

1. The 2A Drywell Equipment Drain pump was running during automatic pump down of the Drywell Equipment Drain Sump when the following alarms were received:

- GROUP II/III INBOARD ISOL. RELAYS NOT RESET (214 D-1)
- DRYWELL SUMP VALVES 94 OR 95 CLOSED (215 E-4)

Which one of the following shows the design response of the Drywell Equipment Drain (DWED) pumps and valves?

- | | | |
|----|---------------------------|---------|
| A. | Inboard Isolation AO-094 | Closed |
| | Outboard Isolation AO-095 | Open |
| | 2A DWED Pump | Running |
| | 2B DWED Pump | Tripped |
| B. | Inboard Isolation AO-094 | Closed |
| | Outboard Isolation AO-095 | Open |
| | 2A DWED Pump | Tripped |
| | 2B DWED Pump | Running |
| C. | Inboard Isolation AO-094 | Closed |
| | Outboard Isolation AO-095 | Open |
| | 2A DWED Pump | Tripped |
| | 2B DWED Pump | Tripped |
| D. | Inboard Isolation AO-094 | Closed |
| | Outboard Isolation AO-095 | Closed |
| | 2A DWED Pump | Tripped |
| | 2B DWED Pump | Tripped |

Answer Key		
Question # 1 RO		
Choice		Basis or Justification
Correct:	C	The given conditions indicate an inboard half isolation, causing DWED sump inboard isolation valve AO-094 to close. Nothing in the stem would indicate that outboard valve AO-095 has closed. If either the inboard or outboard isolation valve closes, both DWED pumps will trip.
Distractors:	A	Plausible if the applicant does not recall that the 2A DWED pump will trip if either isolation valve closes.
	B	Plausible if the applicant believes the 2B DWED pump will start on trip of the 2A pump during automatic pump down, and does not recall that either isolation valve closing will trip both pumps.
	D	Plausible if the applicant believes the conditions indicate a full (inboard and outboard) isolation of the DWED sump.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	ARC-215 E-4; GP-8.C COL		
Learning Objective:	PLOT-5007G-1m		
K/A System:	223002 – Primary Containment Isolation System/Nuclear Steam Supply Shut-off	Importance:	RO / SRO 2.8 / 3.1
K/A Statement: K1.14 – Knowledge of the physical connections and/or cause-effect relationship between the Primary Containment Isolation System/Nuclear Steam Supply Shut-off and the following: Containment drainage system.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

2. Given the following:

- Unit 2 is operating at 100% power
- The 2A RPS Bus is being supplied by the Alternate Power Supply, 20Y050
- The 2A RPS MG Set is in service, ready to power the 2A RPS Bus
- The CRS directed you to transfer RPS Power Supplies

Which one of the following Primary Containment Isolation System (PCIS) Groups will need to be RESET following the power transfer?

- A. Group II Inboard Half Isolation
- B. Group III Inboard Half Isolation
- C. Group II Outboard Half Isolation
- D. Group III Outboard Half Isolation

Answer Key		
Question # 2 RO		
Choice		Basis or Justification
Correct:	B	Transferring from the Alternate Power Supply (20Y050 UPS) results in a momentary loss of power to RPS 'A' and PCIS Div I logic. This results in a Group III Inboard isolation.
Distractors:	A	Group II Inboard isolation occurs on loss of vital AC power to 20Y033.
	C	Group II Outboard isolation occurs on loss of vital AC power to 20Y034.
	D	Group III Outboard isolation occurs on loss of power to RPS Bus 'B'.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	2	3	10CFR55.41(b)(6)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2002) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	GP-8C		
Learning Objective:	PLOT-5007G-05h		
K/A System:	262002 – Uninterruptable Power Supply (A.C. / D.C.)	Importance:	RO / SRO 2.9 / 3.1
K/A Statement: K1.08 – Knowledge of physical connections and/or cause-effect relationships between Uninterruptible Power Supply (A.C. / D.C.) and the following: Containment isolation system.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

3. Select the correct Shutdown Cooling suction valve electrical power supplies.

MO-2-10-17 "Shutdown Cooling Suction Outboard Isolation" is powered by a ____ (1) ____.

MO-2-10-18 "Shutdown Cooling Suction Inboard Isolation" is powered by a ____ (2) ____.

- A. (1) 250 VDC Safety Related Bus
(2) 250 VDC Safety Related Bus
- B. (1) 250 VDC Safety Related Bus
(2) 480V Emergency Bus MCC
- C. (1) 480V Emergency Bus MCC
(2) 250 VDC Safety Related Bus
- D. (1) 480V Emergency Bus MCC
(2) 480V Emergency Bus MCC

Answer Key		
Question # 3 RO		
Choice		Basis or Justification
Correct:	B	MO-2-10-17 is powered by 250 VDC Safety Related Bus 20D11. MO-2-10-18 is powered by 480V E Bus supplied MCC E-124-R-C.
Distractors:	A	MO-2-10-17 is powered by 250 VDC Safety Related Bus 20D11. MO-2-10-18 is powered by 480V E Bus supplied MCC E-124-R-C.
	C	MO-2-10-17 is powered by 250 VDC Safety Related Bus 20D11. MO-2-10-18 is powered by 480V E Bus supplied MCC E-124-R-C.
	D	MO-2-10-17 is powered by 250 VDC Safety Related Bus 20D11. MO-2-10-18 is powered by 480V E Bus supplied MCC E-124-R-C.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	2.5	3	10CFR55.41(b)(7)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
	<input checked="" type="checkbox"/> Previous NRC Exam: (PB 2005) <input type="checkbox"/> Other Exam Bank: ()		
Reference(s):	SO 10.1.B-2; SO 10.1.B-2A COL, E-1615; E-26		
Learning Objective:	PLOT-5010-2b		
K/A System:	205000 – Shutdown Cooling System (RHR Shutdown Cooling Mode)	Importance:	RO / SRO 2.5 / 2.7
K/A Statement:			
K2.02 – Knowledge of the electrical power supplies to the following: Motor operated valves.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

4. Unit 2 conditions are as follows:

- Reactor power is 100%
- RPS bus 'A' is aligned to its ALTERNATE power supply, 20Y050
- RPS bus 'B' is aligned to its NORMAL RPS MG Set power supply
- A loss of 3 SUE occurred, causing a 4KV emergency bus fast transfer
- The E-222 breaker did NOT close on the fast transfer

No operator actions have been taken. Which one of the following describes the status of RPS one minute later?

- A. NO Scram
- B. HALF Scram on RPS 'A'
- C. HALF Scram on RPS 'B'
- D. FULL Scram

Answer Key		
Question # 4 RO		
Choice		Basis or Justification
Correct:	C	The loss of 3 SUE and failure of E-222 breaker to close on the fast transfer will result in a loss of power to the 'B' RPS MG Set. The E-2 diesel will start on E-22 bus under-voltage but will not restore emergency bus MCC power (13 seconds) before the 'B' RPS MG supply breaker trips on loss of power (8 seconds). A loss of power to the 'B' RPS bus will result in a half scram on RPS 'B'. RPS bus 'A' is powered from 20Y050, which is powered from the E-12 bus and 2 SUE.
Distractors:	A	A half scram will occur due to loss of power to RPS bus 'B'. Plausible if applicant does not understand 4160V power distribution to RPS MG Sets and/or 20Y050.
	B	RPS bus 'A' is powered from 20Y050, which is powered from the E-12 bus and 2 SUE. There is no effect on RPS 'A' as a result of this event. Plausible if applicant does not understand 4160V power distribution to RPS MG Sets and/or 20Y050.
	D	A half scram will occur due to loss of power to RPS bus 'B'. RPS bus 'A' is powered from 20Y050, which is powered from the E-12 bus and 2 SUE. There is no effect on RPS 'A' as a result of this event. Plausible if applicant does not understand 4160V power distribution to RPS MG Sets and/or 20Y050.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH		3	10CFR55.41(b)(6)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	SO 54.7.A		
Learning Objective:	PLOT-5060F-2b		
K/A System:	212000 – Reactor Protection System	Importance: RO / SRO 3.2 / 3.3	
K/A Statement: K2.01 – Knowledge of electrical power supplies to the following: RPS motor-generator sets.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

5. A Loss of Coolant Accident occurred on Unit 3. The following plant conditions exist:

- Reactor level initially dropped to -180 inches
- Reactor level is now -150 inches and is rising slowly
- All RHR and Core Spray pumps started automatically and are injecting
- Operators have NOT manipulated any RHR or Core Spray pump controls
- Reactor pressure is 250 psig and lowering
- Drywell pressure is 16 psig and rising

With these conditions present a loss of off-site power (LOOP) occurs. All Emergency Diesel Generators (EDGs) start and load their respective busses.

Which statement below describes how Core Spray pumps will be restarted to control Reactor water level for these conditions?

The Core Spray pumps will _____ once their respective emergency bus reaches 95% of rated voltage.

- A. require a manual restart
- B. automatically restart immediately
- C. automatically restart after a six (6) second time delay
- D. automatically restart sequentially after 13 seconds (A, C) and 23 seconds (B, D)

Answer Key		
Question # 5 RO		
Choice		Basis or Justification
Correct:	C	Once their respective emergency bus reaches 95% of rated voltage, all Core Spray pumps will start after a 6 second time delay.
Distractors:	A	Plausible if the applicant believes the conditions will cause the Core Spray pump breakers to lockout, requiring manual action to restart the pumps.
	B	The pump start logic imposes a 6 second time delay for Core Spray pump starts to allow the bus to recover from the immediate RHR start of RHR pumps.
	D	This choice reflects the sequential loading of the busses that occur if the emergency busses are powered by an off-site source rather than the EDGs.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	3.0	4	10CFR55.41(b)(7)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2005) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	SO 14.7.A-2		
Learning Objective:	PLOT-5014-1I		
K/A System:	262001 – A.C. Electrical Distribution	Importance:	RO / SRO 3.5 / 3.7
K/A Statement: K3.01 – Knowledge of the effect that a loss or malfunction of A.C. Electrical Distribution will have on the following: Major system loads.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

6. Unit 2 is operating at full power when the Standby Liquid Control injection sparger becomes clogged. This results in the pressure input from this line being 10 psig lower than actual.

Evaluate this condition to determine the impact, if any, on indicated Core Plate Flow as read on the Control Room Flow Recorder (FR-095).

Indicated Core Plate Flow on FR-095 will be _____.

- A. higher than actual
- B. lower than actual
- C. reading zero
- D. unaffected

Answer Key		
Question # 6 RO		
Choice		Basis or Justification
Correct:	B	The SBLC injection line is the below core tap for core plate d/p and flow. With the below core plate tap having a lower pressure signal, the indicated d/p will be lower, resulting in a lower than actual core plate flow indication.
Distractors:	A	If the candidate believes that SBLC injects through the above core plate line, then he would determine that indicated core plate flow would be high.
	C	The candidate may believe that the given conditions will result in a sensed d/p of 0 psid, resulting in the flow recorder reading zero.
	D	If the candidate believes that the core plate flow indication uses taps unrelated to the SBLC injection line as do Control Rod Drive d/p and core spray line break detection, he would believe that the indication will be unaffected.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	3	2	10CFR55.41(b)(6)

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2005) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	M-351; M-352	
Learning Objective:	PLOT-5011-3c	
K/A System:	211000 – Standby Liquid Control System	Importance: RO / SRO 2.6 / 2.7
K/A Statement: K3.03 – Knowledge of the effect that a loss or malfunction of the Standby Liquid Control System will have on the following: Core plate differential pressure indication.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

7. Unit 3 is at 100% power with the 3A RHR pump in full flow test in accordance with ST-O-010-301-3 "A RHR Loop Pump, Valve, Flow and Unit Cooler Functional and In-Service Test".

During the test, a steam leak in the drywell results in the following conditions:

- The Reactor is scrammed; all control rods are inserted
- RPV level reached -100 inches and is rising due to HPCI injection
- RPV pressure is 400 psig and lowering
- Drywell pressure is 10 psig and rising
- Offsite power remains available to the 4KV buses

Based on these conditions, which one of the following describes the status of the Unit 3 RHR System?

- A. ALL RHR pumps are injecting.
- B. ALL RHR pumps are operating on minimum flow.
- C. 3A RHR pump remains in full flow test; ALL other RHR pumps remain shutdown.
- D. 3A RHR pump remains in full flow test; ALL other RHR pumps are operating on minimum flow.

Answer Key		
Question # 7 RO		
Choice		Basis or Justification
Correct:	B	The 3A RHR pump full flow test valves (MO-3-10-034A and -039A) receive a close signal when RPV pressure is < 450 psig and an initiation signal (RPV level < -160 inches OR drywell pressure > 2 psig AND RPV pressure < 450 psig) is present. The other RHR pumps receive an auto-start signal (based on drywell pressure > 2 psig and RPV pressure < 450 psig). Since RPV pressure is above the RHR pump shutoff head (~305 psig), the pumps are not injecting but are all running on minimum flow.
Distractors:	A	Since RPV pressure is above the RHR pump shutoff head (~305 psig), the pumps are not injecting but are all running on minimum flow. Plausible if applicant does not recognize conditions or does not recall the value for RHR pump shutoff head.
	C	Plausible if applicant does not recognize that the given conditions result in RHR initiation and injection signals (pump and valve alignment for RPV injection).
	D	Plausible if applicant recognizes that a LPCI initiation signal is present but does not recognize the conditions are met for an injection signal (< 450 psig) and subsequent valve re-alignment.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	2.5	3	10CFR55.41(b)(7)

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	M-1-S-65; RHR DBD P-S-09, pages 118-122		
Learning Objective:	PLOT-5010-4j		
K/A System:	203000 – RHR/LPCI: Injection Mode	Importance:	RO / SRO 3.1 / 3.4
K/A Statement: K4.09 – Knowledge of the RHR/LPCI: Injection Mode design feature(s) and/or interlocks which provide for the following: Surveillance for all operable components.			
REQUIRED MATERIALS:	NONE		
Notes and Comments:			

8. Unit 2 is operating at 100% power.

An electrical transient on 2 Aux Bus resulted in a loss of power to the 2B and 2C Drywell Chillers.

Which one of the following describes the impact of this event, if any, on cooling water to the Instrument Nitrogen compressors?

- A. RBCCW cooling to the compressors will be lost; the compressors must be shutdown and nitrogen loads must be aligned to Backup Nitrogen (bottles).
- B. RBCCW cooling to the compressors will be lost; the compressors must be shutdown and nitrogen loads must be aligned to Instrument Air.
- C. RBCCW cooling to the compressors will be lost; TBCCW will automatically align to cool the compressors.
- D. No impact; the compressors will continue to be cooled by RBCCW.

Answer Key		
Question # 8 RO		
Choice		Basis or Justification
Correct:	B	A loss of power to 2 of 3 DW chillers results in an automatic swap of the DCCW supply to RBCCW. This causes non-essential RBCCW loads to be isolated, which includes the Instrument Nitrogen compressors. Per AO 44A.1-2, Instrument Nitrogen will be shutdown and nitrogen loads will be aligned to Instrument Air (via AO-4230A/B).
Distractors:	A	Per AO 44A.1-2, Instrument Nitrogen will be shutdown and aligned to (backed up by) Instrument Air, not "Backup Instrument Nitrogen" (bottles).
	C	RBCCW will automatically align to cool the Instrument Air compressors on a loss of TBCCW. However, TBCCW does not provide a backup cooling source for the Instrument Nitrogen compressors. Plausible misconception.
	D	When RBCCW is transferred to DCCW, the Instrument Nitrogen compressors will lose RBCCW cooling.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	AO 44A.1-2; SO 16.2.A-2		
Learning Objective:	PLOT-5035-4c		
K/A System:	300000 – Instrument Air System (IAS)	Importance:	RO / SRO 2.8 / 2.8
K/A Statement:			
K4.03 – Knowledge of the Instrument Air System design feature(s) and/or interlocks which provide for the following: Securing of IAS upon loss of cooling water.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:		This question addresses "loss of cooling to instrument nitrogen compressors", which is the pneumatic supply to components inside the drywell. Instrument Nitrogen is not a separate system in the K/A Catalog but typically shows up as "Instrument air/nitrogen". Therefore, this question meets the K/A.	

9. Which one of the following meets the conditions for Automatic Depressurization System (ADS) actuation?
- A. Drywell pressure at 4.1 psig
Reactor water level at -120" for 10 minutes
'A' and 'D' Core Spray pumps operating
 - B. Drywell pressure at 5.0 psig
Reactor water level at -165" for 5 minutes
'A' and 'B' Core Spray pumps operating
 - C. Drywell pressure at 1.2 psig
Reactor water level at -165" for 5 minutes
'B' RHR pump operating
 - D. Drywell pressure at 2.7 psig
Reactor water level at -165" for 3 minutes
'D' RHR pump operating

Answer Key		
Question # 9 RO		
Choice		Basis or Justification
Correct:	D	This is the only set of conditions shown that satisfies all of the ADS logic requirements: level below -160 inches, drywell pressure above 2 psig, at least one RHR pump (or the correct combination of Core Spray pumps) running, and the 105 second timer timed out.
Distractors:	A	Reactor level must be below -160 inches.
	B	The right combination of ECCS pumps is not available; must have at least 1 RHR pump, <u>OR</u> the right combination of Core Spray pumps: A or B <u>and</u> C or D.
	C	Drywell pressure is below 2 psig and the 9.5 minute high drywell pressure bypass is not present.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	M-1-S-52; ARC-227 D-4		
Learning Objective:	PLOT-5001G-5		
K/A System:	218000 – Automatic Depressurization System	Importance:	RO / SRO 3.8 / 3.8
K/A Statement: K5.01 – Knowledge of the operational implications of the following concepts as it applies to the Automatic Depressurization System: ADS logic operation.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

10. Given the following:

- Unit 2 is operating at 100% power
- FEEDWATER FIELD INSTRUMENT TROUBLE (201 H-1) alarms
- 'A' Steam Line Flow Transmitter (DPT 2-6-51A) indicates downscale

Based on these conditions, the Digital Feedwater System is in ____ (1) ____ and Reactor Feedwater pump turbine SPEED will ____ (2) ____.

- A. (1) single-element control
(2) remain steady
- B. (1) three-element control
(2) remain steady
- C. (1) single-element control
(2) lower until level stabilizes at a new lower level
- D. (1) three-element control
(2) lower until level stabilizes at a new lower level

Answer Key		
Question # 10 RO		
Choice		Basis or Justification
Correct:	A	The Digital Feedwater Fault-Tolerance Override Logic will not permit the system to remain in three-element control with a failed steam flow detector. The system would permit three-element control with a failed level detector but not a failed steam flow or feed flow detector.
Distractors:	B	The candidate may expect the system to remain in three-element, because it does remain in three-element control for some failures (e.g., level detector). The system conditions would not change if the candidate believes the failed instrument is bypassed by the system when it fails irrationally.
	C	The candidate may understand that the DFCS will not remain in 3-element control but may believe that with a failed steam flow instrument the system would be biased to allow level to lower to a new lower level causing RFP turbine speed to lower.
	D	The candidate may expect the system to remain in three-element, because it does remain in three-element control for some failures (e.g., level detector). The candidate may believe that with a failed steam flow instrument the system would be biased to allow level to lower to a new lower level causing RFP turbine speed to lower.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	3.0	3	10CFR55.41(b)(7)

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	SO 6C.1.D-2, Section 4.7	
Learning Objective:	PLOT-5006-4n, -4r	
K/A System:	259002 – Reactor Water Level Control System	Importance: RO / SRO 3.1 / 3.1
K/A Statement: K5.01 – Knowledge of the operational implications of the following concepts as they apply to the Reactor Water Level Control System: GEMAC/Foxboro/Bailey controller operation.		
REQUIRED MATERIALS:		NONE
Notes and Comments:		

11. Unit 2 is in MODE 2 with a reactor startup in progress.

- The reactor is subcritical
- Control rod withdrawal has begun
- 2B 24/48 VDC Distribution Panel (20D045) is lost

What effect will this have on the Wide Range Neutron Monitoring (WRNM) System?

- A. Rod Block ONLY
- B. RPS Channel 'B' Half Scram ONLY
- C. Rod Block and RPS Channel 'B' Half Scram
- D. Loss of B, D, F, and H WRNM ODAs on panel 20C005

Answer Key		
Question # 11 RO		
Choice		Basis or Justification
Correct:	C	A loss of power to 20D045 will result in a half scram and rod block due to a WRNM INOP condition.
Distractors:	A	Plausible if applicant does not understand the effects of a power loss on the WRNM system and believes the given conditions will only result in a rod block.
	B	Plausible if applicant does not understand the effects of a power loss on the WRNM system and believes the given conditions will only result in a half scram.
	D	20D045 does not power the ODAs; they are powered by 20Y050. Plausible if applicant does not recall the function of the different power supplies to the WRNM system.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	3	3	10CFR55.41(b)(6)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
	<input checked="" type="checkbox"/> Previous NRC Exam: (PB 2005) <input type="checkbox"/> Other Exam Bank: ()		
Reference(s):	ARC-210 H-3		
Learning Objective:	PLOT 5060C-2c, -4a, -4b		
K/A System:	215003 – Intermediate Range Monitor System (WRNM at Peach Bottom)	Importance:	RO / SRO 3.6 / 3.8
K/A Statement:			
K6.02 – Knowledge of the effect that a loss or malfunction of the following will have on the Intermediate Range Monitor (WRNM) System: 24/48 volt D.C. power.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

12. Given the following:

- Unit 2 is operating at 100% power
- SYSTEM II CORE SPRAY LOGIC POWER FAIL (226 B-1) alarm is received
- Investigation reveals a blown fuse on 125 VDC power distribution panel 20D022

Subsequently, a LOCA occurs, resulting in the following plant conditions:

- RPV level is -75 inches
- RPV pressure is 420 psig
- Drywell pressure is 4.5 psig

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

<u>'A' Core Spray Loop</u>	<u>'B' Core Spray Loop</u>
A. Both pumps ON; injection valve is OPEN	Both pumps ON; injection valve is OPEN
B. Both pumps ON; injection valve is CLOSED	Both pumps OFF; injection valve is CLOSED
C. Both pumps ON; injection valve is OPEN	Both pumps OFF; injection valve is CLOSED
D. Both pumps ON; injection valve is CLOSED	Both pumps ON; injection valve is CLOSED

Answer Key		
Question # 12 RO		
Choice		Basis or Justification
Correct:	C	Plant conditions call for Core Spray initiation and injection (below 450 psig reactor pressure). A loss of 125 VDC power panel 20D022 causes a loss of power to Core Spray loop 'B' logic, which will prevent it from actuating on a LOCA signal. Core Spray loop 'A' is not affected by a loss of 20D022.
Distractors:	A	'B' Core Spray logic will not actuate. Plausible since each RHR logic channel provides pump start signals to BOTH loops of RHR; applicant may confuse Core Spray logic with RHR logic.
	B	'B' Core Spray logic will not actuate. Plausible since each RHR logic channel provides pump start signals to BOTH loops of RHR, but does not provide redundant valve control interlocks; applicant may confuse Core Spray logic with RHR logic.
	D	'A' loop is injecting with both pumps; 'B' loop pumps are not running. Plausible if applicant gets logic confused and/or does not recall RPV pressure permissive for injection.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	ARC-226 B-1; M-1-S-40		
Learning Objective:	PLOT-5014-6d		
K/A System:	209001 – Low Pressure Core Spray System	Importance:	RO / SRO 2.8 / 2.9
K/A Statement: K6.04 – Knowledge of the effect that a loss or malfunction of the following will have on the Low Pressure Core Spray System: D. C. power.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

13. Given the following conditions on Unit 2:

- Battery Charger 2AD003 is placed in the Equalize Mode in accordance with SO 57B.1-2 "125/250 Volt Station Battery Charger Operations"
- During the charge, AC power to the charger is lost due to a momentary loss of power to the E-12 bus
- Power is subsequently restored to the E-12 bus by the diesel generator

Which one of the following describes the status of the 2A Battery Charger one minute after the E-12 bus is reenergized?

