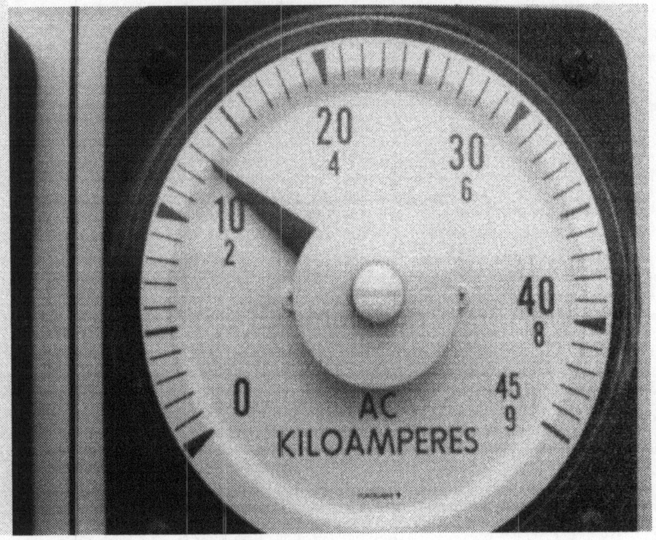
A. (1) A loss of SWC exists
(2) Reduce power per GP-5, “Power Operations”

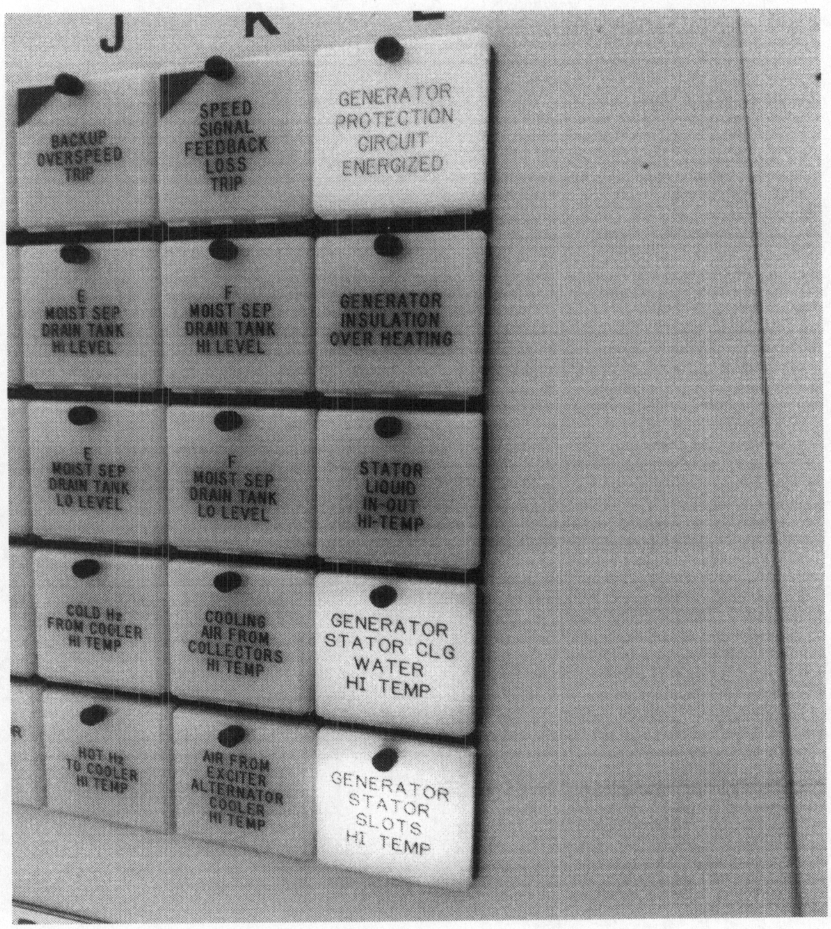
B. (1) A loss of SWC exists
(2) Reduce power per GP-9, “Fast Reactor Power Reduction”