The 2A Battery Charger _____.

- A. automatically returns to the "float" charge mode
- B. automatically returns to the "equalize" charge mode
- C. is deenergized and must be manually returned to service
- D. is energized but the DC output switch must be manually closed

Answer Key		
Question # 13 RO		
Choice		Basis or Justification
Correct:	B	From Note 2 in SO 57B.1-2: "Upon a loss of AC input power, the battery charger will return to the same mode it was in once power is restored. IF the battery charger was in the Equalize mode, THEN the timer will pick up where it was interrupted AND time out."
Distractors:	A	The charger will return to the equalize charge mode. Plausible if the applicant remembers the charger will automatically restart but does not remember it will return to the same mode it was in prior to the power loss.
	C	The battery charger will automatically restart 15 seconds after the E12 bus is restored. Plausible if the applicant does not remember that the charger will automatically restart.
	D	Plausible since procedure precaution requires waiting 15-20 seconds after closing AC input switch before closing DC input switch when placing charger in service to prevent blowing fuses in battery charger. Applicant may believe charger design would prevent automatic restoration (DC switch closure) following a loss of AC power to the charger for the same reason.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2008) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	SO 57B.1-2		
Learning Objective:	PLOT-5057-6a		
K/A System:	263000 – D.C. 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:			

14. Unit 3 was manually scrammed following a loss of feedwater. Current plant conditions are as follows:

- HPCI and RCIC automatically started and injected until they tripped on high RPV water level
- Reactor water level is currently +46 inches and dropping slowly
- Reactor pressure is 925 psig and being controlled automatically by EHC

Which one of the following correctly describes the RCIC System response to these conditions?

The RCIC ____ (1) ____ and the RCIC system will automatically re-inject when Reactor water level has lowered to ____ (2) ____.

- A. (1) Turbine is tripped
(2) +29 inches
- B. (1) Turbine is tripped
(2) -48 inches
- C. (1) Turbine Supply Valve (MO-131) is closed
(2) +29 inches
- D. (1) Turbine Supply Valve (MO-131) is closed
(2) -48 inches

Answer Key		
Question # 14 RO		
Choice		Basis or Justification
Correct:	D	RCIC does not trip on high level (because it can not auto reset a trip like HPCI); instead the turbine supply valve (MO-131) closes. The valve will not reopen until a -48" initiation signal is received (unlike HPCI which will restart at +29").
Distractors:	A	RCIC does not trip on high level and will not re-inject until -48".
	B	RCIC does not trip on high level.
	C	The RCIC turbine supply valve (MO-131) is shut, but the system will not re-inject until reactor water level drops to -48".

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	2.5	4	10CFR55.41(b)(7)

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2005) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	OT-110, Step 3.6	
Learning Objective:	PLOT-5013-4b	
K/A System:	217000 – Reactor Core Isolation Cooling System	Importance: RO / SRO 4.0 / 4.0
K/A Statement: A1.03 – Ability to predict and/or monitor changes in parameters associated with operating the Reactor Core Isolation Cooling System controls including: Reactor water level.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

15. Unit 2 was operating at 100% power.

- The crew is performing a surveillance test for full load testing of the E4 Emergency Diesel Generator (EDG)
- The EDG has just been synchronized to the E-42 Bus

Shortly after the E4 Diesel output breaker is closed, a loss of off-site power (LOOP) occurs.

Based on these conditions, which one of the following describes (1) the status of the E4 EDG and the E-42 Breaker, and (2) the required procedural actions?

- A. (1) E4 EDG is RUNNING; E-42 Breaker is OPEN.
(2) The anti-pump lockout must be manually reset using SO 52A.1.B "Diesel Generator Operations" before the E-42 Breaker will close.
- B. (1) E4 EDG is RUNNING; E-42 Breaker is CLOSED.
(2) Monitor and control EDG loading during continued operation using SO 52A.1.B "Diesel Generator Operations".
- C. (1) E4 EDG is TRIPPED; E-42 Breaker is OPEN.
(2) Restart the EDG using SO 52A.7.A.1.B "Diesel Generator Manual Emergency Start." E-42 Breaker must be manually closed after resetting the anti-pump lockout.
- D. (1) E4 EDG is TRIPPED; E-42 Breaker is OPEN.
(2) Restart the EDG using SO 52A.7.A.1.B "Diesel Generator Manual Emergency Start". E-42 Breaker will automatically close when the EDG is running.

Answer Key		
Question # 15 RO		
Choice		Basis or Justification
Correct:	A	A LOOP under these conditions will cause the E4 output breaker to trip, resulting in a dead E-42 bus. A "dead bus start in test mode" will send a trip signal to the E-42 breaker but not to the DG. Because E-42 receives simultaneous trip and close signals from the dead bus condition, the breaker will anti-pump lockout and must be reset manually.
Distractors:	B	E4 DG will be running but the E-42 breaker will not close due to anti-pump lockout. Plausible if applicant does not understand DG breaker control logic.
	C	E-4 DG will not receive a trip signal so it does not require restart. The anti-pump lockout on the E-42 breaker must be reset. Plausible if applicant does not understand DG breaker control logic.
	D	E-4 DG will not receive a trip signal so it does not require restart. The anti-pump lockout on the E-42 breaker must be reset. Plausible if applicant does not understand DG breaker control logic.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	SO 52A.1.B		
Learning Objective:	PLOT-5052-6f		
K/A System:	264000 – Emergency Diesel Generators	Importance:	RO / SRO 3.5 / 3.6
K/A Statement: A2.01 – Ability to (a) predict the impacts of the following on the Emergency Diesel Generators; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Parallel operation of emergency generator.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

16. Unit 2 was manually scrammed due to a leak in the Torus.

- HPCI is being used for RPV pressure control
- RCIC is being used for RPV level control
- Torus level is 9.5 feet and lowering

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

- A. RCIC must be shutdown using RRC 13.1-2 "RCIC Operation During a Plant Event" to prevent exceeding the vortex limit.
- B. HPCI must be shutdown using RRC 23.1-2 "HPCI Operation During a Plant Event" to prevent exceeding the vortex limit.
- C. RCIC must be shutdown using RRC 13.1-2 "RCIC Operation During a Plant Event" to prevent direct pressurization of the Torus air space.
- D. HPCI must be shutdown using RRC 23.1-2 "HPCI Operation During a Plant Event" to prevent direct pressurization of the Torus air space.

Answer Key		
Question # 16 RO		
Choice		Basis or Justification
Correct:	D	T-102 directs HPCI shutdown if torus level cannot be maintained above 9.5 feet as this is where the exhaust line is uncovered. Operation of HPCI, with its relatively high exhaust pressure, could result in direct pressurization of the torus air space, threatening primary containment integrity.
Distractors:	A	Normal alignment for RCIC is with suction from the CST. Therefore there is no concern for the RCIC vortex limit (which is 6 feet). Plausible if the applicant does not recall the normal RCIC lineup and/or is confused on the various limits associated with torus level.
	B	Normal alignment for HPCI is with suction from the CST. Therefore there is no concern for the HPCI vortex limit (which is below 9.5 feet). Plausible if the applicant does not recall the normal RCIC lineup and/or is confused on the various limits associated with torus level.
	C	RCIC turbine exhaust pressure is insufficient to cause pressurization of the torus. In addition, RCIC is likely to trip on high exhaust pressure if torus pressure became elevated. Plausible if the applicant confuses the HPCI and RCIC limits associated with torus level.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	T-102 and Bases		
Learning Objective:	PLOT-5023-6e		
K/A System:	206000 – High Pressure Coolant Injection System	Importance:	RO / SRO 3.4 / 3.6
K/A Statement: A2.07 – Ability to (a) predict the impacts of the following on the High Pressure Coolant Injection System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Low suppression pool level.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

17. Unit 3 is operating at 100% power when the '3A' Reactor Protection System (RPS) bus is manually transferred to its alternate power source.

Based on this event, what is the automatic response of the Standby Gas Treatment (SGTS)?

SGTS ____ (1) ____ will start and the ____ (2) ____ Filter inlet/outlet dampers will OPEN.

A. (1) 'B' Fan
(2) 'A' Train

B. (1) 'C' Fan
(2) 'B' Train

C. (1) 'B' Fan
(2) 'B' Train

D. (1) 'C' Fan
(2) 'A' Train

Answer Key**Question # 17 RO**

Choice		Basis or Justification
Correct:	D	SBGT consists of three fans (A, B, C) and two trains (A, B). Since it is common to both units, each <u>PCIS power supply failure</u> has a unique effect on system alignment: loss of 3A RPS bus starts the 'C' fan and aligns the 'A' filter train dampers; loss of 2A RPS bus starts the 'A' fan and aligns the 'A' filter train; loss of 2B or 3B RPS starts the 'B' fan and aligns the 'B' filter train; loss of 20Y033 or 20Y034 will align the 'A' or 'B' filter train (respectively) but will not result in any fan starts.
Distractors:	A	Incorrect fan. Plausible if applicant does not recall or understand the effects of a loss of RPS bus power on the SBGT System.
	B	Incorrect train. Plausible if applicant does not recall or understand the effects of a loss of RPS bus power on the SBGT System.
	C	Correct for loss of 'B' RPS bus. Plausible if applicant does not recall or understand the effects of a loss of RPS bus power on the SBGT System.

Psychometrics

Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	2.5	3	10CFR55.41(b)(7)

Source Documentation

Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2002)	
	<input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: ()	
	<input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	GP-8C	
Learning Objective:	PLOT-5009A-06d	
K/A System:	261000 – Standby Gas Treatment System	Importance: RO / SRO 3.2 / 3.1
K/A Statement: A3.02 – Ability to monitor automatic operations of the Standby Gas Treatment System including: Fan start.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

18. The following conditions exist on Unit 2 following a loss of offsite power (LOOP):

- Reactor level lowered to -180 inches and is currently +20 inches.
- The EDGs are supplying their respective 4 KV busses.
- Offsite power has been restored to the 2 SUE bus.
- The D/G AUTO START BYPASS pushbutton has been depressed.
- The E-1 EDG has been paralleled with the 2 SUE bus.

Which one of the following will occur if the E-1 EDG is still operating in parallel with the 2 SUE bus when the E-1 EDG Auto Start Bypass Timer times out?

E-1 EDG load sharing will _____.

- A. remain in the DROOP mode
- B. remain in the ISOCHRONOUS mode
- C. automatically swap to the DROOP mode
- D. automatically swap to the ISOCHRONOUS mode

Answer Key		
Question # 18 RO		
Choice		Basis or Justification
Correct:	D	Per NOTE 4.3 of SO 52B.2.A, depressing the D/G AUTO START BYPASS pushbutton initiates a 3-minute timer which places the diesel generator in the DROOP mode. CAUTION 4.3 states that diesel generator load sharing will automatically swap back to the ISOCHRONOUS mode when the D/G AUTO START BYPASS timer times out.
Distractors:	A	Per SO 52B.2.A, diesel generator load sharing will automatically swap back to the ISOCHRONOUS mode when the D/G AUTO START BYPASS timer times out.
	B	Per SO 52B.2.A, diesel generator load sharing will automatically swap back to the ISOCHRONOUS mode when the D/G AUTO START BYPASS timer times out.
	C	Per SO 52B.2.A, diesel generator load sharing will automatically swap back to the ISOCHRONOUS mode when the D/G AUTO START BYPASS timer times out.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> Other Exam Bank: (LORT) <input type="checkbox"/> ILT Exam Bank		
Reference(s):	SO 52B.2.A		
Learning Objective:	PLOT-5052-4		
K/A System:	264000 – Emergency Diesel Generators	Importance:	RO / SRO 3.4 / 3.4
K/A Statement: A3.03 – Ability to monitor automatic operations of the Emergency Diesel Generators including: Indicating lights, meters and recorders.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

19. T-116 "RPV Flooding" is being executed following loss of all RPV level indication. All ADS valves are open.

Which one of the following conditions indicates that the RPV is flooded to the Main Steam Lines?

	<u>Torus Pressure</u>	<u>SRV Tailpipe Temperature</u>
A.	10 PSIG	240 °F
B.	10 PSIG	260 °F
C.	20 PSIG	250 °F
D.	20 PSIG	270 °F

Saturated Steam: Temperature Table
(From 1967 ASME Steam Tables)

Temp (°F)	Press (PSIA)	Temp (°F)	Press (PSIA)
176	6.869	240	24.968
180	7.511	244	26.968
184	8.203	248	28.796
188	8.947	252	30.883
192	9.747	256	33.091
196	10.605	260	35.427
200	11.526	264	37.894
204	12.512	268	40.500
208	13.568	272	43.249
212	14.696	276	46.147
216	15.901	280	49.200
220	17.186	284	52.414
224	18.556	288	55.795
228	20.015	292	59.350
232	21.567	296	63.084
236	23.216	300	67.005

Answer Key**Question # 19 RO**

Choice		Basis or Justification
Correct:	C	Per T-116 Note #41, one of the indications that the RPV is flooded to the main steam lines is "open SRV tailpipe temperatures indicate subcooling". 20 psig (34.7 psia) has a corresponding Saturation Temperature (Tsat) of ~259 °F. The given temperature of 250 °F is below Tsat, indicating that the SRV is passing subcooled water.
Distractors:	A	10 psig (24.7 psia) has a corresponding Saturation Temperature (Tsat) of ~239 °F. The given temperature of 240 °F is above Tsat, indicating that the SRV is NOT passing subcooled water.
	B	10 psig (24.7 psia) has a corresponding Saturation Temperature (Tsat) of ~239 °F. The given temperature of 260 °F is above Tsat, indicating that the SRV is NOT passing subcooled water.
	D	20 psig (34.7 psia) has a corresponding Saturation Temperature (Tsat) of ~259 °F. The given temperature of 270 °F is above Tsat, indicating that the SRV is NOT passing subcooled water.

Psychometrics

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

Source Documentation

Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: ()	
	<input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: ()	
	<input type="checkbox"/> ILT Exam Bank	
Reference(s):	T-116 Bases	
Learning Objective:	PLOT-1560-9	
K/A System:	239002 – Relief/Safety Valves	Importance: RO / SRO 3.6 / 3.7
K/A Statement:		
A4.02 – Ability to manually operate and/or monitor in the control room: Tail pipe temperatures.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

20. Unit 2 is operating at 70% power at the end of cycle with the following conditions:

- All APRM channels are in-service and operable
- APRM '1' has a total of 13 LPRM detectors bypassed
- APRM '1' has 7 out of a possible 10 'B' level LPRM detectors bypassed

Based on these conditions, which APRM '1' response is correct if an additional 'B' level LPRM to APRM '1' is manually bypassed?

- A. NO alarms and NO Rod Block
- B. An APRM TROUBLE alarm and Rod Block
- C. An APRM DOWNSCALE alarm and Rod Block
- D. An APRM INOP alarm, Rod Block and Scram Vote to RPS

Answer Key		
Question # 20 RO		
Choice		Basis or Justification
Correct:	B	APRM trouble alarm and rod block due to "too few inputs" (< 3 LPRMs per level). APRM will continue to average the remaining LPRMs.
Distractors:	A	Total LPRMs are still greater than the "too few inputs" per APRM setpoint (< 20 LPRMs total), but < 3 LPRMs per level generates an alarm and rod block.
	C	Trouble alarm only and 30 LPRMs remaining at 70% power will not result in an APRM downscale trip.
	D	Conditions result in a trouble alarm only, NOT an INOP trip with the GE NUMAC APRM system. Plausible since standard BWR APRM system generates an INOP trip on too few inputs.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	4.0	3	10CFR55.41(b)(6)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2002) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	ARC-211 A-3; ARC-211 C-2; ARC-211 E-5; Tech Spec 3.3.1.1 Bases		
Learning Objective:	PLOT-5060-4g		
K/A System:	215005 – Average Power Range Monitor/ Local Power Range Monitor System	Importance:	RO / SRO 3.6 / 3.8
K/A Statement: A4.06 – Ability to manually operate and/or monitor in the control room: Verification of proper functioning/operability.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

21. Given the following:

- An ATWS is in progress on Unit 2
- The CRS directed the URO to inject Standby Liquid Control (SBLC)
- The URO placed the SBLC control switch to START SYSTEM 'A'

Which one of the following indications is correct for these conditions?

- A. BOTH "Squib Valve Continuity" lights will extinguish.
- B. ONLY the 2A "Squib Valve Continuity" light will extinguish.
- C. STANDBY LIQUID SQUIB VALVE LOSS OF CONTINUITY alarm will be received.
- D. GROUP II/III INBOARD AND OUTBOARD ISOLATION RELAYS NOT RESET alarms will be received.

Answer Key		
Question # 21 RO		
Choice		Basis or Justification
Correct:	D	These alarms will be received due to RWCU isolation on SBLC initiation.
Distractors:	A	Both squib valves fire when either pump is started. However, the continuity lights remain lit and the "loss of continuity" annunciator will not alarm unless or until the pump control switch is placed in OFF. Plausible if the applicant does not recall that the continuity lights do not provide accurate indication of squib valve status following SBLC system initiation.
	B	Both squib valves fire when either pump is started. However, the continuity lights remain lit and the "loss of continuity" annunciator will not alarm unless or until the pump control switch is placed in OFF. Plausible if the applicant believes only the 2A squib valve will fire and does not recall that the continuity lights do not provide accurate indication of squib valve status following SBLC system initiation.
	C	Both squib valves fire when either pump is started. However, the continuity lights remain lit and the "loss of continuity" annunciator will not alarm unless or until the pump control switch is placed in OFF. Plausible if the applicant does not recall that the alarm circuit does not provide accurate indication of squib valve status following SBLC system initiation.

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

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2007) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	SO 11.1.B-2; ARC-211 H-3; ARC-214 D-1; ARC-214 E-1	
Learning Objective:	PLOT-5011-4d	
K/A System:	211000 – Standby Liquid Control System	Importance: RO / SRO 4.2 / 4.2
K/A Statement: G2.4.46 – Ability to verify that the alarms are consistent with the plant conditions.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

22. Which one of the following is correct regarding SRV operation from the Alternative Shutdown Panel in the Recirc MG Set Room?

The ____ (1) ____ SRVs can be operated from this location and SRV position indication comes from the SRV ____ (2) ____.

- A. (1) A, B, and K
(2) acoustic monitoring
- B. (1) A, B, and K
(2) control switch position
- C. (1) H, E, and L
(2) acoustic monitoring
- D. (1) H, E, and L
(2) control switch position

Answer Key		
Question # 22 RO		
Choice		Basis or Justification
Correct:	B	The A, B, and K SRVs can be operated from the Alternative Control Station. Per SE-10 Caution #104 and Bases, "SRV position indicating lights do not indicate actual valve position, but rather the lights are simply a reflection of the switch position. Acoustic valve position is not part of the protected ASD equipment."
Distractors:	A	Plausible since position indication for SRVs operated from the Remote Shutdown Panel is from the acoustic monitors, not SRV control switch position.
	C	Plausible since the H, E, and L SRVs are operated from the Remote Shutdown Panel, not the Alternative Shutdown Panel.
	D	Plausible since the H, E, and L SRVs are operated from the Remote Shutdown Panel, not the Alternative Shutdown Panel.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	3.25	3	10CFR55.41(b)(7)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2009) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	SE-10 and Bases; SE-1		
Learning Objective:	PLOT-5001A-5d, -5f		
K/A System:	239002 – Relief/Safety Valves	Importance:	RO / SRO 3.8 / 4.0
K/A Statement: G2.1.32 – Ability to explain and apply system limits and precautions.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

23. The Instrument Air System is in a normal lineup when the following occur:

- INSTRUMENT AIR DRYER TROUBLE (216 C-4) alarm is received
- B INSTRUMENT AIR HEADER LO PRESS (216 D-4) alarm is received
- 'B' Instrument Air Header Pressure (PI-2425B) on Panel 20C012 is lowering
- 'B' Instrument Air Receiver Pressure (PI-2429B) on Panel 20C012 is steady at 110 psig
- The TBEO reports there is a valve malfunction on the 'B' Instrument Air Dryer and that neither the 'C' or 'D' drying tower is in service

Which one of the following describes the correct action to mitigate this event?

- A. Isolate the 'B' Instrument Air Dryer
- B. Bypass the 'B' Instrument Air Dryer
- C. Cross-tie 'A' and 'B' instrument air headers
- D. Cross-tie Unit 2 and Unit 3 'B' instrument air headers

Answer Key		
Question # 23 RO		
Choice		Basis or Justification
Correct:	D	The given conditions indicate both towers for the 'B' air dryer are isolated, which means there is no flow to the 'B' instrument air header from the 'B' air compressor/receiver. Therefore, 'B' instrument air header pressure will continue to lower. Per ON-119, the correct action to take for this condition is to cross-tie the Unit 2 and Unit 3 'B' instrument air headers.
Distractors:	A	This alone will not mitigate this event; the 'B' instrument air dryer is effectively already isolated from the 'B' instrument air header. In order to restore 'B' instrument air header pressure, the Unit 2 and 3 instrument air headers must be cross-tied.
	B	There is no provision for bypassing a malfunctioning dryer in ON-119 or ARC-216 C-4. Both references direct cross-tying the Unit 2 and Unit 3 instrument air headers.
	C	Cross-tying the 'A' and 'B' instrument air headers will not be effective in restoring 'B' instrument air header pressure since the 'A' supply must pass through the 'B' air dryer in order to supply the 'B' header.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	3.0	2	10CFR55.41(b)(10)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2007) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	ARC-216 C-4; ON-119		
Learning Objective:	PLOT-5036-6b		
K/A System:	300000 – Instrument Air System (IAS)	Importance:	RO / SRO 2.9 / 3.0
K/A Statement: K3.03 – Knowledge of the effect that a loss or malfunction of the Instrument Air System will have on the following: Cross-tied units.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

24. Unit 2 was operating at 100% power when a feedwater malfunction resulted in a reactor scram.

- HPCI and RCIC initiated on low RPV level
- Reactor level is now +20 inches and rising
- Subsequently, LT-2-02-3-072C, one of the two Wide Range Reactor Water Level inputs to HPCI logic fails downscale
- All other RPV level instruments remain operable

Assuming no operator action is taken, which one of the following describes HPCI System response as RPV level rises?

The HPCI System will _____ at +46 inches RPV level.

- A. trip AND isolate
- B. trip but NOT isolate
- C. isolate but NOT trip
- D. NOT trip and NOT isolate

Answer Key		
Question # 24 RO		
Choice		Basis or Justification
Correct:	D	HPCI RPV high level trip requires input from both LT-72C and LT-72D (2-out-of-2 logic). With one transmitter downscale, the HPCI system will not trip on high level. HPCI does not isolate on high RPV level (isolations cause a turbine trip, not the other way around).
Distractors:	A	The HPCI trip logic is 2-out-of-2, requiring both inputs to cause a trip. HPCI does not isolate on high RPV level (isolations cause a turbine trip, not the other way around).
	B	The HPCI trip logic is 2-out-of-2, requiring both inputs to cause a trip.
	C	HPCI does not isolate on high RPV level (isolations cause a turbine trip, not the other way around).

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	3.5	4	10CFR55.41(b)(7)

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	SO 23.7.C-2; ARC-221 B-1	
Learning Objective:	PLOT-5023-4c	
K/A System:	206000 – High Pressure Coolant Injection System	Importance: RO / SRO 3.4 / 3.4
K/A Statement: K1.12 – Knowledge of the physical connections and/or cause-effect relationships between the High Pressure Coolant Injection System and the following: Nuclear boiler instrumentation.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:	An event occurred at PB in 2004 (IR #252501) that resulted in loss of 1 input to the high level trip logic due to a lifted lead. This condition went unnoticed for several weeks.	

25. Given the following:

- Unit 2 is operating at 25% power
- #2 APRM fails downscale (not INOP)

This condition will generate an _____.

- A. alarm ONLY
- B. alarm and rod block ONLY
- C. alarm and half scram ONLY
- D. alarm, rod block and half scram

Answer Key		
Question # 25 RO		
Choice		Basis or Justification
Correct:	B	APRM downscale ($\leq 3.2\%$) in MODE 1 will generate a control rod withdraw block and downscale alarm 211 C-2 only.
Distractors:	A	APRM downscale ($\leq 3.2\%$) in MODE 1 will generate a control rod withdraw block and downscale alarm 211 C-2.
	C	A scram vote signal is only generated for: APRM INOP Trip, High Neutron Flux, and Simulated Thermal Power High. In addition, APRM downscale will generate a control rod withdraw block (in Mode 1 ONLY).
	D	A scram vote signal is only generated for: APRM INOP Trip, High Neutron Flux, and Simulated Thermal Power High.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
	<input checked="" type="checkbox"/> Previous NRC Exam: (PB 2007) <input type="checkbox"/> Other Exam Bank: ()		
Reference(s):	ARC-211 C-2		
Learning Objective:	PLOT-5060-3a		
K/A System:	215005 – Average Power Range Monitor/ Local Power Range Monitor System	Importance:	RO / SRO 3.7 / 3.6
K/A Statement: A3.08 – Ability to monitor automatic operations of the Average Power Range Monitor/Local Power Range Monitor System including: Control rod block status.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

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

- T=0 – Drywell pressure is 2.1 psig
- T=2 – the E32 BUS DIFFERENTIAL OR OVERCURRENT RELAYS (004 C-1) alarm is received
- T=5 – the ‘A’ EMERG SERVICE WATER PUMP TRIP (002 B-5) alarm is received

Assuming no operator actions, what is the status of the ‘B’ ESW pump and the ECW pump two minutes later?

The ‘B’ ESW pump is ____ (1) ____ and the ECW pump is ____ (2) ____.

- A. (1) running
(2) running
- B. (1) NOT running
(2) running
- C. (1) running
(2) NOT running
- D. (1) NOT running
(2) NOT running

Answer Key		
Question # 26 RO		
Choice		Basis or Justification
Correct:	B	When drywell pressure rises above 2 psig the 'A' and 'B' ESW pumps and the ECW pump will automatically start. With ESW header pressure > 30 psig, the ECW pump will automatically shutdown 45 seconds after it first started. Since the 'B' ESW pump is powered from the E32 bus, it will trip as a result of the E32 bus differential/overcurrent condition. When the 'A' ESW pump trips, the ECW pump will automatically restart when ESW header pressure drops below 30 psig.
Distractors:	A	First part is incorrect – the 'A' ESW pump is not running due to the E32 bus differential/overcurrent condition. Plausible if the applicant does not know pump power supplies or recognize the E32 bus is locked out.
	C	Both parts are incorrect – the 'A' ESW pump is not running due to the E32 bus differential/overcurrent condition. The ECW pump is running due to the loss of both ESW pumps (low ESW header pressure). Plausible if the applicant does not know pump power supplies or recognize the E32 bus is locked out; or does not know ECW pump auto-start conditions.
	D	Second part is incorrect – the ECW pump is running due to the loss of both ESW pumps (low ESW header pressure). Plausible if the applicant does not know ECW pump auto-start conditions.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2009) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	SO 52A.1.B; ARC-004 C-1; ARC-002 B-5		
Learning Objective:	PLOT-5033-4a		
K/A System:	400000 – Component Cooling Water System (CCWS)	Importance:	RO / SRO 3.0 / 3.0
K/A Statement: K4.01 – Knowledge of CCWS design feature(s) and/or interlocks which provide for the following: Automatic start of standby pump.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

27. Given the following:

- Unit 2 is operating at 85% power
- The 2A Reactor Feed Pump tripped
- Reactor level dropped to +15 inches before turning and beginning to rise

Based on these conditions, what is the most limiting Recirculation System response and the reason for that response?

The Recirculation pumps will runback to _____.

- A. 30% to ensure adequate Reactor Feedwater Flow is available
- B. 30% to ensure adequate Recirc Pump Net Positive Suction Head
- C. 45% to ensure adequate Reactor Feedwater Flow is available
- D. 45% to ensure adequate Recirc Pump Net Positive Suction Head

Answer Key		
Question # 27 RO		
Choice	Basis or Justification	
Correct:	C	With a reactor water level < 17 inches and individual RFP flow < 20%, a 45% runback will occur to ensure adequate feedwater flow is available.
Distractors:	A	Runback to 30% is incorrect—reactor water level < 17 inches concurrent with a reactor scram will cause a 30% runback. The reason is also incorrect—this is the reason for the 45% runback.
	B	Runback to 30% is incorrect—reactor water level < 17 inches concurrent with a reactor scram will cause a 30% runback. The reason is correct—adequate Recirc pump NPSH is the reason for the 30%.
	D	Runback to 45% is correct. The reason is also incorrect—this is the reason for the 30% runback.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2009) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	OT-100; UFSAR Chapter 7.9 and 7.10		
Learning Objective:	PLOT-5002-4b		
K/A System:	259001 – Reactor Feedwater System	Importance:	RO / SRO 3.1 / 3.1
K/A Statement: K1.16 – Knowledge of the physical connections and/or cause-effect relationships between the Reactor Feedwater System and the following: Recirculation.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

28. Given the following:

- Unit 2 was initially operating at 100% power
- 7 Drywell Cooler Fans have their control switches in RUN
- 7 Drywell Cooler Fans have their control switches in AUTO
- A loss of offsite power (LOOP) occurs
- All 4 EDGs start and re-energize their associated busses
- RPV level is being maintained by HPCI and RCIC
- Drywell pressure is 0.9 psig

With no operator actions, what is the status of the Drywell Cooler Fans?

- A. ALL fans are tripped
- B. ALL fans are running
- C. ONLY the 7 fans in RUN are running
- D. ONLY the 7 fans in AUTO are running

Answer Key		
Question # 28 RO		
Choice		Basis or Justification
Correct:	C	If power is lost to the 480 V emergency MCCs, the running fans will stop. When power is restored, the fans with control switches in RUN will restart; the fans with control switches in AUTO will remain off.
Distractors:	A	When power is restored, the fans with control switches in RUN will restart. All fans would be tripped if drywell pressure was above 2 psig.
	B	Fans with their control switch in AUTO only start on a low flow condition following a 10-second time delay.
	D	Fans with their control switch in AUTO only start on a low flow condition following a 10-second time delay.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	E-195, sheet 1		
Learning Objective:	PLOT-5040C-6a		
K/A System:	223001 – Primary Containment System and Auxiliaries	Importance:	RO / SRO 2.7 / 2.9
K/A Statement: K2.09 – Knowledge of the electrical power supplies to the following: Drywell cooling fans.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

29. Given the following:

- A reactor startup is in progress on Unit 2
- The following control rod drive conditions exist:
 1. Control rod 18-39 is at position '04' and is stuck
 2. Control rod 38-19 is at position '36' and is isolated
 3. Control rod 42-43 is at position '48' and has a slow scram time

Which of these conditions has a negative effect on Shutdown Margin?

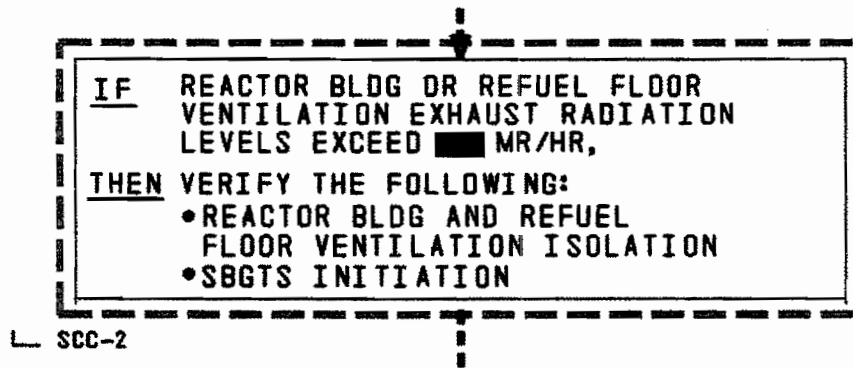
- A. 1 and 2 combined
- B. 1 and 3 combined
- C. 2 and 3 combined
- D. 2 ONLY

Answer Key		
Question # 29 RO		
Choice		Basis or Justification
Correct:	A	A control rod that is stuck at position '04' along with a control rod that is isolated from its HCU at position '36' challenges Tech Spec shutdown margin criteria. Reactor Engineering determination is required under these conditions to determine if SDM criteria are met.
Distractors:	B	A single control rod with a slow scram time does not challenge shutdown margin criteria. Tech Spec 3.1.4 allows up to 13 (depending on location), but the bases for limiting the number of slow control rods is to ensure valid transient and accident analysis assumptions, not for shutdown margin.
	C	A single control rod with a slow scram time does not challenge shutdown margin criteria.
	D	A single isolated control rod does not challenge shutdown margin criteria.

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

Source Documentation		
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank	
Reference(s):	SO 3.7.E-2; Tech Spec definitions; Tech Spec 3.1; T-101, Note 24	
Learning Objective:	PLOT-1800-3; PLOT-PBIG-2101-T101-4, -6	
K/A System:	201003 – Control Rod and Drive Mechanism	Importance: RO / SRO 3.2 / 3.8
K/A Statement: K3.03 – Knowledge of the effect that a loss or malfunction of the Control Rod and Drive Mechanism will have on the following: Shutdown margin.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

30. Per T-103 "Secondary Containment Control" Bases, which statement below describes the reason for the following step?



- A. Prevent an offsite radioactive release.
- B. Provide for a filtered and elevated release.
- C. Minimize the radiation exposure to station personnel.
- D. Route release path through hardened ducts to prevent ductwork failure.

Answer Key		
Question # 30 RO		
Choice		Basis or Justification
Correct:	B	A high radiation condition, as sensed by RB and RF Floor Ventilation process radiation monitors, will automatically isolate RB and RF Floor Ventilation dampers to contain potentially contaminated air. At the same time, the SBTG System is initiated. Per T-103 Bases, the purpose of this action is to provide for a filtered, monitored, and elevated release through the main stack, vice through the vent stacks.
Distractors:	A	The isolation does not prevent a release, but does filter and elevate the release. Plausible since the purpose of most automatic isolations is to prevent a release.
	C	Radiation dose to station personnel is not changed by the isolation. However, the severity of the release to the public is minimized.
	D	This distractor is based on a procedural precaution about manual alignment of SBTG; it is not the basis for automatic isolations.

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

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> Other Exam Bank: (LORT) <input type="checkbox"/> ILT Exam Bank	
Reference(s):	T-103 Bases; SO 9A.1.B	
Learning Objective:	PLOT-5040B-4b	
K/A System:	272000 – Radiation Monitoring System	Importance: RO / SRO 3.7 / 4.1
K/A Statement: K4.02 – Knowledge of Radiation Monitoring System design feature(s) and/or interlocks which provide for the following: Automatic actions to contain the radioactive release in the event that predetermined release rates are exceeded.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

31. Given the following:

- Unit 2 is operating at 100% power
- The 'A' RPS bus was transferred to its alternate power supply
- Reactor Building Ventilation is being restored in accordance with SO 40B.1.A-2 "Reactor Building Ventilation System Startup and Normal Operation"
- After placing all system fans in their normal lineup, Reactor Building and Refuel Floor differential pressures on Panel 20C012 indicate +0.1 inches H₂O

Which one of the following actions is correct in accordance with SO 40B.1.A-2?

- A. remove one RB Exhaust Fan from service
- B. place one additional RB Supply Fan in service
- C. remove one RF Floor Supply Fan from service
- D. place one additional Equipment Cell Exhaust Fan in service

Answer Key		
Question # 31 RO		
Choice		Basis or Justification
Correct:	C	Per SO 40B.1.A-2, the normal ventilation system lineup is 1 Equipment Cell exhaust fan, 2 RB supply fans, 2 RB exhaust fans, 2 RF supply fans and 2 RF exhaust fans. Per the SO, if the normal ventilation system lineup does not establish normal differential pressure (-0.1 to -0.4 inches H ₂ O), the procedure directs removing one RF supply OR exhaust fan from service. In this case, a RF supply fan must be removed from service to establish the proper negative d/p.
Distractors:	A	Since normal differential pressure is -0.1 to -0.4 inches H ₂ O, removing one RB exhaust fan from service would cause differential pressures to become more positive. Plausible if applicant does not know required d/p range and/or does not understand ventilation system design.
	B	Since normal differential pressure is -0.1 to -0.4 inches H ₂ O, placing one additional RB supply fan in service would cause differential pressures to become more positive. In addition, SO 40B.1.A-2 gives direction to avoid running 3 RB supply or exhaust fans at the same time. Plausible if applicant does not know required d/p range and/or does not understand ventilation system design.
	D	This would make d/p negative, but SO 40B.1.A-2, Caution 4.5.1-1, prohibits running both Equipment Cell exhaust fans. Plausible if applicant does not recall SO 40B.1.A-2 cautions and limitations.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	SO 40B.1.A-2		
Learning Objective:	PLOT-5040B-5b		
K/A System:	288000 – Plant Ventilation Systems	Importance:	RO / SRO 3.2 / 3.4
K/A Statement: K5.02 – Knowledge of the operational implications of the following concepts as they apply to Plant Ventilation Systems: Differential pressure control.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

32. ON-114 “Actual Fire Reported in the Power Block, Diesel Generator Building, Emergency Pump, Inner Screen or Emergency Cooling Tower Structures” contains the following note:

NOTE

IF power is lost to the Motor Driven Fire Pump (00P064) controller for more than 8 seconds, THEN the Motor Driven Fire Pump automatic start feature is defeated. This interlock does NOT affect the ability to manually start the pump. Guidance for resetting the auto start logic can be found in SO 37B.1.A “Common Plant Fire Water System Lineup for Automatic Operation”.

The basis for defeating the automatic start feature is to prevent _____.

- A. the pump from automatically starting with reduced bus voltage
- B. overloading the diesel generators during a loss of off-site power
- C. a simultaneous start with the Diesel Driven Fire Pump and a water hammer
- D. a spurious start due to loss of power to the fire header pressure instrumentation

Answer Key		
Question # 32 RO		
Choice		Basis or Justification
Correct:	B	ON-114 Bases for the note says that the defeat of the auto start feature occurs after an 8 second loss of power to prevent an auto start during a LOOP event which could cause an EDG to exceed its 200 hour rating.
Distractors:	A	The candidate could believe that this interlock is to protect the Fire Pump from damage due to low bus voltage.
	C	The candidates are trained to have concern for situations that may cause water hammers and resultant equipment damage and possible personnel safety issues, however, this is not the concern in this situation.
	D	Loss of instrumentation is a plausible concern for causing an undesired system operation.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	3.0	3	10CRF55.41(b)(8)

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	ON-114 Bases	
Learning Objective:	PLOT-PBIG-1550-4	
K/A System:	286000 – Fire Protection System	Importance: RO / SRO 3.1 / 3.1
K/A Statement: K6.01 – Knowledge of the effect that a loss or malfunction of the following will have on the Fire Protection System: A. C. electrical distribution.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

33. Given the following:

- Control Room Ventilation was initially in a normal lineup
- The PRO performed SO 40D.7.B “Place Control Room Emergency Ventilation In Service From The Control Room”

Which one of the following describes the effect of this action on Control Room pressure relative to Turbine Building pressure?

Control Room pressure will _____.

- A. remain approximately the same since it is controlled by modulating dampers
- B. remain approximately the same since it is based on supply & exhaust fan capacity
- C. become more positive since more air is being supplied to the Control Room
- D. become more negative since more air is being exhausted from the Control Room

Answer Key**Question # 33 RO**

Choice		Basis or Justification
Correct:	B	During normal operation, the CR ventilation system maintains the control room at a positive pressure by virtue of the capacities of the supply, fresh air and return fans—20,600 CFM is delivered by the supply and fresh air fans; 18,600 CFM is exhausted by the return and exhaust fans. The remaining 2000 CFM pressurizes the control room and is exfiltrated to the turbine building. CREV operation does not change control room pressure since 3000 CFM is supplied by the CREV supply fans and 1000 CFM is still exhausted (to the TB roof) via the toilet and utility room exhaust fan. The remaining 2000 CFM pressurizes the control room and is exfiltrated to the turbine building, as was the case during normal operation.
Distractors:	A	The control room ventilation system uses modulating dampers to control temperature and humidity, not for controlling control room pressure.
	C	Operating CREV does not change the amount of flow brought in from the outside or the amount that is exhausted.
	D	Operating CREV does not change the amount of flow brought in from the outside or the amount that is exhausted.

Psychometrics

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

Source Documentation

Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: ()	
	<input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: ()	
	<input type="checkbox"/> ILT Exam Bank	
Reference(s):	M-384; SO 40D.5.A; SO 40D.7.B	
Learning Objective:	PLOT-5040D-5b	
K/A System:	290003 – Control Room HVAC	Importance: RO / SRO 2.5 / 2.8
K/A Statement:		
A1.04 – Ability to predict and/or monitor changes in parameters associated with operating the Control Room HVAC controls including: Control room pressure.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

34. An electric ATWS exists on Unit 2.

The Reactor Operator is directed to perform T-220-2 "Driving Control Rods During a Failure to Scram".

Prior to implementing this procedure, the Rod Worth Minimizer (RWM) loses power.

Which one of the following describes (1) the impact of this power loss on control rod insertion and (2) the action required by T-220-2 to insert control rods?

- A. (1) Control rod insertion is prevented
(2) Bypass the RWM AND place the Rod Control switch (3A-S2) in the "IN" position
- B. (1) Control rod insertion is prevented
(2) Bypass the RWM AND place the Emergency In / Notch Override switch (3A-S3) in the "EMERG ROD IN" position
- C. (1) Control rod insertion is NOT be prevented
(2) Place the Rod Control switch (3A-S2) in the "IN" position
- D. (1) Control rod insertion is NOT be prevented
(2) Place the Emergency In / Notch Override switch (3A-S3) in the "EMERG ROD IN" position

Answer Key		
Question # 34 RO		
Choice		Basis or Justification
Correct:	B	A loss of power to the RWM (i.e., hardware/software failure) will result in all rod blocks becoming active, unless the RWM is bypassed. T-220 directs bypassing the RWM (regardless of specific plant conditions) and inserting control rods using the "Emergency In/Notch Override" control switch.
Distractors:	A	T-220 directs inserting control rods using the "Emergency In/Notch Override" control switch.
	C	A loss of power to the RWM will result in all rod blocks becoming active, unless the RWM is bypassed. T-220 directs inserting control rods using the "Emergency In/Notch Override" control switch.
	D	A loss of power to the RWM will result in all rod blocks becoming active, unless the RWM is bypassed. T-220 directs bypassing the RWM (regardless of specific plant conditions).