C. (1) A loss of SWC exists
(2) Perform GP-4, “Manual Reactor Scram”

D. (1) A loss of SWC does NOT exist
(2) Continue monitoring per OT-113 “Loss of Stator Cooling”


GEN AMPS
RANGE SEL
GEN-A5
LOW
HIGH


0
10
2
20
4
30
6
40
8
45
9
AC
KILOAMPERES


J
K
BACKUP OVERSPEED TRIP
SPEED SIGNAL FEEDBACK LOSS TRIP
GENERATOR PROTECTION CIRCUIT ENERGIZED
E MOIST SEP DRAIN TANK HI LEVEL
F MOIST SEP DRAIN TANK HI LEVEL
GENERATOR INSULATION OVER HEATING
E MOIST SEP DRAIN TANK LO LEVEL
F MOIST SEP DRAIN TANK LO LEVEL
STATOR LIQUID IN-OUT HI-TEMP
COLD H2 FROM COOLER HI TEMP
COOLING AIR FROM COLLECTORS HI TEMP
GENERATOR STATOR CLG WATER HI TEMP
HOT H2 TO COOLER HI TEMP
AIR FROM EXCITER ALTERNATOR COOLER HI TEMP
GENERATOR STATOR SLOTS HI TEMP

Answer Key		
Question # 97 SRO		
Choice		Basis or Justification
Correct:	C	Correct - OT-113, "Loss of Stator Cooling" follow up actions explains that the alarms received do to make a valid loss of SWC and with main generator amps > 9,480 amps, a GP-4 scram is required.
Distractors:	A	Incorrect - GP-4 "Scram" is required, not GP-5.
	B	Incorrect - GP-4 "Scram" is required, not GP-9.
	D	Incorrect - the alarms received do to make a valid loss of SWC and with main generator amps > 9,480 amps, a GP-4 scram is required.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(12)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	OT-113, "Loss of Stator Cooling"		
Learning Objective:	PLOT-5050A Obj 6		
K/A System:	None	Importance:	SRO 3.7
K/A Statement: 2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:	Imbed photos		

98. Unit 3 is operating at 100% power

The following indications are observed:

- Main Steam Line radiation monitors (RR-3-17-252) indicate 1.3 E+3 mR/hr.
- Vent Stack Exhaust radiation monitors (RR-3979) indicates 3 E-7 μCi/cc.
- Air Ejector Discharge radiation monitor (RR-3-17-152) indicates 7.5 E+2 mR/hr.
- Main Stack Gas radiation monitor (RR-0-17-051A) indicates 3.7 E-6 μCi/cc.

Which one of the following describes the reason for the above indications and what procedural guidance is required to be directed?

A. A resin injection has occurred; lower power in accordance with GP-9-3, "Fast Reactor Power Reduction".

B. A resin injection has occurred; lower power in accordance with GP-9-3, "Fast Reactor Power Reduction" rods <u>ONLY</u>.

C. Fuel cladding damage has occurred; lower power in accordance with GP-9-3, "Fast Reactor Power Reduction".

D. Fuel cladding damage has occurred; lower power in accordance with GP-9-3, "Fast Reactor Power Reduction" rods <u>ONLY</u>.

Answer Key		
Question # 98 SRO		
Choice		Basis or Justification
Correct:	C	Correct – All the radiation monitors are reading normal full power background except the Steam Jet Air Ejector (SJAE) Discharge radiation monitor (RR-3-17-152). It is reading higher than normal. Failed fuel causes the release of fission product gases (Xe, Kr, I) into the reactor coolant. Fuel leaks do not cause Main Steam Line radiation levels to rise. The ½ life of Xe and Kr are long enough to indicate on the SJAE discharge radiation monitors. Alarm 318 E-1 “AIR EJECTOR DISCHARGE RADIATION HIGH-HIGH” requires reducing reactor power using GP-9-3 as required to maintain off gas discharge radiation levels below 700 mr/hr as read on RR-3-17-152. The GP-9 power reduction would include use of inserting control rods once the core flow limit is reached.
Distractors:	A	Incorrect – The injection of a resin into the reactor will cause a rise in N-16 activity in the main steam lines. During operation, the dissolved O2 in the reactor reacts with the N-16 to form nitrates (NO3). NO3 is soluble in water and does not readily carry over with the steam. A change in pH causes the N-16 to combine with the free hydrogen to produce ammonia (NH3) and nitrous oxide (N2O). Ammonia and nitrous oxide are more volatile; therefore more N-16 carries over with the steam. The rise in N-16 only indicates on the main steam line radiation monitors because of the short half life of the N-16.
	B	Incorrect – See A above.
	D	Incorrect - Alarm 318 E-1 “AIR EJECTOR DISCHARGE RADIATION HIGH-HIGH” requires reducing reactor power using GP-9-3 as required to maintain off gas discharge radiation levels below 700 mr/hr as read on RR-3-17-152. The GP-9 power reduction <u>would</u> include use of inserting control rods once the core flow limit is reached