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	ARC-211 F-5; SO 62.7.A-2; T-220; M-1-S-20 Sheets 9, 12		
Learning Objective:	PLOT-5062A-6a		
K/A System:	201006 – Rod Worth Minimizer (RWM)	Importance:	RO / SRO 2.5 / 2.8
K/A Statement: A2.01 – Ability to (a) predict the impact of the following on the Rod Worth Minimizer (RWM); and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Power supply loss.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

35. The following conditions exist on Unit 2:

- An ATWS is in progress
- SLC has NOT been initiated
- Reactor pressure is being controlled with RWCU in the Recirc Mode
- T-227-2 “Defeating RWCU Isolation Interlocks” has been completed
- A pipe break occurs in the suction line of the operating RWCU pump, causing RPV level to lower

Based on these conditions, the RWCU System will _____.

- A. isolate on low RPV level
- B. isolate on high system flow
- C. remain in service until T-227 is restored
- D. remain in service unless SBLC is initiated

Answer Key		
Question # 35 RO		
Choice		Basis or Justification
Correct:	B	T-227-2 ONLY defeats RPV low level and SBLC initiation isolation. All other RWCU isolations, such as high flow, are still in effect.
Distractors:	A	T-227-2 defeats RPV low level isolation.
	C	T-227-2 ONLY defeats RPV low level and SBLC initiation isolation. All other RWCU isolations, such as high flow, are still in effect.
	D	T-227-2 ONLY defeats RPV low level and SBLC initiation isolation. All other RWCU isolations, such as high flow, are still in effect.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	T-227-2		
Learning Objective:	PLOT-5012-4d		
K/A System:	204000 – Reactor Water Cleanup System	Importance:	RO / SRO 3.6 / 3.6
K/A Statement: A3.03 – Ability to monitor automatic operations of the Reactor Water Cleanup System including: Response to system isolations.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

36. A LOCA has occurred on Unit 2. RPV water level is now reading -150 inches on LR-110A blue pen at the 20C004C RCIC Panel.

Based on the above conditions, which one of the following process parameters is providing this recorder level indication?

Level is sensed by the _____.

- A. LT-72C, Wide Range level transmitter
- B. LT-73C, Fuel Zone level transmitter
- C. LT-112, Wide Range level transmitter
- D. LT-113, Fuel Zone level transmitter

Answer Key		
Question # 36 RO		
Choice		Basis or Justification
Correct:	B	LR-110A Blue pen comes from either LT-72C or 73C. When reactor level (WR) lowers below minus (-) 100 inches, the recorder swaps from Wide Range (LT-72C) to the Fuel Zone (LT-73C) transmitter.
Distractors:	A	Blue pen has swapped from Wide Range LT-72C to Fuel Zone LT-73C. The green pen always reads Wide Range, not the blue pen.
	C	LT-112 is the uncompensated Wide Range input to the HPCI Alternate Control Station.
	D	LT-113 is always the Fuel Zone input to the LI-113 indicator on the 'A' RHR Panel.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	2.0	3	10CFR55.41(b)(7)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
	<input checked="" type="checkbox"/> Previous NRC Exam: (PB 2002) <input type="checkbox"/> Other Exam Bank: ()		
Reference(s):	ST-O-098-01N-2		
Learning Objective:	PLOT-5002B-5a		
K/A System:	216000 – Nuclear Boiler Instrumentation	Importance:	RO / SRO 3.3 / 3.1
K/A Statement:			
A4.01 – Ability to manually operate and/or monitor in the control room: Recorders.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

37. Which one of the following is the reason ON-100 "Failure of a Jet Pump" directs a plant shutdown if a jet pump failure has been confirmed.
- A. Invalid heat balance due to inaccurate Recirc flow measurement
 - B. Invalid LOCA analysis due to potential for a displaced jet pump mixer
 - C. Unknown effect on core power distribution due to Recirc loop flow mismatch
 - D. Potential for violating thermal limits due to inaccurate Recirc flow measurement

Answer Key		
Question # 37 RO		
Choice	Basis or Justification	
Correct:	B	This is the reason given in ON-100 Bases—operation with a displaced jet pump mixer is not part of the licensing basis. Per Tech Spec 3.4 Bases, jet pump operability is an implicit assumption in the design basis loss of coolant accident analysis.
Distractors:	A	This is not the reason given in ON-100 Bases. Plausible since various mass flow rates are part of the heat balance equation (although recirc flow is not among them).
	C	This is not the reason given in ON-100 Bases. Plausible since recirc loop flow mismatch is an ON-100 concern (requiring reference to Tech Spec 3.4.2, which is also based on LOCA analysis assumptions).
	D	This is not the reason given in ON-100 Bases. Plausible since inaccurate recirc flow measurement could negatively impact thermal limit calculations.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	ON-100 Bases; Tech Spec 3.4 Bases		
Learning Objective:	PLOT-PBIG-1550-3		
K/A System:	202001 – Recirculation System	Importance:	RO / SRO 3.9 / 4.0
K/A Statement: G2.1.27 – Knowledge of system purpose and/or function.			
REQUIRED MATERIALS:	NONE		
Notes and Comments:	This question meets the K/A since it requires knowledge of the purpose/function of Recirculation System jet pumps from an accident analysis/plant safety perspective.		

38. Given the following:

- Fuel loading is in progress on Unit 2
- The first 3 fuel assemblies of a fuel cell are fully seated in the correct core locations and are in the correct orientation
- The 4th fuel assembly loaded in this cell is fully seated into its correct core location, but is inadvertently oriented 180 degrees from its correct position

Which one of the following could occur due to the misoriented fuel assembly?

- A. Reduced core flow through the fuel assembly
- B. Unmonitored violations of core thermal limits
- C. Inaccurate calibration of LPRMs using the TIP System
- D. Improper installation of the Steam Separator Assembly

Answer Key		
Question # 38 RO		
Choice		Basis or Justification
Correct:	B	Per the UFSAR, section 14.5.3.5, "a misoriented fuel bundle during power operation potentially could lead to unmonitored violations of core thermal limits."
Distractors:	A	A misoriented fuel assembly will not impact flow through a fuel assembly, which is primarily based on fuel assembly mechanical design, core orificing, etc. Plausible if applicant does not understand/recall fuel assembly design.
	C	TIP detectors, which measure gamma flux, are used to calibrate LPRM detectors. A misoriented fuel assembly will not change the measured gamma flux and will therefore not effect LPRM calibration. Plausible if applicant does not understand/recall TIP System function and/or operation.
	D	A misoriented fuel assembly will not impact installation of the steam separator assembly. Plausible if applicant does not understand/recall reactor vessel and internals design.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (DR 1997) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	UFSAR, Chapter 14		
Learning Objective:	NLSRO-0763-1		
K/A System:	234000 – Fuel Handling Equipment	Importance:	RO / SRO 3.0 / 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:			

39. Unit 2 was initially operating at 100% power when the 2A Reactor Recirculation pump tripped. Current plant conditions are as follows:

- APRM power level is oscillating 58% to 69%
- OPRM Pretrip Condition alarms (211 B-5) are being received repetitively

Which one of the following actions is required?

- A. Insert GP-9-2 Appendix 1 rods ONLY.
- B. Manually scram the reactor and enter the T-100 "Scram".
- C. Raise the speed of the operating Recirculation pump to suppress the APRM oscillations.
- D. Insert ALL GP-9-2 rods, followed by NF-AB-720-1 approved sequence rods, as required to stop the power oscillations.

Answer Key		
Question # 39 RO		
Choice		Basis or Justification
Correct:	D	OT-112 step 2.2 (Immediate Action) requires insertion of all GP-9-2 control rods on a Recirc pump trip. Step 2.5 (also Immediate Action) directs monitoring for THI and inserting GP-9-2 rods followed by NF-AB-720-1 rods until THI no longer exists. At this stage of the transient, the operator cannot determine if GP-9-2 rods alone will be sufficient.
Distractors:	A	This action is required when a Recirc pump trips, but it is not the only action required in this case since APRM flux oscillations exceed 10% peak-to-peak, indicating THI.
	B	This action is required when NO Recirc pumps are operating, or when APRM flux oscillations exceed 15% peak-to-peak.
	C	Raising Recirc pump speed is one of the options for exiting Region 2 of the P-F Map, but NOT a THI suppression action.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	OT-112; GP-5-1; ARC-211 B-5		
Learning Objective:	PLOT-PBIG-1540-1, -3, -4		
K/A System:	295001 – Partial or Complete Loss of Forced Core Flow Circulation	Importance:	RO / SRO 2.5 / 3.3
K/A Statement: AK1.04 – Knowledge of the operational implications of the following concepts as they apply to Partial or Complete Loss of Forced Core Flow Circulation: Limiting cycle oscillation.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

40. Unit 2 is operating in Mode 4 when a sustained loss of shutdown cooling occurs.

Which of the following is the reason ON-125 “Loss of Shutdown Cooling” directs raising RPV level to above +50 inches?

- A. Provides sufficient NPSH for placing a Recirculation pump in service.
- B. Satisfies Technical Specification requirements for reactor coolant circulation.
- C. Promotes natural circulation and helps prevent stagnation of coolant in the core.
- D. Establishes a longer “time to boil” while aligning alternate decay heat removal systems.

Answer Key		
Question # 40 RO		
Choice		Basis or Justification
Correct:	C	Per ON-125 Bases, raising level to above the separators (> +50 inches) promotes natural circulation, which will prevent stagnation (thermal stratification) of reactor coolant.
Distractors:	A	Not the basis per ON-125. In addition, +50 inches is more than is required for recirculation pump NPSH.
	B	Per ON-125, raising RPV level to +50 inches does NOT satisfy Tech Spec requirements for reactor coolant circulation. This can only be satisfied by restoring forced circulation (i.e., a Recirc or RHR pump must be in service).
	D	Not the basis per ON-125. In addition, adding inventory has only a minor impact on time to boil, which is primarily based on decay heat load.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	2.5	3	10CFR55.41(b)(10)

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank	
	<input checked="" type="checkbox"/> Previous NRC Exam: (PB 2002) <input type="checkbox"/> Other Exam Bank: ()	
Reference(s):	ON-125 and Bases	
Learning Objective:	PLOT-1550-28c	
K/A System:	295021 – Loss of Shutdown Cooling	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 Loss of Shutdown Cooling: Thermal stratification.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

41. Unit 2 is operating with the following conditions:

- Main Generator volts: 22.0 KV
- Main Generator MW: 1100 MWe
- Main Generator VARS: 120 MVARs
- Hydrogen pressure: 60 psig

A grid disturbance results in steadily lowering grid voltage.

The Main Generator voltage regulator responds as designed by attempting to raise Main Generator terminal voltage.

With no operator action, this transient could result in _____.

Figure 1 of AO 50.7-2 "Generator Capability Curve" is PROVIDED SEPARATELY.

- A. overheating the Main Generator rotor windings
- B. overheating the Main Generator stator windings
- C. exceeding the Generator Under Excitation Limit
- D. Generator Lockout due to reverse power relay trip

Answer Key		
Question # 41 RO		
Choice		Basis or Justification
Correct:	B	The given conditions (lowering grid voltage) will cause the generator automatic voltage regulator to attempt to raise grid voltage, causing the generator to pick up additional VARS (i.e., move up on the Generator Capability Curve). Without operator action, this would result in exceeding the generator capability curve (B-C) for 60 psig hydrogen pressure. Per Figure 1 of AO 50.7-2, curve B-C is limited by armature (stator) heating.
Distractors:	A	This would be true if curve A-B was the limiting factor. Plausible if one was confused between field, armature, rotor and stator.
	C	This would be true if grid voltage was rising, resulting in lowering VARS on the main generator (i.e., move down on the Generator Capability Curve).
	D	A reverse power trip occurs when real load (MW) is reduced to the point where the grid supplies the generator. The given conditions would not result in lowering MW, especially to the point of reverse power. Plausible if one was confused on real vs. reactive load sharing between generators.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		<input checked="" type="checkbox"/> Previous NRC Exam: (PB 2008) <input type="checkbox"/> Other Exam Bank: ()
Reference(s):	AO 50.7-2		
Learning Objective:	PLOT-5050-6f		
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 concept as it applies to Generator Voltage and Electric Grid Disturbances: Over-excitation.			
REQUIRED MATERIALS:		Figure 1 of AO 50.7-2	
Notes and Comments:			

42. Refueling movements are in progress on Unit 2.

Which one of the following unanticipated conditions is symptomatic of a refueling event requiring action in accordance with ON-124 "Fuel Floor and Fuel Handling Problems"?

- A. FUEL STORAGE POOL HI LEVEL alarms on local Panel 20C075.
- B. 2 UNIT REFUELING FLOOR AREA HI RADIATION (003 B-4) alarms.
- C. An irradiated LPRM detector is dropped in the ISFSI Cask Handling Area.
- D. REFUELING FLOOR VENT EXHAUST HI RADIATION (218 A-1) alarms.

Answer Key		
Question # 42 RO		
Choice		Basis or Justification
Correct:	B	ON-124 requires entry and action for any Fuel Floor ARM alarm.
Distractors:	A	This alarm does not require entry into ON-124. Note that receiving a "Fuel Storage Pool Hi Radiation" alarm, or indications associated with a loss of Spent Fuel Pool water inventory (e.g., lowering level), do require entry into ON-124.
	C	ON-124 entry is required for a fuel assembly or single fuel rod dropped or damaged, but not for an LPRM detector.
	D	Although this condition obviously requires action, it is not an entry condition into ON-124.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	3	2	10CFR55.41(b)(10)

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2005) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	ON-124	
Learning Objective:	PLOT-PBIG-1550-2	
K/A System:	295023 – Refueling Accidents	Importance: RO / SRO 3.4 / 3.6
K/A Statement: AK2.03 – Knowledge of the interrelations between Refueling Accidents and the following: Radiation Monitoring Equipment.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

43. Unit 2 is operating at 100% power when a Turbine Trip occurs. Two minutes later the following conditions are observed:

- Reactor power is 2E-02%
- Rod 22-51 is at position “02”
- Rod 50-31 is at position “48”
- All other control rods are at “00”

Which one of the following statements is correct for these conditions?

The reactor ____ (1) ____ shutdown; an ATWS ____ (2) ____ in progress.

- A. (1) is
(2) is
- B. (1) is
(2) is NOT
- C. (1) is NOT
(2) is
- D. (1) is NOT
(2) is NOT

Answer Key		
Question # 43 RO		
Choice		Basis or Justification
Correct:	A	Per T-101 NOTE 23, the reactor is shutdown if it is know to be subcritical with reactor power below 1%. Per T-101 NOTE 24, ATWS criteria stipulate that if any single rod is withdrawn (at '48' in this case), all other rods must be fully inserted. Having one rod at '48' and another rod at '02' does not meet these criteria.
Distractors:	B	An ATWS is in progress.
	C	The reactor is shutdown.
	D	The reactor is shutdown; an ATWS is in progress.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	3		10CFR55.41(b)(2)

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	T-101 (Notes 23 and 24)		
Learning Objective:	PLOT-PBIG-2100-T101-4, -6		
K/A System:	295006 – Scram	Importance:	RO / SRO 4.2 / 4.3
K/A Statement: AK2.06 – Knowledge of the interrelationship between Scram and the following: Reactor power.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

44. Unit 2 was operating at 100% power when a large break occurred in the Torus.

As Torus level lowers, which one of the following describes when the LOCA downcomer vents and the SRV tailpipes will become uncovered?

<u>LOCA Downcomer Vents</u>	<u>SRV Tailpipes</u>
A. 12.5 feet	7 feet
B. 12.5 feet	6 feet
C. 10.5 feet	7 feet
D. 10.5 feet	6 feet

Answer Key		
Question # 44 RO		
Choice		Basis or Justification
Correct:	C	Per T-102 Bases, the LOCA downcomer vents are uncovered at 10.5 feet. Per T-112 Bases, the SRV tailpipes are uncovered at 7 feet.
Distractors:	A	12.5 feet is when T-102 requires a reactor scram and RPV depressurization due to low torus level.
	B	12.5 feet is when T-102 requires a reactor scram and RPV depressurization due to low torus level.
	D	6 feet is the RCIC vortex limit.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	T-102 Bases; T-112 Bases		
Learning Objective:	PLOT-1560-9		
K/A System:	295030 – Low Suppression Pool Water Level	Importance:	RO / SRO 3.5 / 3.8
K/A Statement: EK2.08 – Knowledge of the interrelationships between Low Suppression Pool Water Level and the following: SRV discharge submergence.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

45. The following conditions exist on Unit 3:

- ATWS
- Group I isolation
- Reactor power is 40%
- Torus Cooling is NOT available

Which one of the following limits will be challenged first by these conditions?

- A. Drywell Spray Initiation Limit
- B. Heat Capacity Temperature Limit
- C. Pressure Suppression Pressure Limit
- D. Primary Containment Pressure Limit

Answer Key		
Question # 45 RO		
Choice		Basis or Justification
Correct:	B	The given conditions indicate SRV discharge into the Torus. Without torus cooling, HCTL will be challenged first.
Distractors:	A	DWSIL is not an initial concern because there are no given conditions of Primary Containment high pressure or temperature.
	B	PSP is not an initial concern since there are no given conditions that indicate the Primary Containment is not functioning properly.
	D	PCP limit is not an initial concern because there is no given condition of Primary Containment high pressure.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2009) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	TRIP Bases		
Learning Objective:	PLOT-2102-6		
K/A System:	295026 – Suppression Pool High Water Temperature	Importance:	RO / SRO 3.9 / 4.0
K/A Statement: EK3.02 – Knowledge of the reasons for the following responses as they apply to Suppression Pool High Water Temperature: Suppression pool cooling.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

46. Given the following:

- A startup is in progress on Unit 3 with reactor power at 5%
- Panel 30Y033 is inadvertently de-energized, resulting in a loss of power to portions of PCIS logic

Which of the following RWCU System containment isolation valves close as a result of this event?

1. MO-3-12-15, Cleanup Inlet Isolation-Inboard
2. MO-3-12-18, Cleanup Inlet Isolation-Outboard
3. MO-3-12-68, Cleanup Outlet Isolation

A. 1 ONLY

B. 2 ONLY

C. 2 and 3 ONLY

D. 1, 2, and 3

Answer Key		
Question # 46 RO		
Choice		Basis or Justification
Correct:	D	A loss of Panel 30Y033 causes a loss of power to PCIS inboard isolation valve logic. This results in closure of associated inboard containment isolation valves, including RWCU valve MO-3-12-15. Loss of 30Y033 also results in closure of RWCU outboard containment isolation valves MO-3-12-18 and MO-3-12-68. This is due to loss of power to the NRHX high outlet temperature relay, which feeds both the inboard and outboard RWCU isolation valve logic. Note #2 in GP-8.C describes the RWCU response to a loss of 30Y033.
Distractors:	A	MO-3-12-18 and MO-3-12-68 also close on a loss of 30Y33.
	B	MO-3-12-15 and MO-3-12-68 also close on a loss of 30Y33.
	C	MO-3-12-15 also closes on a loss of 30Y33.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2007) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	GP-8.C; M-1-S-23; AO 58A.2-3		
Learning Objective:	PLOT-5012-6F		
K/A System:	295003 – Partial or Complete Loss of A.C. Power	Importance:	RO / SRO 3.7 / 3.7
K/A Statement: AK3.06 – Knowledge of the reasons for the following responses as they apply to Partial or Complete Loss of A.C. Power: Containment isolation.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

47. According to the UFSAR, which one of the following statements describes the reason for disabling control room controls IAW SE-10 "Plant Shutdown from the Alternative Shutdown Panels" after abandoning the control room?
- A. To prevent High Pressure Coolant Injection (HPCI) System automatic operation.
 - B. To ensure interlocks associated with operation of safe shutdown equipment are defeated.
 - C. To prevent simultaneous operation from the control room and the Alternative Shutdown Panels.
 - D. To ensure fire-induced circuit faults will NOT prevent operation, or cause spurious operation, of safe shutdown equipment.

Answer Key		
Question # 47 RO		
Choice		Basis or Justification
Correct:	D	From the UFSAR: "transfer/isolation switches provide electric circuit isolation between alternative shutdown circuits and circuits that could be affected by a fire in one of the four areas of concern (control room, cable spreading room, computer room, emergency shutdown panel area)." From 10CFR50, Appendix R: "The safe shutdown equipment and systems for each fire area shall be known to be isolated from associated non-safety circuits in the fire area so that hot shorts, open circuits, or shorts to ground in the associated circuits will not prevent operation of the safe shutdown equipment."
Distractors:	A	HPCI system automatic system operation (trips, isolations and automatic start) is defeated when control is transferred to the Alternative Shutdown Panel, but this is not the design basis reason for disabling Control Room controls.
	B	Interlocks are defeated when operation is transferred to the Alternative Shutdown Panels, but this is not the design basis reason for disabling Control Room controls.
	C	This could be (and is) accomplished procedurally; it is not the design basis reason for disabling Control Room controls.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CRF55.41(b)(7)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
	<input checked="" type="checkbox"/> Previous NRC Exam: (PB 2008) <input type="checkbox"/> Other Exam Bank: ()		
Reference(s):	SE-10; UFSAR FPP, Ch. 5		
Learning Objective:	PLOT-1555-9		
K/A System:	600000 – Plant Fire on Site	Importance:	RO / SRO 2.8 / 3.4
K/A Statement:			
AK3.04 – Knowledge of the reasons for the following responses as they apply to Plant Fire on Site: Actions contained in the abnormal procedure for plant fire on site.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

48. 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 to establish control at the HPCI Alternative Shutdown Panel

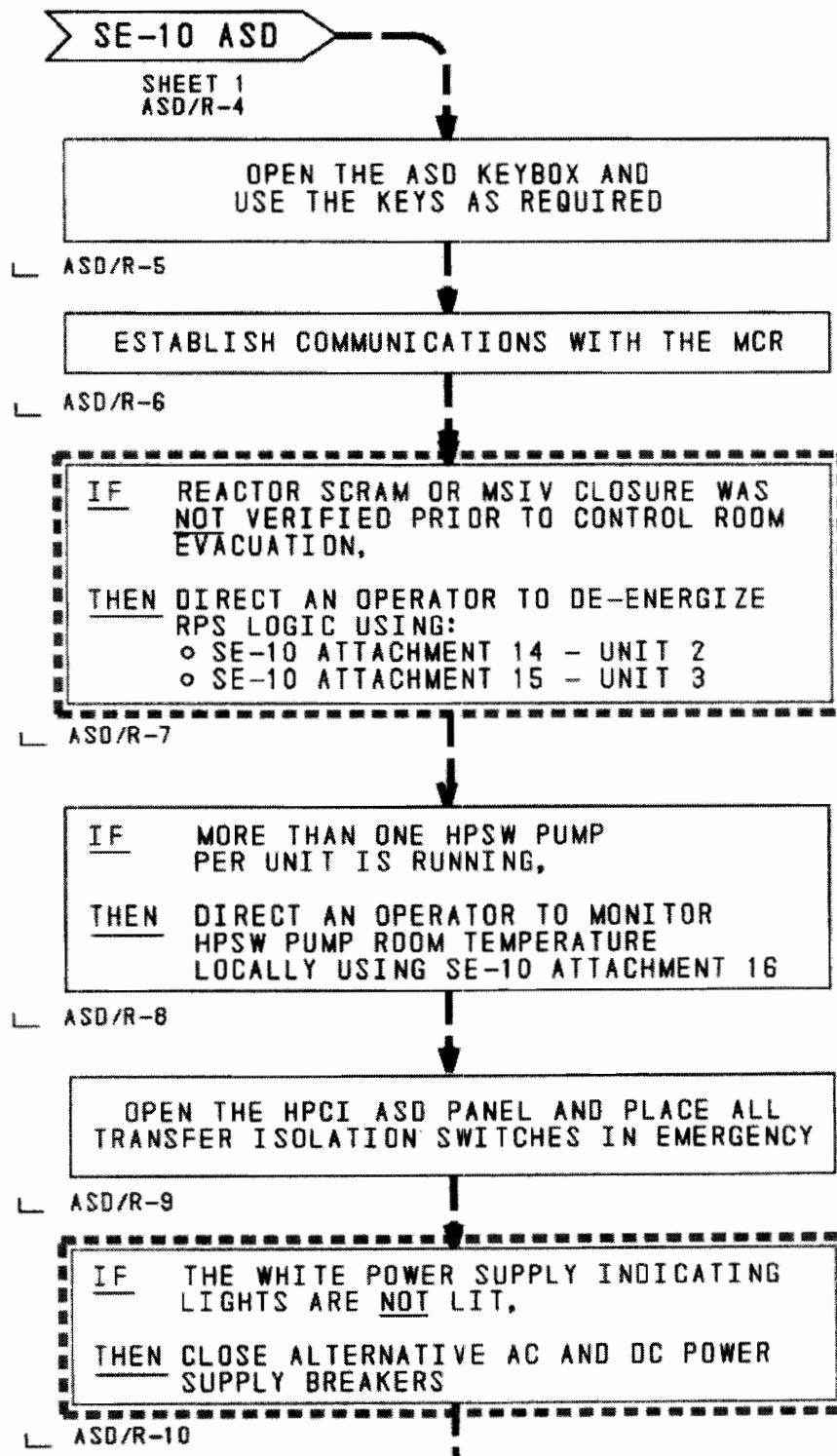
After placing the transfer isolation switch for the HPCI Aux Oil Pump to EMERGENCY, the URO observes the white power supply indicating light for the HPCI Aux Oil Pump is lit.

Which statement below is correct for these conditions?

A portion of SE-10 Sheet 2 is PROVIDED ON THE NEXT PAGE.

The white power supply indicating light shows that the ____ (1) ____ source of DC ____ (2) ____ power is available to the HPCI Aux Oil Pump.

- A. (1) normal
(2) control
- B. (1) normal
(2) operating
- C. (1) alternate
(2) control
- D. (1) alternate
(2) operating



Answer Key		
Question # 48 RO		
Choice		Basis or Justification
Correct:	A	Per SE-10 Bases Step ASD/R-10; normal (DC) control power is not available if the white power supply is not lit, and closing the alternate (DC) supply breaker establishes a separate and independent source of control power for the labeled component. As long as a (DC) power supply is present as indicated by the white light, the switch is not operated to prevent cross-tying normal and alternate (DC) power supplies.
Distractors:	B	The white light provides indication of control power status; not operating power. Plausible if applicant believes the transfer isolation switches align component operating power vice control power.
	C	The white light indicates that normal control power is available and there is no need to close the alternate power supply breaker. Plausible if applicant does not understand what is being accomplished by these steps of SE-10.
	D	The white light indicates that normal control power is available and there is no need to close the alternate power supply breaker. In addition, the white light provides indication of control power status; not operating power. Plausible if applicant believes the transfer isolation switches align component operating power vice control power, or does not understand what is being accomplished by these steps of SE-10.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	SE-10 Bases		
Learning Objective:	PLOT-1555-12		
K/A System:	295016 – Control Room Abandonment	Importance:	RO / SRO 2.8 / 2.9
K/A Statement: AA1.05 – Ability to operate and/or monitor the following as it applies to Control Room Abandonment: D.C. electrical distribution.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

49. Given the following:

- A radiological accident condition has occurred at Peach Bottom
- 2 VENT EXH STACK RAD MONITOR HI/TROUBLE A (218 B-5) alarms
- 2 VENT EXH STACK RAD MONITOR HI/TROUBLE B (218 C-5) alarms
- Unit 2 Vent Stack Radiation is reading 2×10^{-5} $\mu\text{Ci/cc}$ and rising

Which one of the following could be the source of the radiation release?

- A. Standby Gas Treatment Exhaust
- B. PEARL Building Ventilation Exhaust
- C. Radwaste Building Ventilation Exhaust
- D. Recombiner Building Ventilation Exhaust

Answer Key		
Question # 49 RO		
Choice		Basis or Justification
Correct:	C	Radwaste Building Ventilation exhausts to the Unit 2 vent stack.
Distractors:	A	SBGT exhausts to the main stack.
	B	The Recombiner Building exhausts to the Unit 3 vent stack.
	D	The PEARL Building exhausts to the Unit 3 vent stack.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	ON-104 and Bases		
Learning Objective:	PLOT-1550-9a		
K/A System:	295038 – High Offsite Release Rate	Importance:	RO / SRO 3.9 / 4.2
K/A Statement: EA1.01 – Ability to operate and/or monitor the following as it applies to High Offsite Release Rate: Stack-gas monitoring system.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

50. During an ATWS condition, the URO initiated the 'B' Standby Liquid Control (SBLC) System using RRC 11.1-2 "SBLC System Initiation During a Plant Event".

The following conditions exist:

- RPV pressure is 1020 psig
- SBLC discharge pressure is 1400 psig

Which statement below is correct for these conditions?

- A. SBLC is injecting at full flow.
- B. SBLC is injecting at reduced flow.
- C. SBLC is NOT injecting; initiate System 'A'.
- D. SBLC is NOT injecting; do NOT initiate System 'A'.

Answer Key		
Question # 50 RO		
Choice		Basis or Justification
Correct:	C	Based on the given conditions (1400 psig pump discharge pressure), SBLC is not injecting. Per RRC 11.1-2 and the supporting system operating procedure (SO 11.1.B-2), the operator is directed to verify SBLC is injecting and, if not, to start the other SBLC pump.
Distractors:	A	SBLC is not injecting. Plausible if applicant does not recognize 1400 psig pump discharge pressure as abnormal.
	B	SBLC is not injecting. Plausible if applicant recognizes 1400 psig pump discharge pressure as abnormal, but does not understand SBLC system design and believes the system is injecting at reduced flow.
	D	SBLC is not injecting but the 'A' SBLC system should be started to comply with the procedure. Plausible if applicant is not familiar with procedure direction and/or believes whatever failure exists will also prevent System 'A' from injecting.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	2.75	3	10CFR55.41(b)(6)

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: () <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	RRC 11.1-2; SO 11.1.B-2	
Learning Objective:	PLOT-5011-4d, -5c	
K/A System:	295037 – Scram Condition Present and Reactor Power Above APRM Downscale or Unknown	Importance: RO / SRO 4.5 / 4.5
K/A Statement: EA1.04 – Ability to operate and/or monitor the following as it applies to Scram Condition Present and Reactor Power Above APRM Downscale or Unknown: SBLC.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

51. Unit 2 was operating at 100% power when a Loss of Coolant Accident occurred. The following conditions currently exist:

- Drywell pressure is 6 psig
- Drywell sprays are not available
- Drywell bulk average temperature is 275 degrees F
- Drywell coolers are being supplied by Drywell Chilled Water (DWCW)
- DWCW return header pressure is 28 psig
- The Reactor and Radwaste Buildings are not accessible
- T-223-2 "Drywell Cooler Fan Bypass" is being implemented

T-223-2 Figure 1 is PROVIDED ON THE NEXT PAGE.

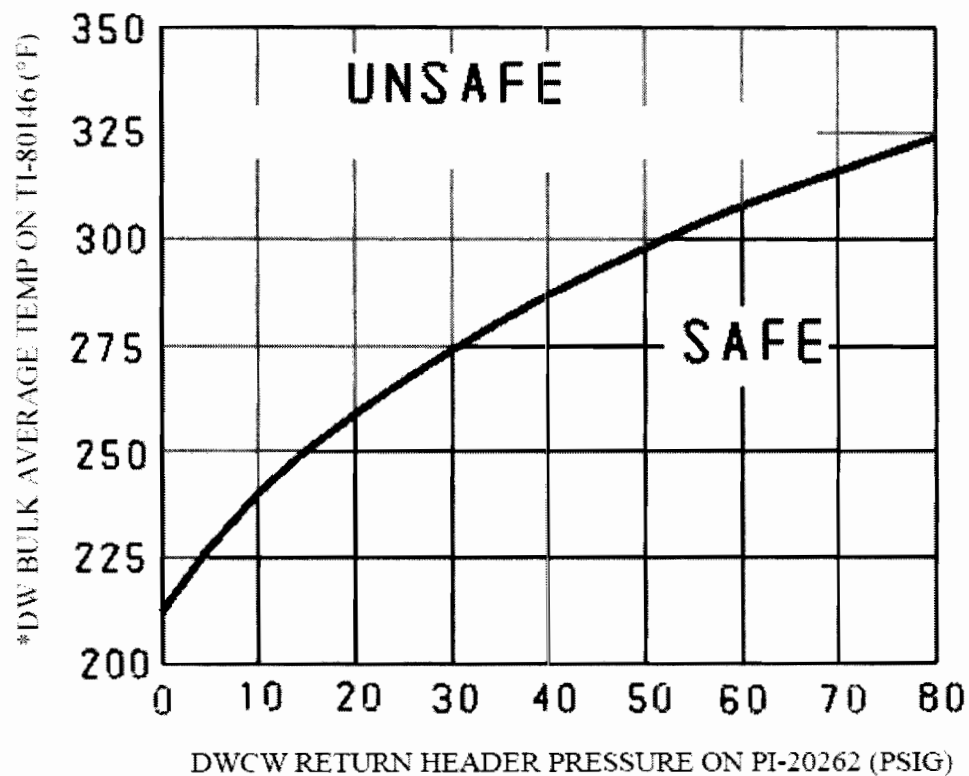
Based on these conditions, the Drywell Cooler Fans _____.

- A. may be restarted in "Slow" speed ONLY
- B. may be restarted in "Slow" or "Fast" speed
- C. cannot be restarted until Reactor Building access is restored
- D. cannot be restarted until an Engineering evaluation is obtained

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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 # 51 RO		
Choice		Basis or Justification
Correct:	D	Drywell cooler fan units cannot be restarted since operation of the coolers plots on the UNSAFE side of the Drywell Chilled Water Saturation Curve (T-223 Figure 1). Per step 4.1 of T-223, operation must be verified to be on the safe side of the curve, or an engineering evaluation must be obtained, prior to starting (or restarting) any drywell cooler fan unit.
Distractors:	A	Plausible since T-223 states the drywell cooler fans should be started in SLOW speed if drywell pressure is above 0.75 psig.
	B	Plausible since T-223 states the drywell cooler fans should be started in SLOW speed if drywell pressure is above 0.75 psig, but allows starting the fans in FAST speed if the local fan speed control switches are not accessible (as is the case here).
	C	Plausible since the local fan speed control switches are not accessible.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	T-223		
Learning Objective:	PLOT-1560-4		
K/A System:	295028 – High Drywell Temperature	Importance:	RO / SRO 4.0 / 4.1
K/A Statement: EA2.01 – Ability to determine and/or interpret the following as it applies to High Drywell Temperature: Drywell temperature.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

52. The following conditions exist on Unit 3:

- The crew is executing T-111 “Level Restoration”
- RPV level is -190 inches and slowly lowering
- RPV pressure is 550 psig and slowly lowering
- An emergency depressurization is in progress with 5 SRVs open
- The 3A Core Spray pump is the only available source of injection

Based on these conditions, Adequate Core Cooling (ACC) is _____.

- A. NOT being maintained
- B. being maintained by submergence
- C. being maintained by spray cooling
- D. being maintained by steam cooling

Answer Key		
Question # 52 RO		
Choice		Basis or Justification
Correct:	D	When RPV water level cannot be maintained above TAF (-172 inches), adequate steam flow (cooling) is established by maintaining RPV water level above the Minimum Steam Cooling RPV Water Level (-195 inches), as long as RPV pressure is above the Minimum Steam Cooling Pressure (270 psig with 5 SRVs open).
Distractors:	A	ACC is being maintained by steam cooling. Plausible if applicant does not recognize steam cooling conditions are met.
	B	The core is adequately cooled by submergence when it can be determined that RPV level is at or above TAF (-172 inches). Plausible if applicant associates TAF with -195 inches.
	C	Adequate spray cooling is provided when design spray flow requirements are satisfied (at least 6250 gpm from one Core Spray loop) and RPV water level is at or above the elevation of the jet pump suctions (-226 inches).

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input checked="" type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> Other Exam Bank: (LORT) <input type="checkbox"/> ILT Exam Bank		
Reference(s):	T-BAS (Intro); TRIP/SAMP Curves, Tables & Limits Bases; T-111 and Bases		
Learning Objective:	PLOT-5014-3a		
K/A System:	295031 – Reactor Low Water Level	Importance:	RO / SRO 4.6 / 4.8
K/A Statement: EA2.04 – Ability to determine and/or interpret the following as it applies to Reactor Low Water Level: Adequate core cooling.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

53. Unit 2 is operating at 100% power when an EHC malfunction results in the following events:

- Turbine control valves swing partially closed then back open
- REACTOR HI PRESS (210 G-2) alarm is received
- Reactor power initially rises then returns to the pre-transient level
- Reactor pressure peaks at ~1065 psig then returns to the pre-transient level

Which one of the following actions is required by OT-102 "Reactor High Pressure" for these conditions?

- A. Perform GP-4 "Manual Reactor Scram".
- B. Place the Mode Switch in SHUTDOWN.
- C. Perform GP-9-2 "Fast Reactor Power Reduction".
- D. Maintain reactor pressure ≤ 1035 psig with EHC Pressure Set.

Answer Key		
Question # 53 RO		
Choice		Basis or Justification
Correct:	D	The given conditions indicate reactor pressure exceeded the RPV Hi Press alarm setpoint (1053 psig), but not the RPS scram setpoint (1085 psig). Since RPV power and pressure returned to pre-transient values, the action required by OT-102 for these conditions is to maintain RPV pressure less than or equal to 1035 psig using EHC pressure set.
Distractors:	A	GP-4 prerequisite is "Plant conditions require a manual scram and sufficient time is available to perform pre-scram actions." None of the given plant conditions require a reactor scram.
	B	This choice is based on the applicant believing there was an RPS failure, in which case the correct action would be to initiate a manual scram using the Mode Switch. Plausible if the applicant does not recall the RPS scram setpoint of 1085 psig.
	C	This is the immediate operator action of OT-102 "Reactor High Pressure" <u>IF</u> reactor pressure continues to rise.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2009) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	ARC-210 G-2; OT-102		
Learning Objective:	PLOT-5060F-1b		
K/A System:	295025 – High Reactor Pressure	Importance:	RO / SRO 4.3 / 4.3
K/A Statement: EA2.01 – Ability to determine and/or interpret the following as it applies to High Reactor Pressure: Reactor pressure.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

54. Which one of the following correctly shows the impact of a loss of power to 125 VDC Power Distribution Panels 20D021 (Unit 2) or 30D021 (Unit 3)?

Loss of power to Panel ____ (1) ____ results in the following equipment being unavailable: ____ (2) ____.

- | | |
|-------------------|---|
| A. 20D021 (Div I) | Unit 2 HPCI
2A Core Spray Pump
3A Core Spray Pump |
| B. 20D021 (Div I) | E-1 Diesel
Unit 2 RCIC
2A Core Spray Pump
3A Core Spray Pump |
| C. 30D021 (Div I) | Unit 3 HPCI
2A Core Spray Pump
3A Core Spray Pump |
| D. 30D021 (Div I) | E-1 Diesel
Unit 3 RCIC
2A Core Spray Pump
3A Core Spray Pump |

Answer Key		
Question # 54 RO		
Choice	Basis or Justification	
Correct:	B	Per SE-13, a loss of 20D021 results in a loss (inoperability) of Unit 2 RCIC, the E-1 diesel the 2A and 3A Core Spray pumps (and other loads).
Distractors:	A	Unit 2 HPCI is powered from Division II 125 VDC Panel 20D022. The E-1 diesel is also inoperable on a loss of Panel 20D021. Plausible since there is cross-tying of DC power supplies between units for ECCS related equipment.
	C	Unit 3 HPCI is powered from Division II 125 VDC Panel 30D022. The 2A Core Spray pump is not impacted by a loss of 30D021, although the 3A Core Spray pump is. Plausible since there is cross-tying of DC power supplies between units for ECCS related equipment.
	D	Of the items listed, only Unit 3 RCIC is affected by a loss of Panel 30D021. Plausible since other Unit 3 DC panels (30D023 and 30DD306) do impact diesel generators and Core Spray pumps.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	SE-13		
Learning Objective:	PLOT-5057-3		
K/A System:	295004 – Partial or Complete Loss of D.C. Power	Importance:	RO / SRO 3.8 / 3.9
K/A Statement: G2.2.3 – Knowledge of the design, procedural, and operational differences between units.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

55. Given the following:

- A AIR COMP TROUBLE (216 B-1) alarm is received
- The 'A' Air Compressor (2AK001) indicates "tripped" on Panel 20C012
- Investigation shows the 'A' Air Compressor tripped on high receiver pressure
- 'A' Instrument Air Receiver (2AT006) pressure is currently 105 psig

Which one of the following is correct regarding reset of the 'A' Air Compressor trip?

- A. Air receiver pressure does NOT allow the air compressor trip to be reset.
- B. Air receiver pressure allows the air compressor trip to automatically reset.
- C. The trip can only reset by depressing the "Reset-Start" button locally at the compressor.
- D. The trip can only be reset by placing the compressor control switch to STOP at Panel 20C012.

Answer Key		
Question # 55 RO		
Choice		Basis or Justification
Correct:	C	Per ARC-216 B-1, a high receiver pressure trip occurs at 120 psig. Since normal system pressure is 100 to 115 psig, current receiver pressure (105 psig) allows compressor reset. Per the NOTE in ARC-216 B-1, a compressor trip can only be reset locally by depressing the "Reset-Start" button located at the tripped compressor.
Distractors:	A	Per ARC-216 B-1, a high receiver pressure trip occurs at 120 psig. Since normal system pressure is 100 to 115 psig, current receiver pressure (105 psig) allows compressor reset.
	B	Per the NOTE in ARC-216 B-1, a compressor trip can only be reset locally by depressing the "Reset-Start" button located at the tripped compressor.
	D	Per the NOTE in ARC-216 B-1, a compressor trip can only be reset locally by depressing the "Reset-Start" button located at the tripped compressor.

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

Source Documentation		
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank	
Reference(s):	ARC-216 B-1	
Learning Objective:	PLOT-5036-	
K/A System:	295019 – Partial or Complete Loss of Instrument Air	Importance: RO / SRO 3.0 / 3.0
K/A Statement: G2.4.50 – Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

56. Unit 2 was operating at 100% power when Drywell pressure began to rise. The crew entered OT-101 "High Drywell Pressure".

At 1.2 psig Drywell pressure the crew performed GP-4 "Manual Reactor Scram".

Which one of the following identifies how OT-101 is required to be used in conjunction with T-101 "RPV Control" and/or T-102 "Primary Containment Control"?

At 2 psig Drywell pressure the crew must _____.

- A. Exit OT-101 and enter T-102 ONLY
- B. Exit OT-101 and enter T-101 and T-102
- C. Enter T-102 ONLY and execute concurrently with OT-101
- D. Enter T-101 and T-102 and execute concurrently with OT-101

Answer Key		
Question # 56 RO		
Choice		Basis or Justification
Correct:	D	Per OT-101, "Follow-up Action" step 3.3, if drywell pressure reaches 2.0 psig, enter and execute concurrently T-101 and T-102. Per OT-101 Bases, this is because OT-101 provides further direction for mitigating the consequences of the high drywell pressure condition.
Distractors:	A	OT-101 must be executed concurrently with T-101 and T-102.
	B	OT-101 must be executed concurrently with T-101 and T-102.
	C	T-101 must also be entered and executed concurrently with OT-101.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> ILT Exam Bank		<input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Other Exam Bank: ()
Reference(s):	OT-101 and Bases		
Learning Objective:	PLOT-2102-3		
K/A System:	295024 – High Drywell Pressure	Importance:	RO / SRO 4.2 / 4.0
K/A Statement: G2.4.8 – Knowledge of how abnormal operating procedures are used in conjunction with EOPs.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

57. Given the following:

- Unit 3 is operating at 100% power
- A feedwater controller failure occurs
- RPV water level rises at a rate of 2 inches per second

Assuming no operator actions, one minute later the reactor recirculation pumps will be _____.