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	ARC 318 E-1	
Learning Objective:	PLOT-5008 Obj 7i	
K/A System:	None	Importance: SRO 3.1
K/A Statement:	2.3.15 Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		

99.
- Unit 2 has experienced an ATWS condition.
- The HPCI System is injecting into the RPV at 2500 gpm.
- HPCI turbine speed is 2200 rpm.
- HPCI suction is lined up to the Torus
- RPV level is -195 inches and steady.
- Torus temp is 210°F and slowly rising.
- Torus pressure is 2.5 psig and slowly rising.

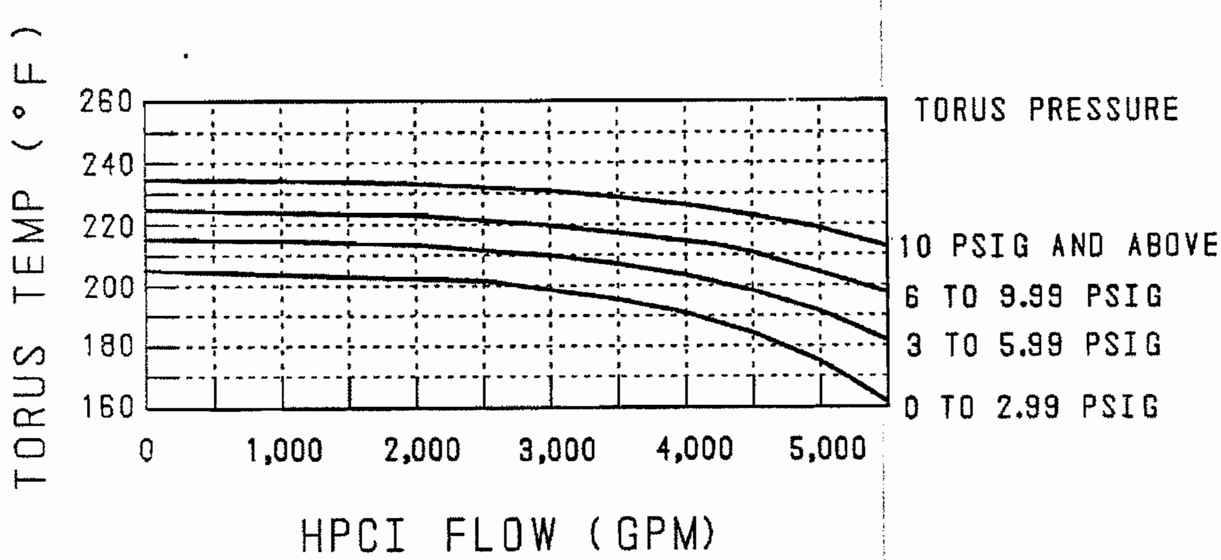
Using the HPCI NPSH Limit Curve below, based on the above conditions, the HPCI system pump NPSH is on the ___(1)___ side of curve and the Control Room Supervisor should direct ___(2)___.

A. (1) safe
(2) maintaining HPCI flow at the current value

B. (1) unsafe
(2) maintaining HPCI flow at the current value

C. (1) unsafe
(2) lowering HPCI turbine speed to return operation to the safe side of the NPSH curve

D. (1) unsafe
(2) securing HPCI; any further turbine speed reduction will cause system damage



Answer Key		
Question # 99 SRO		
Choice		Basis or Justification
Correct:	B	Correct - Torus temperature of 210°F and Torus pressure of 2.5 psig places system operation above the lowest curve on the NPSH curve, which is on the unsafe side of the curve. Due to the ATWS condition, RPV level was lowered per T-117 "Level Power Control" to -195" which supports Adequate Core Cooling (ACC). If the HPCI system speed is lowered, RPV level will lower and ACC is no longer assured. T-117 step LQ-18 and/or LQ-19 directs exceeding NPSH curves in order to maintain RPV level no lower than -195".
Distractors:	A	Incorrect – Torus temperature of 210°F and Torus pressure of 2.5 psig places system operation above the lowest curve on the NPSH curve, which is on the unsafe side of the curve.
	C	Incorrect – Torus temperature of 210°F and Torus pressure of 2.5 psig places system operation above the lowest curve on the NPSH curve, which is on the unsafe side of the curve. However, lowering HPCI turbine speed, and thereby lowering system flow, will not bring system operation below the lowest NPSH curve.
	D	Incorrect – Torus temperature of 210°F and Torus pressure of 2.5 psig places system operation above the lowest curve on the NPSH curve, which is on the unsafe side of the curve. If the HPCI system is secured RPV level will lower and ACC is no longer assured. T-117 step LQ-18 and/or LQ-19 directs exceeding NPSH curves in order to maintain RPV level no lower than -195".

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(5)

Source Documentation			
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()	
Reference(s):	T-117 "Level Power Control" step LQ-18 and LQ-19 T-102 , "Primary Containment Control" Sheet 3		
Learning Objective:	PLOT-2117 Obj 5		
K/A System:	None	Importance:	SRO 4.0
K/A Statement: 2.1.32 Ability to explain and apply all system limits and precautions.			
REQUIRED MATERIALS:	**NONE**		
Notes and Comments:			

100. During the performance of ST-O-032-301-3, “HPSW Pump, Valve, and Flow Functional and In-service Test” the 3C HPSW pump discharge differential pressure was in the ALERT Range.

Per ST-O-032-301-3, the 3C HPSW pump ___(1)___ and status is tracked by ___(2)___.

A. (1) is immediately declared inoperable
(2) a short duration time clock entry

B. (1) is immediately declared inoperable
(2) T.S. 3.7.1 Condition A – one HPSW subsystem inoperable

C. (1) remains operable
(2) initiating an issue to place the pump on increased test frequency.

D. (1) remains operable
(2) Potential Tech Spec Action (PTSA) entry

Answer Key		
Question # 100 SRO		
Choice		Basis or Justification
Correct:	C	Correct – per limitations step 4.3.6 of the ST. If any pump has test results in the ALERT range, the pump remains operable. Initiate an Issue to place the pump on increased test frequency
Distractors:	A	Incorrect - Pump is not declared inoperable until performance reaches the Action Range. A SDTC entry is not required per the ST. Only for SSCs that are inop.
	B	Incorrect - Pump is not declared inoperable until performance reaches the Action Range. A SDTC entry is not required per the ST. Only for Systems, Structures, and Components that are inoperable. T.S. 3.7.1 only entered if pump is inoperable.
	D	Incorrect – The degraded pump condition would not be tracked by a Potential Tech Spec Action (PTSA) entry. The PTSA would not need to be entered until the HPSW pump is declared inoperable.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
MEMORY			10CFR55.43(b)(5)

Source Documentation		
Source:	☒ New Exam Item ☐ Modified Bank Item ☐ ILT Exam Bank	☐ Previous NRC Exam: () ☐ Other Exam Bank: ()
Reference(s):	ST-O-032-301-3, “HPSW Pump, Valve, and Flow Functional and In-service Test”	
Learning Objective:	PLOT 5032 Obj 9	
K/A System:	None	Importance: SRO 4.3
K/A Statement: G 2.2.14 - Knowledge of the process for controlling equipment configuration or status.		
REQUIRED MATERIALS:	**NONE**	
Notes and Comments:		