- A. tripped
- B. operating at 30% speed
- C. operating at 45% speed
- D. operating at the initial speed

Answer Key		
Question # 57 RO		
Choice		Basis or Justification
Correct:	A	With no operator actions and RPV water level rising at 2 inches/second, level will reach the high level turbine trip setpoint (+46") in approximately 10 seconds. A turbine trip from full power will result in high reactor pressure and SRV actuations. This transient, as analyzed in Section 14.5.2.2 of the UFSAR, results in a peak reactor pressure of ~1250 psig (at the bottom of the vessel; equivalent to ~1200 psig in the steam dome). An ATWS (ARI)-RPT will occur at 1106 psig...approximately 13 seconds into the event.
Distractors:	B	Recirc pumps trip on high reactor pressure. This choice is based on the applicant not accounting for Recirc pumps tripping on high RPV pressure and the high level trip of feed pumps causing a 30% runback due to total feedwater flow < 20% along with RPV level < 17 inches (following scram).
	C	Recirc pumps trip on high reactor pressure. This choice is based on the applicant not accounting for Recirc pumps tripping on high RPV pressure and the high level trip of feed pumps causing a 45% runback due to any feed pump flow < 20% along with RPV level < 17 inches (following scram).
	D	Recirc pumps trip on high reactor pressure. This choice is based on applicant not recognizing the conditions will result in any change to Recirc pump status. Plausible if applicant does not understand the sequence of events and plant response to a feedwater controller failure.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	3	2	10CFR55.41(b)(6)

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2007) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	ARC-314 C-3; UFSAR 14.5.2.2, UFSAR Figure 14.5.5	
Learning Objective:	PLOT-5006-3j	
K/A System:	295005 – Main Turbine Generator Trip	Importance: RO / SRO 3.2 / 3.3
K/A Statement: AK2.03 – Knowledge of the interrelationships between Main Turbine Generator Trip and the following: Recirculation system.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

58. Given the following conditions:

- Unit 3 was initially operating at 100% power
- 3A TBCCW pump tripped due to a motor fault
- 3B TBCCW pump is blocked

Which one of the following describes the impact on continued power operations?

- A. A Reactor power reduction will be required due to loss of Stator Water Cooling.
- B. A Reactor power reduction will be required due to loss of Isophase Bus Cooling.
- C. An immediate plant shutdown will be required due to loss of cooling to the CRD pumps.
- D. An immediate plant shutdown will be required due to loss of cooling to the Condensate pumps.

Answer Key		
Question # 58 RO		
Choice		Basis or Justification
Correct:	B	The Isolated Phase Bus coolers are not vital TBCCW loads. Therefore, on a loss of TBCCW, they are isolated during the swap to RBCCW. Per ON-118, this requires a power reduction to < 18,000 stator amps IAW GP-9-2.
Distractors:	A	Stator Water Cooling System coolers are cooled by Service Water and therefore not impacted by a loss of TBCCW. Plausible if the applicant does not recall which systems cool which loads.
	C	CRD pumps are vital TBCCW loads; cooling swaps to RBCCW on loss of TBCCW. A plant shutdown and/or power reduction is not necessary.
	D	Although a loss of TBCCW does result in a loss of cooling to the Condensate pumps, ON-118 does not direct an immediate plant shutdown. Instead, monitoring of Condensate pump temperatures is directed and if necessary, the pumps are removed from service, which requires a power reduction.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	2.25	3	10CFR55.41(b)(10)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2005) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	ON-118 Bases		
Learning Objective:	PLOT-5034-3b		
K/A System:	295018 – Partial or Complete Loss of Component Cooling Water	Importance:	RO / SRO 3.5 / 3.6
K/A Statement: AK1.01 – Knowledge of the operational implications of the following concepts as they apply to Partial or Complete Loss of Component Cooling Water: Effects on component/system operation.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

59. Unit 2 was operating at 100% power for 6 months when the crew scrammed the reactor due to a loss of main condenser vacuum. The following conditions exist shortly after the scram:

- HPCI is unavailable
- RPV level is 30 inches
- RPV pressure is 930 psig
- Vacuum is 6" and degrading

Based on these conditions, and with no operator action, reactor pressure is ____ (1) ____ as a result of ____ (2) ____.

- A. (1) rising
(2) MSIV closure
- B. (1) rising
(2) Bypass Valve closure
- C. (1) lowering
(2) RPV cooldown
- D. (1) lowering
(2) Bypass Valve operation

Answer Key		
Question # 59 RO		
Choice		Basis or Justification
Correct:	B	Bypass valves automatically close at 7" Hg vacuum, which results in a loss of the main condenser as a heat sink. With no operator action, RPV pressure will rise due to decay heat.
Distractors:	A	Automatic MSIV closure does not occur on a loss of main condenser vacuum. Plausible since OT-106 directs manual closure of MSIVs at 5" Hg vacuum.
	C	Based on 6 months of operation at 100% power, there is sufficient decay heat to cause reactor pressure to rise.
	D	Bypass valves automatically close at 7" Hg vacuum. Since the given conditions state that vacuum has lowered to 6" Hg, bypass valves are already closed.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	OT-106		
Learning Objective:	PLOT-1540-5		
K/A System:	295002 – Loss of Main Condenser Vacuum	Importance:	RO / SRO 3.6 / 3.8
K/A Statement: AK1.03 – Knowledge of the operational implications of the following concepts as they apply to Loss of Main Condenser Vacuum: Loss of heat sink.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

60. Unit 2 was operating at 100% power when Drywell pressure began to rise. The crew entered OT-101 "High Drywell Pressure".

At 1.2 psig Drywell pressure the crew performed GP-4 "Manual Reactor Scram". The following conditions currently exist:

- RPV level is -5 inches and is being controlled per T-100 "Scram"
- Drywell pressure is 1.5 psig and slowly rising
- All PRO and URO scram actions have been completed
- No other actions have been performed

Which one of the following is the pneumatic supply to the ADS valves under these conditions?

- A. Backup Instrument Air Supply
- B. Backup Instrument Nitrogen bottles
- C. Backup Instrument Nitrogen from CAD
- D. Instrument Nitrogen Compressors "A" and/or "B"

Answer Key		
Question # 60 RO		
Choice		Basis or Justification
Correct:	A	Based on the given conditions, a Group II/III isolation signal occurred due to low RPV level (-1 inch). This results in an isolation of the N2 compressor suction valves and the N2 receiver supply to the A and B drywell headers. Since all PRO scram actions are complete, the A and B drywell header isolation valves have been bypassed and reopened per RRC 94.2-2, aligning the N2 receivers to drywell loads. As N2 receiver pressure lowers to 85 psig, the Backup Instrument Air isolation valves will automatically open to re-pressurize the receivers and supply drywell pneumatic loads.
Distractors:	B	Backup Instrument Nitrogen from N2 bottles to ADS SRVs is not permitted in T-100; only from T-101 "RPV Control" (there are no given T-101 entry conditions) and only if specifically directed to be aligned (not part of the URO or PRO scram actions).
	C	Backup Instrument Nitrogen from CAD is not permitted in T-100; only from T-101 "RPV Control". Since drywell pressure has not reached 2 psig and RPV level is well above -48 inches, there are no T-101 entry conditions.
	D	N2 compressors A and B tripped due to the loss of suction generated by the Group III isolation signal (-1 inch).

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

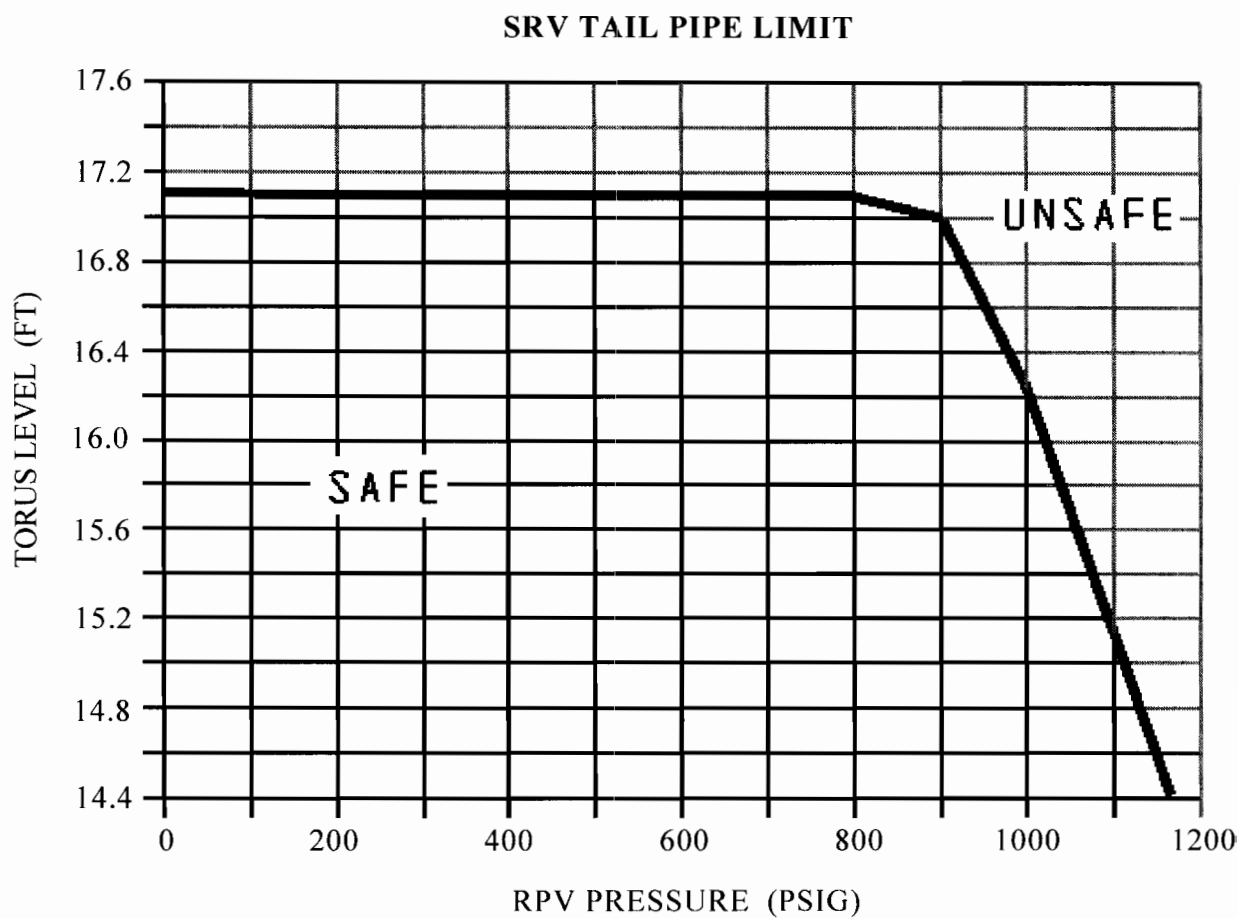
Source Documentation			
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Reference(s):	T-100; GP-8.B; GP-8.E; RRC 94.2-2		
Learning Objective:	PLOT-5016-1		
K/A System:	295010 – High Drywell Pressure	Importance:	RO / SRO 2.6 / 2.8
K/A Statement: AK2.04 – Knowledge of the interrelationships between High Drywell Pressure and the following: Nitrogen makeup system.			
REQUIRED MATERIALS:	NONE		
Notes and Comments:			

61. A high Torus water level condition exists on Unit 3.

In accordance with T-102 "Primary Containment Control", Torus level is being lowered in an attempt to maintain below Curve T/L-1 "SRV Tail Pipe Limit" (provided on the NEXT PAGE).

The reason Torus level is maintained below the "SRV Tail Pipe Limit" curve is to prevent _____.

- A. exceeding the Torus level Tech Spec Limiting Condition for Operation
- B. flooding the Safety Relief Valve solenoids, rendering the SRVs inoperable
- C. direct pressurization of the Primary Containment without pressure suppression
- D. covering the highest vent capable of passing all of the decay heat from the reactor



Answer Key		
Question # 61 RO		
Choice		Basis or Justification
Correct:	C	The SRV Tail Pipe Limit Curve is specifically designed to prevent the back pressure during SRV operation from damaging the SRV components, potentially causing direct pressurization of containment without pressure suppression.
Distractors:	A	The Suppression Pool Water Level LCO is exceeded when level is above 14.9 feet, which is below the values shown in curve T/L-1.
	B	The concern for rendering the SRVs inoperable due to solenoid flooding is real but does not occur until 21 feet Torus level, as opposed to the just over 17 foot limit shown on the SRV Tail Pipe Limit Curve.
	D	The concern for exceeding the level of the highest vent that can pass all of the decay heat after shutdown is real but it is not a concern until level has risen to the point that Maximum Containment dP is exceeded, which will not occur until level is significantly greater than 21 feet.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2005) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	T-102 Bases, Step T/L-23; TRIP/SAMP CURVES, TABLES, & LIMITS – BASES, Step 27		
Learning Objective:	PLOT-1560-03, -09		
K/A System:	295029 – High Suppression Pool Water Level	Importance:	RO / SRO 3.6 / 4.0
K/A Statement: EK3.02 – Knowledge of the reasons for the following response as it applies to High Suppression Pool Water Level: Lowering suppression pool water level.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

62. Given the following:

- Unit 2 is operating at 100% power
- The 2A CRD pump is blocked for maintenance
- The 2B CRD pump tripped on motor overload

Which one of the following describes the impact, if any, on RWCU System operation?

- A. No impact; RWCU operation may continue.
- B. RWCU must be shutdown to prevent pump damage due to loss of seal cooling.
- C. RWCU must be shutdown to minimize pump motor area contamination due to loss of purge supply.
- D. RWCU flow must be maximized in preparation for a reactor scram and trip of both Recirc pumps.

Answer Key		
Question # 62 RO		
Choice		Basis or Justification
Correct:	C	RWCU shutdown is required by ON-107 if CRD restoration is not imminent. This is to minimize radioactive contamination of the RWCU pump motor area due to the loss of RWCU pump seal purge supply.
Distractors:	A	RWCU shutdown is required by ON-107 if CRD restoration is not imminent.
	B	Correct action; wrong reason. Plausible since this is the reason Recirc pumps may have to be shutdown on a loss of CRD; applicant could confuse Recirc pump seal purge with RWCU recirc pump seal purge.
	D	Plausible since a sustained loss of CRD will require a reactor scram and may require shutdown of both Recirc pumps. Incorrect since RWCU must be secured on a sustained loss of CRD, which is the case here.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	ON-107 Bases		
Learning Objective:	PLOT-5014-6g		
K/A System:	295022 – Loss of CRD Pumps	Importance:	RO / SRO 2.5 / 2.6
K/A Statement: AA1.04 – Ability to operate and/or monitor the following as it applies to Loss of CRD Pumps: Reactor Water Cleanup System.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

63. During Refuel Floor operations on Unit 2 the Control Room receives the following alarms and indications:

- REFUELING FLOOR VENT EXHAUST HI RADIATION (218 A-1)
- REAC BLDG ZONE VENT EXHAUST HI RADIATION (218 B-1)
- REAC BLDG OR REFUELING FLOOR VENT EXH HI RAD TRIP (218 D-4)
- Refueling Floor Radiation Trip Units RIS-2-17-458 A and D are both reading above 16 mR/hr

Which one of the following describes the ventilation system response to these conditions?

- A. Reactor Building Ventilation trips
Refuel Floor Ventilation trips
SBGT initiates and aligns to the Reactor Building and Refuel Floor
- B. Reactor Building Ventilation continues to run
Refuel Floor Ventilation trips
SBGT initiates and aligns to the Refuel Floor
- C. Reactor Building Ventilation trips
Refuel Floor Ventilation continues to run
SBGT initiates and aligns to the Reactor Building
- D. Reactor Building Ventilation continues to run
Refuel Floor Ventilation continues to run
SBGT remains in standby

Answer Key		
Question # 63 RO		
Choice		Basis or Justification
Correct:	A	A trip of "A" and "D" Refuel Floor radiation monitors will result in a Group III isolation. The Group III isolation will trip both Reactor Building and Refuel Floor Ventilation and align SBGT to the entire Reactor Building and Refuel Floor.
Distractors:	B	Reactor Building will also trip even though the high radiation was on the Refuel Floor. SBGT is aligned to both the Refuel Floor and Reactor Building. Plausible if applicant does not recognize, based on the given conditions, that the logic requirements are met for a Group III isolation of both RB and RF ventilation systems.
	C	Both Reactor Building and Refuel Floor Ventilation will trip and SBGT will be aligned to both areas. Plausible if applicant does not recognize, based on the given conditions, that the logic requirements are met for a Group III isolation of both RB and RF ventilation systems.
	D	Both Reactor Building and Refuel Floor Ventilation will trip and SBGT will be aligned to both areas. Plausible if applicant does not recognize, based on the given conditions, that the logic requirements are met for a Group III isolation of both RB and RF ventilation systems, and SBGT initiation.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
	<input checked="" type="checkbox"/> Previous NRC Exam: (PB 2005) <input type="checkbox"/> Other Exam Bank: ()		
Reference(s):	ARC-218 A-1, B-1 and D-4		
Learning Objective:	PLOT-5007G-1c		
K/A System:	295034 – Secondary Containment Ventilation High Radiation	Importance:	RO / SRO 3.8 / 4.2
K/A Statement:			
EA2.01 – Ability to determine and/or interpret the following as they apply to Secondary Containment Ventilation High Radiation: Ventilation radiation levels.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

64. Unit 2 is operating at 100% power when an inadvertent Group II/III isolation occurs due to a spurious low RPV level (+1 inch) signal.

Which one of the following describes the status of Drywell Chilled Water flow to the Drywell cooling units and Recirc pump motor coolers one minute later?

<u>Drywell Cooling</u>	<u>Recirc Pump Motor Cooling</u>
A. Isolated	Isolated
B. Isolated	In-service
C. In-service	Isolated
D. In-service	In-service

Answer Key		
Question # 64 RO		
Choice		Basis or Justification
Correct:	D	Both are in service. Drywell Chilled Water (DWCW) to the drywell cooling units and Recirc pump motor coolers does <u>NOT</u> automatically isolate on Group II/III isolation signal. Per GP-8.B, if containment conditions require isolating these loads (i.e., drywell pressure is greater than DWCW pressure), manual isolation is required.
Distractors:	A	Both are in service. Drywell chilled water to the fan units does isolate when the fans trip (-160 inches RPV level <u>OR</u> 2 psig drywell pressure), but this would not occur on a +1 inch low RPV level isolation.
	B	Both are in service. Drywell chilled water to the fan units does isolate when the fans trip (-160 inches RPV level <u>OR</u> 2 psig drywell pressure), but this would not occur on a +1 inch low RPV level isolation.
	C	Both are in service.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (LGS 2006) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	GP-8.B		
Learning Objective:	PLOT-5007G-1, -3		
K/A System:	295020 – Inadvertent Containment Isolation	Importance:	RO / SRO 3.2 / 3.2
K/A Statement: AA1.02 – Ability to operate and/or monitor the following as it applies to Inadvertent Containment Isolation: Drywell ventilation/cooling system.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

65. Given the following:

- Unit 3 is operating at 100% power
- A loss of feedwater heating occurs
- The crew enters OT-104 "Positive Reactivity Insertion"
- OT-104 directs lowering reactor power using GP-9-3 to at least 10% below the pre-transient power level

To comply with this step the operator must first ____ (1) _____. The reason for lowering power at least 10% is to ____ (2) _____.

- A. (1) insert control rods
(2) provide margin to the full power thermal limits
- B. (1) insert control rods
(2) avoid reaching an APRM rod block or scram setpoint
- C. (1) reduce Recirc flow
(2) provide margin to the full power thermal limits
- D. (1) reduce Recirc flow
(2) avoid reaching an APRM rod block or scram setpoint

Answer Key		
Question # 65 RO		
Choice		Basis or Justification
Correct:	C	Based on the initial conditions of 100% power, GP-9-3 will direct lowering Recirc flow <u>first</u> until either flow reaches ~61.5 Mlbm/hr, or an APRM HIGH alarm occurs. Per OT-104 Bases, the reason for lowering reactor power by at least 10% is to provide additional core thermal margin under potentially asymmetric feedwater heating conditions.
Distractors:	A	Incorrect first action – for these conditions, GP-9-3 directs lowering Recirc flow <u>first</u> until either flow reaches ~61.5 Mlbm/hr, or an APRM HIGH alarm occurs.
	B	Incorrect first action – for these conditions, GP-9-3 directs lowering Recirc flow <u>first</u> until either flow reaches ~61.5 Mlbm/hr, or an APRM HIGH alarm occurs. Incorrect bases – avoiding the APRM rod block and scram setpoints is not the bases for performing this step.
	D	Incorrect bases – avoiding the APRM rod block and scram setpoints is not the bases for performing this step.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	OT-104 and Bases; GP-9-3		
Learning Objective:	PLOT-PBIG-1550-3		
K/A System:	295014 – Inadvertent Reactivity Addition	Importance: RO / SRO 4.3 / 4.4	
K/A Statement: G2.1.23 – Ability to perform specific system and integrated plant procedures during all modes of plant operation.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

66. Given the following:

- Both Units are operating at full power.
- The entire shift team was present at a 0730 Shift Turnover Meeting conducted by the Control Room Supervisor (CRS) and the Shift Manager (SM).
- At 1100, the Fourth Reactor Operator (RO) enters the Unit 2 Controls area to relieve the Unit 2 RO for lunch.
- The Unit 2 RO will be eating in the Control Room Lunchroom.

What is the MINIMUM TURNOVER ACTIVITY and the MAXIMUM DURATION of this mid-shift turnover in accordance with OP-AA-112-101 "Shift Turnover and Relief"?

- A. Tour the Main Control Boards with the off-going RO; relief duration shall be < 30 minutes.
- B. Tour the Main Control Boards with the off-going RO; relief duration shall be < 60 minutes.
- C. Review the Shift Turnover Checklist including any deviations; relief duration shall be < 30 minutes.
- D. Review the Shift Turnover Checklist including any deviations; relief duration shall be < 60 minutes.

Answer Key		
Question # 66 RO		
Choice		Basis or Justification
Correct:	D	Section 4.1.7 states that mid-shift relief for "less than one hour" only requires a review of the Shift Turnover Checklist and any deviations from the indicated status.
Distracters:	A	A control board tour is not required and the turnover is valid for 60 minutes.
	B	A control board tour is not required.
	C	This mid-shift turnover is valid for 60 minutes.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	2.5	3	10CFR55.41(b)(10)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	OP-AA-112-101		
Learning Objective:	PLOT-1570-17		
K/A System:	G2.1 – Conduct of Operations	Importance:	RO / SRO 3.7 / 3.9
K/A Statement: G2.1.3 – Knowledge of shift or short-term relief turnover practices.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

67. Unit 3 is in MODE 5 with refueling activities in progress.

Which one of the following conditions requires the Reactor Operator to notify the Fuel Handling Director to suspend core alterations, in accordance with FH-6C "Core Component Movement – Core Transfers"?

- A. A FUEL POOL SERV WATER BOOSTER PUMP OVERCURRENT (216 C-5) alarm.
- B. Shutdown Cooling (SDC) has been removed from service to complete a swap of SDC loops.
- C. Wide Range neutron count rate doubles when a fifth fuel bundle is seated around the 'A' WRNM detector.
- D. The white rod permissive light on Panel 20C005 is NOT lit when the refuel platform is over the core with fuel loaded on the main hoist.

Answer Key		
Question # 67 RO		
Choice		Basis or Justification
Correct:	C	FH-6C requires notifying the FHD to secure fuel handling when the WRNM count rate doubles after the fourth fuel bundle is placed around the detector (step 10.2.14). ON-124 entry is required if count rate doubles <i>twice</i> .
Distracters:	A	Loss of a Fuel Pool Cooling Service Water pump does not require securing fuel handling.
	B	Swapping SDC loops does not require securing fuel handling.
	D	Under the conditions described, the white light should be extinguished.

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

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2005) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	FH-6C; ON-124	
Learning Objective:	NLSRO-0763-6	
K/A System:	G 2.1 – Conduct of Operations	Importance: RO / SRO 3.9 / 3.8
K/A Statement: G2.1.44 – Knowledge of RO duties in the control room during fuel handling such as responding to alarms from fuel handling area, communication with the fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

68. In order to operate at the Maximum Power Level stated in the facility license, which of the below conditions must be met?
1. Three Leading Edge Flow Meters must meet TRMS 3.20 "LEADING EDGE FLOW METER (LEFM) SYSTEM" requirements
 2. Core Thermal Power (CTP) calculation must be available
 3. Shift Average CTP must NOT exceed 3514 megawatts thermal at any time
- A. 1 ONLY
- B. 2 ONLY
- C. 1 AND 2 ONLY
- D. 1, 2 AND 3

Answer Key		
Question # 68 RO		
Choice		Basis or Justification
Correct:	C	GP-5, Note 2 on page 42 states that MAPL is determined IAW TRM 3.20, which requires three OPERABLE LEFMs (for Reactor Operators, this is "above the line" TRMS knowledge). GP-5, Step 6.1.6 describes the required actions to take if CTP calculation is NOT available – reduce generator output by 5 MWe. GP-5, Note 7 on page 44 describes how to maintain Shift Average CTP below MAPL for the shift, allowing excursions during the shift provided MAPL is not exceeded at end of shift.
Distractors:	A	Plausible as this is a TRM requirement. Candidate may be aware of this limit but not know CTP requirement.
	B	Plausible as this is a GP-5 requirement. Candidate may be aware of this limit but not know TRM requirement invoked by GP-5.
	D	Plausible if candidate believes Shift Average CTP must be maintained below MAPL in addition to knowing the TRM and CTP requirements. Note that the Facility Operating License authorizes Peach Bottom to operate "at steady state reactor core power levels not in excess of 3514 megawatts thermal". GP-5 guidance is used to clarify what is meant by "steady state".

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY			10CRF55.41(b)(10)

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	Facility Operating License; GP-5; TRM 3.20		
Learning Objective:	PLOT-DBIG-1530-3		
K/A System:	G2.2 – Equipment Control	Importance:	RO / SRO 3.6 / 4.5
K/A Statement: G2.2.38 – Knowledge of conditions and limitations in the facility license.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

69. 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 0 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 # 69 RO		
Choice		Basis or Justification
Correct:	D	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	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	This would rely on the Reactor 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	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:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	ARC-206 C-1; OT-110; GP-4; T-100	
Learning Objective:	PLOT-1529-2	
K/A System:	G2.2 – 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:		

70. Both units are operating at 100% power with the following conditions present:

- RIS-0760D "Main Control Room Ventilation Radiation Monitor" is failed with a trip inserted per GP-25 Appendix 14 "MCR Ventilation Isolation, Division II"
- CONTROL ROOM RAD MONITOR DIV II INITIATED (003 A-3) is lit due to the GP-25 trip

One hour later, an annunciator is received and the PRO observes:

- CONTROL ROOM VENT SUPPLY FAN HI-LO (003 A-1) is in alarm
- CONTROL ROOM VENT SUPPLY LO FLOW CREV START (003 A-5) is in alarm
- CONTROL ROOM RAD MONITOR DIV I INITIATED (003 A-2) is in alarm
- Flow Recorder FR-0765 indicates 200 scfm and lowering
- RIS-0760C "Main Control Room Ventilation Radiation Monitor" is failed upscale

Based on these conditions, the Control Room Emergency Ventilation System has

- _____.
- A. started due to the low flow condition
 - B. NOT started as indicated by the low flow condition
 - C. started because the Rad Monitor initiation logic is satisfied
 - D. NOT started because the Rad Monitor initiation logic is NOT satisfied

Answer Key		
Question # 70 RO		
Choice		Basis or Justification
Correct:	A	The CREV system is in service as indicated by 003 A-5, and was initiated by Low Flow. The Rad Monitor combination would NOT result in CREV initiation (Rad Monitor logic is "A <u>or</u> B AND C <u>or</u> D").
Distracters:	B	The low flow signal is actually from normal Control Room Ventilation and is normal during a CREV initiation.
	C	Plausible because the alarms indicate Div I and Div II initiated, even though the logic for CREV initiation due to Rad Monitors is NOT satisfied (Rad Monitor logic is "A <u>or</u> B AND C <u>or</u> D").
	D	Plausible because CREV has NOT started due to Rad Monitor logic, it has started due to LOW FLOW condition.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	3.25	4	10CFR55.41(b)(11)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2009) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	GP-25 Appendix 14; SO 40D.1.A, ARC-003 A-1, ARC-003 A-2, ARC-003 A-5,		
Learning Objective:	PLOT-5040D-4a		
K/A System:	G2.3 – Radiation Control	Importance:	RO / SRO 2.9 / 2.9
K/A Statement: G2.3.5 – Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

71. A transient on Unit 2 resulted in the following conditions:

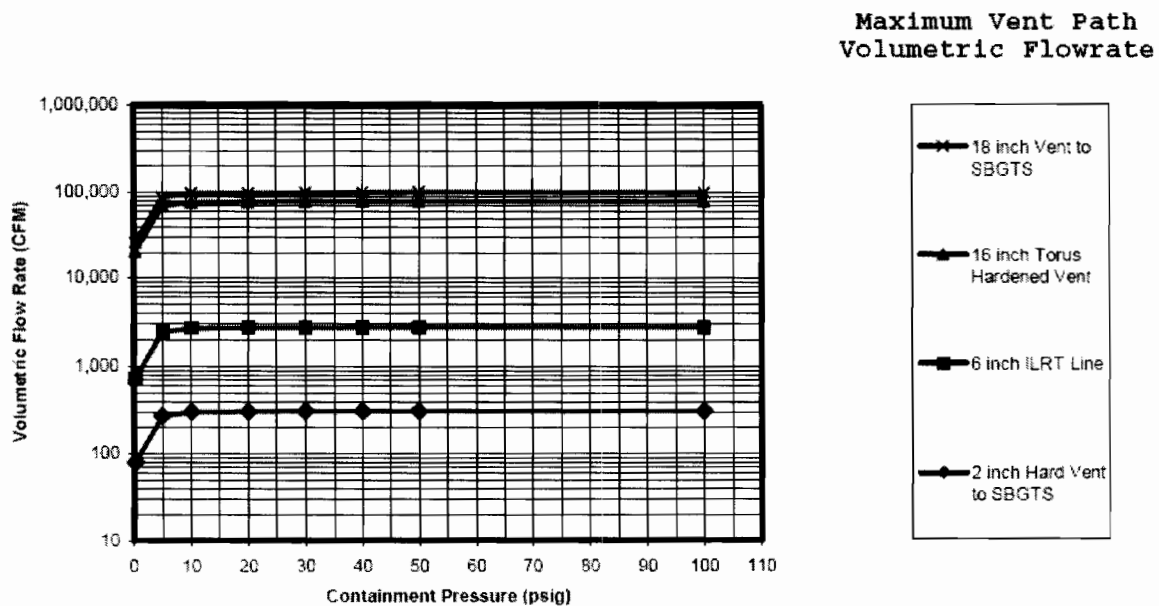
- Containment venting is required for combustible gas control using T-200-2 “Primary Containment Venting”
- Chemistry determined that the maximum Containment vent rate that will not exceed the General Emergency release rate is 2,000 scfm
- Drywell pressure on PR-2508 is 25 psig
- Standby Gas Treatment is available

Using Figure 1 of T-200-2, PROVIDED ON THE NEXT PAGE, determine which one of the following vent paths will most quickly remove the combustible gases without exceeding the General Emergency release rate.

- A. 2 inch hard vent to SBGTS
- B. 6 inch ILRT line
- C. 16 inch Torus Hardened Vent
- D. 18 inch vent to SBGTS

FIGURE 1

MAXIMUM PRIMARY CONTAINMENT VENT RATE FOR VARIOUS VENT PATH SIZES



Answer Key		
Question # 71 RO		
Choice		Basis or Justification
Correct:	A	Plot Containment pressure of 25 psig and vent rate of 2000 SFCM, the point is ABOVE the 2 in Hard Vent to SBGTS Line and BELOW the 6 inch ILRT Line; the 2 in Hard Vent to SBGTS is the largest vent path that will NOT exceed the GE release rate.
Distracters:	B	Plot Containment pressure of 25 psig and vent rate of 2000 SFCM, the point is ABOVE the 2 in Hard Vent to SBGTS Line and BELOW the 6 inch ILRT Line; the 2 in Hard Vent to SBGTS is the largest vent path that will NOT exceed the GE release rate. Plausible if plotted wrong or the candidate does not understand the curve.
	C	Plot Containment pressure of 25 psig and vent rate of 2000 SFCM, the point is ABOVE the 2 in Hard Vent to SBGTS Line and BELOW the 6 inch ILRT Line; the 2 in Hard Vent to SBGTS is the largest vent path that will NOT exceed the GE release rate. Plausible if plotted wrong or the candidate does not understand the curve.
	D	Plot Containment pressure of 25 psig and vent rate of 2000 SFCM, the point is ABOVE the 2 in Hard Vent to SBGTS Line and BELOW the 6 inch ILRT Line; the 2 in Hard Vent to SBGTS is the largest vent path that will NOT exceed the GE release rate. Plausible if plotted wrong or the candidate does not understand the curve.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2009) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	T-102 and Bases		
Learning Objective:	PLOT-PBIG-2100-3		
K/A System:	G2.3 – Radiation Control	Importance:	RO / SRO 3.8 / 4.3
K/A Statement: G2.3.11 – Ability to control radiation releases.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

72. For an actual fire reported at Peach Bottom, which one of the following affected areas will REQUIRE entry into ON-114 "Actual Fire Reported in the..."?
- A. Inner Screen Structure
 - B. Water Treatment Plant
 - C. SU-25 Startup Switchgear House
 - D. Low Level Radwaste Storage Facility

Answer Key		
Question # 72 RO		
Choice		Basis or Justification
Correct:	A	ON-114 entry symptom includes the following areas: Power Block, Diesel Generator Building, Emergency Pump Structure, Inner Screen Structure, and the Emergency Cooling Tower Structure. Reactor Operators are required to know entry conditions for ON, OT and TRIP procedures from memory.
Distracters:	B	ON-114 entry symptom includes the following areas: Power Block, Diesel Generator Building, Emergency Pump Structure, Inner Screen Structure, and the Emergency Cooling Tower Structure. Plausible because a fire in the Water Treatment Plant would involve dispatch of the Fire Brigade, but is NOT an ON-114 Entry Symptom Area.
	C	ON-114 entry symptom includes the following areas: Power Block, Diesel Generator Building, Emergency Pump Structure, Inner Screen Structure, and the Emergency Cooling Tower Structure. Plausible because a fire in the SU-25 Switchgear House would involve dispatch of the Fire Brigade, but is NOT an ON-114 Entry Symptom Area.
	D	ON-114 entry symptom includes the following areas: Power Block, Diesel Generator Building, Emergency Pump Structure, Inner Screen Structure, and the Emergency Cooling Tower Structure. Plausible because a fire in the LLRW Facility would involve dispatch of the Fire Brigade, but is NOT an ON-114 Entry Symptom Area.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	2	3	10CFR55.41(b)(10)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2002) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	ON-114		
Learning Objective:	PLOT-PBIG-2100-3		
K/A System:	G2.4 – Emergency Procedures/Plan	Importance:	RO / SRO 3.4 / 3.9
K/A Statement: G2.4.27 – Knowledge of “fire in the plant” procedures.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

73. A Main Control Room Annunciator Mode Switch is to be placed in manual for greater than one shift.

How is the position of the Annunciator Mode Switch indicated to the Control Room staff?

- A. Equipment Deficiency Tag (EDT)
- B. Equipment Status Tag (EST)
- C. Green Triangle or Sticker
- D. Red Triangle or Sticker

Answer Key		
Question # 73 RO		
Choice		Basis or Justification
Correct:	B	Per OP-AA-103-102, Equipment Status Tags are used to track annunciator mode switch repositioning for more than one shift.
Distracters:	A	Plausible because per OP-AA-108-105-1001, the use of the Equipment Deficiency tag would be appropriate if the alarm itself were malfunctioning. In this case the EST is used to track the status of the annunciator mode switch, not the annunciator function.
	C	Plausible because OP-PB-103-102-1002 directs use of GREEN triangles or stickers for nuisance alarms expected to remain annunciated for greater than one shift.
	D	Plausible because OP-PB-103-102-1002 directs use of GREEN triangles or stickers for nuisance alarms expected to remain annunciated for greater than one shift, and RED triangles are used for grouping alarms for first-in identification.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	OP-PB-103-102-1002; OP-AA-103-102; OP-AA-108-105-1001		
Learning Objective:	PLOT-1529-1		
K/A System:	G2.4 – Emergency Procedures/Plan	Importance:	RO / SRO 4.2 / 4.1
K/A Statement: G2.4.31 – Knowledge of annunciator alarms, indications, or response procedures.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

74. An Equipment Operator (EO) has been assigned to enter the Moisture Separator Area to investigate a steam leak. The following information has been provided:

- The Equipment Operator has 3280 mRem TEDE annual Exposure
- Expected dose for investigation of the steam leak is 300 mRem

In accordance with RP-AA-203 "Exposure Control and Authorization", which one of the following describes the action required, if any, to investigate the steam leak under these conditions?

- A. A Planned Special Exposure must be obtained
- B. A Dose Control Level Extension must be obtained
- C. An Emergency Exposure Extension must be obtained
- D. No action required since total exposure will be < 4000 mRem

Answer Key		
Question # 74 RO		
Choice		Basis or Justification
Correct:	B	RP-AA-203 requires dose extension above 2000 mRem TEDE. Dose extensions are granted in 500 mRem increments. The current extension is good to 3500 mRem. Another extension is required to get to the 3580 mRem expected exposure.
Distractors:	A	This evolution does not qualify as a Planned Special Exposure, which is separate from and in addition to the annual exposure limits.
	C	This evolution does not require an Emergency Exposure Extension since the conditions do not rise to the level of "lifesaving or protecting valuable property".
	D	RP-AA-203 requires dose extension above 2000 mRem TEDE. Above 4000 mRem, Site Vice President approval is required.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
MEMORY	2.5	3	10CFR55.41(b)(12)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2007) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	RP-AA-203		
Learning Objective:	PLOT-1730-3		
K/A System:	G2.3 – Radiation Control	Importance: RO / SRO 3.2 / 3.7	
K/A Statement: G2.3.4 – Knowledge of radiation exposure limits under normal or emergency conditions.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

75. Given the following conditions:

- A complete loss of off-site power has occurred
- RPV water level is -20 inches
- Drywell pressure is 6 psig
- All four Emergency Diesel Generators (EDGs) are running but do NOT have cooling water available
- The Control Room Supervisor directs you to shutdown the running Emergency Diesel Generators

In accordance with SE-11 "Loss of Off-site Power", which one of the following describes how the EDGs are required to be shutdown?

- A. Install jumpers at each local EDG Gauge Panel.
- B. Depress the STOP Pushbutton on each local EDG Gauge Panel.
- C. Install jumpers in Main Control Room Panels 00C029A, B, C, and D.
- D. Place each EDG control switch in "Pull-to-Lock" at Main Control Room Panels 00C026A, B, C, and D.

Answer Key		
Question # 75 RO		
Choice		Basis or Justification
Correct:	C	Correct per SE-11, Attachment A, direction for shutting down the EDGs.
Distracters:	A	SE-11, Attachment A directs shutting down the EDGs by installing jumpers in the MCR.
	B	SE-11, Attachment A directs shutting down the EDGs by installing jumpers in the MCR.
	D	The MCA relay is picked up due to a LOCA signal; this precludes shutting down the EDG from the normal control location.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	RO
HIGH	2.25	3	10CFR55.41(b)(10)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	SE-11, Attachment A		
Learning Objective:	PLOT-1555-3		
K/A System:	G2.1 – Conduct of Operations	Importance:	RO / SRO 4.4 / 4.0
K/A Statement: 2.1.30 – Ability to locate and operate components, including local controls.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

76. Given the following conditions:

- Unit 2 is operating at 100% power
- 2A TBCCW pump is in service
- TURB BLDG COOLING WATER SUPPLY LO PRESS (217 C-5) is received
- ISO-PHASE BUS TROUBLE (206 F-5) is received
- 2B TBCCW automatically starts

Two minutes later, TBCCW system pressure on Panel 20C012 (PI-2229) is 25 psig.

Which one of the following is correct for these conditions?

TBCCW system pressure ____ (1) ____; the CRS must direct the crew to ____ (2) ____.

- A. (1) is low
(2) reduce generator load to < 18,000 stator amps using GP-9-2 "Fast Reactor Power Reduction"
- B. (1) is low
(2) perform a plant shutdown using GP-4 "Manual Reactor Scram" and remove Condensate pumps from service
- C. (1) is low
(2) perform a plant shutdown using GP-4 "Manual Reactor Scram" and remove Station Air Compressors from service
- D. (1) has been restored
(2) restore TBCCW pump lineup to normal using SO 34A.1.A-2 "TBCCW System Startup and Normal Operations"

Answer Key**Question # 76 SRO**

Choice		Basis or Justification
Correct:	A	Normal TBCCW system pressure on PI-2229 is ~ 100 psig. The standby TBCCW pump starts at 70 psig and a low pressure condition (217 C-5) is alarmed at 50 psig. Alarm 206 F-5 is received due to loss of TBCCW flow to the Iso-phase Bus Coolers. Per ON-118, if TBCCW cooling cannot be restored (as is the case here) power must be reduced to < 18,000 stator amps IAW GP-9-2). This is done prior to securing both TBCCW pumps and transferring vital loads to RBCCW, since the Isolated Phase Bus coolers are not vital TBCCW loads.
Distractors:	B	Although a loss of TBCCW does result in a loss of cooling to Condensate pumps, ON-118 does not direct an immediate plant shutdown unless a unit trip is likely (imminent per ON-118 bases), which is not the case based on the given conditions. Instead, ON-118 directs monitoring Condensate pump temperatures and, if preset values are exceeded, removing the pumps from service, which first requires a power reduction using GP-9-2.
	C	There are no direct actions in ON-118 for loss of cooling to the Station Air Compressors. ON-119 "Loss of Instrument Air" directs a rapid plant shutdown using GP-4 only if air header pressure cannot be stabilized above 75 psig, or if equipment critical to continued plant operation begins to malfunction due to low air pressure. For a sustained loss of TBCCW, ON-119 directs cross-tying the Unit 2 instrument air system to Unit 3.
	D	TBCCW system pressure has not been restored.

Psychometrics

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

Source Documentation

Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: ()	
	<input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: ()	
	<input type="checkbox"/> ILT Exam Bank	
Reference(s):	ARC-217 C-5; ARC-206 F-4; ARC-206 F-5; ON-118 and Bases; ON-119	
Learning Objective:	PLOT-5034-3b	
K/A System:	295018 – Partial or Complete Loss of Component Cooling Water	Importance: SRO 2.9
K/A Statement: AA2.05 – Ability to determine and/or interpret the following as it applies to Partial or Complete Loss of Component Cooling Water: System pressure.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

77. Unit 2 is operating at 100% power with rising Drywell pressure.

- The crew began venting the Drywell using SO 7B.3.A-2 "Containment Atmosphere Pressure Control and Nitrogen Makeup"
- The Reactor was scrammed at 1.1 psig Drywell pressure
- RPV level lowered to -10 inches following the scram; current RPV level is +20 inches
- Drywell pressure is now 1.2 psig and rising slowly

In order to reestablish Drywell venting, which one of the following is correct for monitoring Drywell radiation levels using the Primary Containment Radiation Gas Sampler (PCRGs)?

The PCRGs _____.

- A. is isolated; direct resetting the isolation using GP-8.B "PCIS Isolation Group II and III"
- B. is isolated; direct bypassing the isolation using GP-8.E "Primary Containment Isolation Bypass"
- C. is NOT isolated; direct manual isolation using GP-8.B "PCIS Isolation Group II and III" if drywell pressure exceeds 2 psig
- D. is NOT isolated; direct continuous monitoring of drywell radiation levels using SO 7B.3.A-2 "Containment Atmosphere Pressure Control and Nitrogen Makeup"

Answer Key**Question # 77 SRO**

Choice		Basis or Justification
Correct:	A	OT-101 "High Drywell Pressure" directs venting IAW SO 7B.3.A-2 if drywell radiation levels are within acceptable limits. SO 7B.3.A-2 requires continuous monitoring of drywell radiation levels while venting. PCRGS provides this function but its sample points tap off the CAD H2/O2 gas analyzer sample lines, which isolate on a Group III isolation (including RPV level below +1 inch). Since RPV level drops below +1 inch following a reactor scram from 100% power, it is necessary to reset the isolation, once RPV level is restored, to allow continued monitoring of drywell radiation levels while venting.
Distractors:	B	PCRGS automatically isolated at +1 inch RPV level. Since RPV level is above the isolation setpoint, bypassing the isolation is not required. Section 6.0 of GP-8.E provides direction for bypassing the CAD gas sample valves isolation, if necessary, to restore PCRGS.
	C	PCRGS automatically isolated at +1 inch RPV level. It will also automatically isolate at 2 psig drywell pressure. GP-8.B is the correct procedure to perform a manual isolation if the automatic isolation did not occur as designed.
	D	PCRGS automatically isolated at +1 inch RPV level. SO 7B.3.A-2 is the correct procedure for monitoring drywell radiation levels while venting, but the PCRGS must first be restored (isolation reset) in order to continue monitoring drywell radiation levels.

Psychometrics

Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH	2.5	3	10CFR55.43(b)(5)

Source Documentation

Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2002)	
	<input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: ()	
	<input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	SO 7B.3.A-2; GP-8.B; OT-101; T-102	
Learning Objective:	PLOT-5007B-4d	
K/A System:	295024 – High Drywell Pressure	Importance: SRO 4.0
K/A Statement:		
EA2.08 – Ability to determine and/or interpret the following as it applies to High Drywell Pressure: Drywell radiation levels.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:	Used on 2002 NRC SRO exam for ~ the same K/A (295010 AA2.03).	

78. 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:

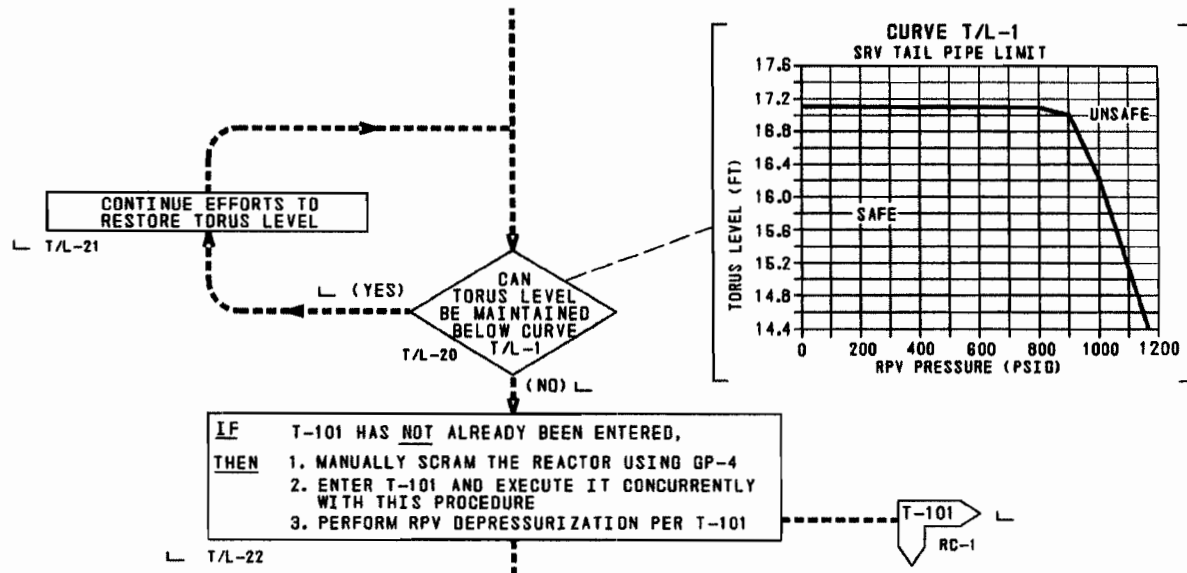
- Reactor power is 6%
- 1 SRV is stuck open
- RPV level is -200 inches and rising
- EHC is controlling RPV pressure at 950 psig
- Torus temperature is 180 degrees F and rising
- RHR loop 'A' is in Torus cooling; loop 'B' is unavailable
- Torus pressure is 6 psig and slowly rising
- Torus level is 16 feet and slowly rising
- HPCI is injecting at 5000 gpm

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

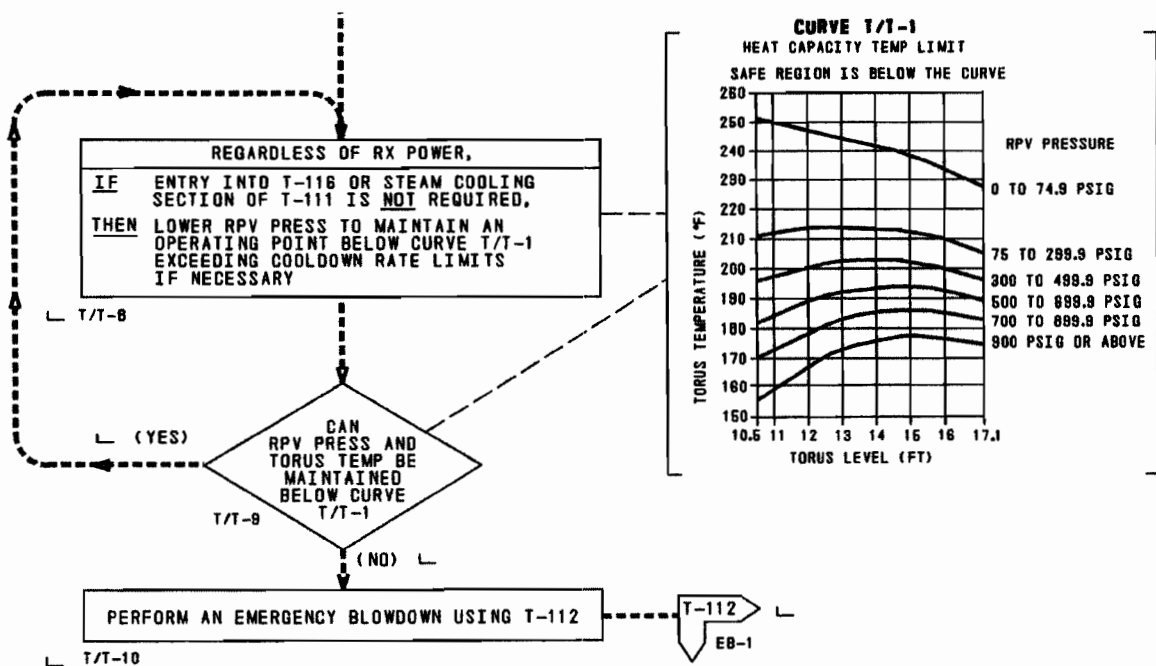
Portions of T-102 "Primary Containment Control" AND T-117 "Level/Power Control" are PROVIDED ON THE NEXT TWO PAGES.

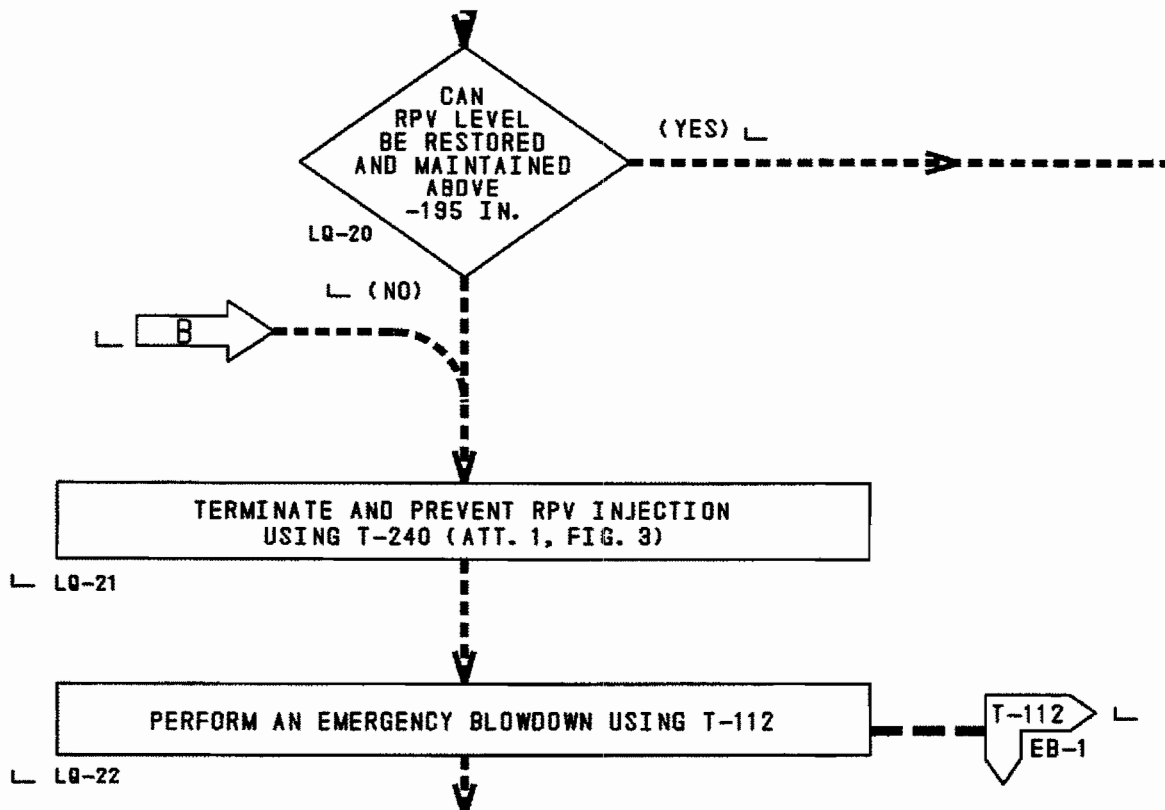
- A. Perform Emergency Blowdown per T-112 due to inability to maintain RPV level above -195 inches.
- B. Reduce RPV pressure to less than 900 psig in order to maintain on the safe side of T/L-1 "SRV Tail Pipe Limit".
- C. Perform Emergency Blowdown per T-112 due to being on the unsafe side of T/T-1 "Heat Capacity Temperature Limit".
- D. Reduce RPV pressure to less than 900 psig in order to maintain on the safe 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 # 78 SRO		
Choice		Basis or Justification
Correct:	C	For the given conditions of torus level at 16 feet and torus temperature at 180 degrees F, the HCTL curve has been exceeded. This requires an emergency blowdown per T-102, step T/T-9 and T/T-10, which require an emergency blowdown if unable to "maintain" operation below the curve.
Distractors:	A	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.
	B	Plausible since Torus level is ~1.8 feet away from T/L-1 limit and level is rising slowly. Reducing pressure for the purposes of maintaining this curve is not warranted at this time.
	D	The HCTL curve has already been exceeded, requiring an emergency blowdown. Plausible if applicant incorrectly plots/interprets the HCTL curve, or believes reducing pressure to restore operation to the safe side of the curve is allowed.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	T-102 and Bases		
Learning Objective:	PLOT-PBIG-2102-5a		
K/A System:	295037 – Scram Condition Present and Reactor Power Above APRM Downscale or Unknown	Importance:	SRO 4.1
K/A Statement:			
EA2.04 – Ability to determine and/or interpret the following as it applies to Scram Condition Present and Reactor Power Above APRM Downscale or Unknown: Suppression pool temperature.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

79. Unit 2 was operating at 80% 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 39 and 43% in 4-5 second random intervals

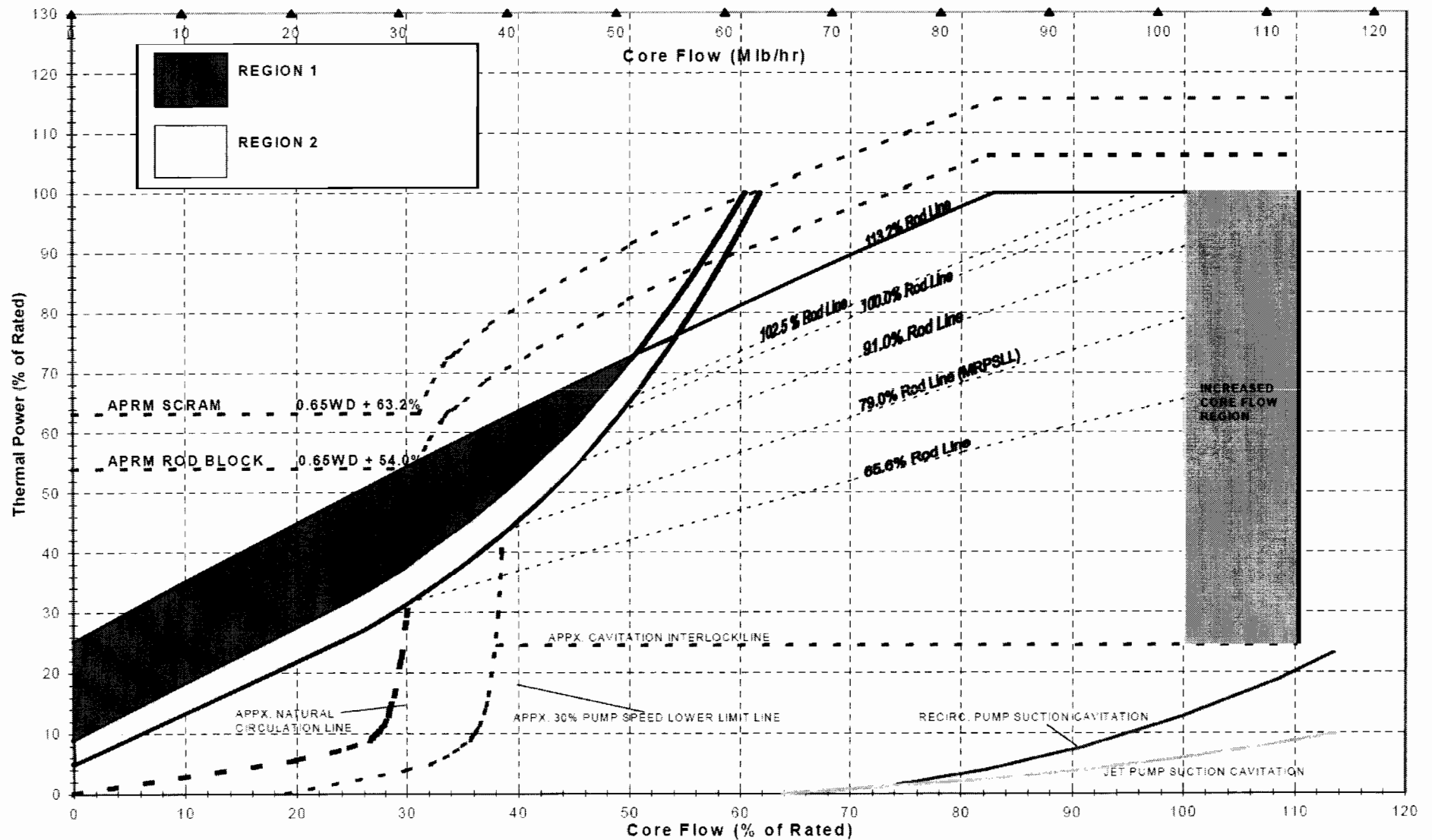
Which one of the following is correct for these conditions?

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

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" due to indications of Thermal Hydraulic Instability
- 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 # 79 SRO		
Choice	Basis or Justification	
Correct:	D	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. 39-43% power shows the reactor is operating in the normal operating region. The follow-up actions of OT-112 are required.
Distractors:	A	If a core flow calculation error is made, the applicant could believe the reactor is operating in Region 1.
	B	If a core flow calculation error is made, the applicant could believe the reactor is operating in Region 2. The indications provided do not meet the criteria for THI, although inserting GP-9-2 rods would be a correct action if operating in Region 2.
	C	If a core flow calculation error is made, the applicant could believe the reactor is operating in Region 2. Raising recirc pump speed would be a correct action if operating in Region 2 without indications of THI.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2008) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT 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 3.8
K/A Statement:			
AA2.01 – Ability to determine and/or interpret the following as they apply to Partial or Complete Loss of Forced Core Flow Circulation: Power/flow map.			
REQUIRED MATERIALS:	AO 60A.1-2 "PBAPS Backup Stability Solution Power Flow Map" (whiteout "immediate exit" in upper left corner) – (imbedded)		
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.		

80. The following conditions exist:

- Both units were initially operating at 100% power
- A complete loss of offsite power (LOOP) occurred
- SE-11 “Loss of Off-Site Power” is being implemented
- Attachment U “Opening Secondary Containment Doors to Support Long Term HPCI / RCIC Operation” is required since HPCI Room Cooling is NOT available

For these conditions, which one of the following statements is correct regarding HPCI and RCIC operability per Technical Specification Bases?

- A. HPCI is operable without HPCI Room Coolers available.
- B. HPCI is NOT operable without HPCI Room Coolers available.
- C. HPCI is considered operable once Attachment U is implemented.
- D. Implementing Attachment U also causes RCIC to become inoperable.

Answer Key**Question # 80 SRO**

Choice		Basis or Justification
Correct:	A	Per Tech Spec 3.7.2 Bases, "ESW provides cooling to the HPCI and RCIC room coolers; however, cooling function is not required to support HPCI or RCIC System operability." Per SE-11 Bases for implementing Attachment U, "...room coolers are not required to support HPCI operability."
Distractors:	B	Per Tech Spec 3.7.2 and SE-11 Bases, the cooling function is not required to support HPCI System operability. Plausible if applicant does not recall Tech Spec or SE-11 Bases.
	C	Per SE-11 Bases for implementing Attachment U, "...room coolers are not required to support HPCI operability." Plausible if applicant believes opening RCIC room doors into the HPCI room (i.e., provide cooling from RCIC room coolers) makes HPCI operable without HPCI room coolers.
	D	The cooling function is not required to support RCIC System operability. Plausible if applicant believes opening RCIC room doors into the HPCI room (increasing load on RCIC room coolers) also causes RCIC to become inoperable.

Psychometrics

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

Source Documentation

Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: ()	
	<input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: ()	
	<input type="checkbox"/> ILT Exam Bank	
Reference(s):	SE-11 Bases; Tech Spec 3.7.2 Bases; TRM 3.11 Bases	
Learning Objective:	PLOT-5033-9	
K/A System:	295003 – Partial or Complete Loss of A.C. Power	Importance: SRO 4.2
K/A Statement:		
G2.2.25 – Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

81. Unit 2 was operating at full power when a small break Loss of Coolant Accident (LOCA) occurred. The following conditions currently exist:
- Torus level is 17 feet and rising
 - Torus pressure is 9.8 psig and rising
 - Drywell temperature indicated 165 degrees F before TI-80146 "Drywell Bulk Average Temperature Indicator" failed
 - Based on T-102 "Primary Containment Control" NOTE #27 below, the crew attempted to perform a manual calculation of Drywell Bulk Average Temperature using RT-O-40C-530-2 "Drywell Temperature Monitoring" but the calculation was invalid

#27

**IF TI-80146(90146) IS OUT OF SERVICE, THEN USE
RT-O-40C-530 TO DETERMINE DW BULK AVG TEMP**

Evaluate these conditions to determine the appropriate action related to spraying the Drywell.

- A. Do NOT spray the Drywell since the safe side of the DWSIL curve cannot be verified per RT-O-40C-530-2.
- B. Do NOT spray the Drywell since Torus level may rise above the limit of T-102 "Primary Containment Control" for spraying the Drywell.
- C. Spray the Drywell per T-102 after verifying the safe side of the DWSIL curve using TI-2501, Point 136 plus 10 degrees F.
- D. Spray the Drywell per T-102 after verifying the safe side of the DWSIL Curve using the hottest temperature indicated on TI-2501, Points 119-127.

Answer Key		
Question # 81 SRO		
Choice		Basis or Justification
Correct:	A	RT-O-40C-530-2 precaution 4.2.2 states that if the calculation of Drywell Bulk Average Temperature is invalid, the safe side of the DWSIL curve cannot be verified. DO NOT SPRAY THE DRYWELL.
Distractors:	B	Per T-102, the Torus level limit for spraying the Drywell is 18 feet. If Drywell sprays are required and all other conditions are met, Torus level at 17 feet and rising would not prevent spraying the Drywell.
	C	TI-2501, Point 136 (plus 10 degrees F) can be used to calculate approximate drywell temperature for entering ON-120 or T-102, but not for spraying the drywell.
	D	Using the hottest temperature from TI-2501 points 119-127 is an acceptable method of determining when to initiate RPV blowdown, but it is not acceptable for use on the DWSIL curve.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2008) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	T-102 (Note #27); RT-O-40C-530-2		
Learning Objective:	PLOT-1560-11		
K/A System:	295028 – High Drywell Temperature	Importance:	SRO 4.3
K/A Statement: G2.4.20 – Knowledge of the operational implications of EOP warnings, cautions and notes.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

82. Unit 2 was operating at 100% power when a Group I isolation occurred. The following conditions are present:

- All APRM downscale lights are lit
- 7 control rods remained at position '48' on the scram
- RPV water level lowered to -30 inches and is now -5 inches
- Torus temperature is 105 degrees F and rising slowly
- Drywell pressure is 0.7 psig and steady

What action is required when Torus temperature exceeds 110 degrees F?

T-117 "Level/Power Control" is PROVIDED SEPARATELY.

- A. Lower RPV water level to -60 inches
- B. Lower RPV water level to -172 inches
- C. Maintain RPV water level -195 to +35 inches
- D. Raise RPV water level; maintain +5 to +35 inches

Answer Key		
Question # 82 SRO		
Choice		Basis or Justification
Correct:	C	The conditions given show that an ATWS is in progress per T-101, Note 24. Therefore, RPV level control is directed by T-117. With APRM downscaler are lit, reactor power is < 4%. Therefore, T-117 does not require lowering RPV water level. Step LQ-18 directs a water level control band of -195 to +35 inches (based on answering 'NO' at step LQ-17).
Distractors:	A	Based on answering 'YES' at step LQ-6 (power above 4%) and 'NO' at step LQ-10 (are any SRVs open—plausible if applicant does not recognize that SRVs would be open following a Group I isolation, which is indicated by rising Torus temperature).
	B	Based on answering 'YES' at step LQ-6 (power above 4%) and 'YES' at step LQ-10 (are any SRVs open—expected following a Group I isolation and is indicated by rising Torus temperature).
	D	Plausible since this is the level band directed by T-101, RC/L. However, RC/L is exited if an ATWS is in progress (step RC/L-2). Plausible if applicant does not recall T-101 RC/L direction.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	T-117		
Learning Objective:	PLOT-DBIG-2117-9b		
K/A System:	295026 – Suppression Pool High Water Temperature	Importance:	SRO 4.6
K/A Statement: G2.4.21 – 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, radioactive release control, etc.			
REQUIRED MATERIALS:		T-117 “Level/Power Control”	
Notes and Comments:			

83. The following conditions exist on Unit 3:

- Drywell pressure is 5 psig
- Torus pressure is 4 psig
- Torus level is 15 feet
- Drywell bulk average temperature is 250 degrees F and rising
- Initiation of Torus Sprays using RHR per T-204 is complete

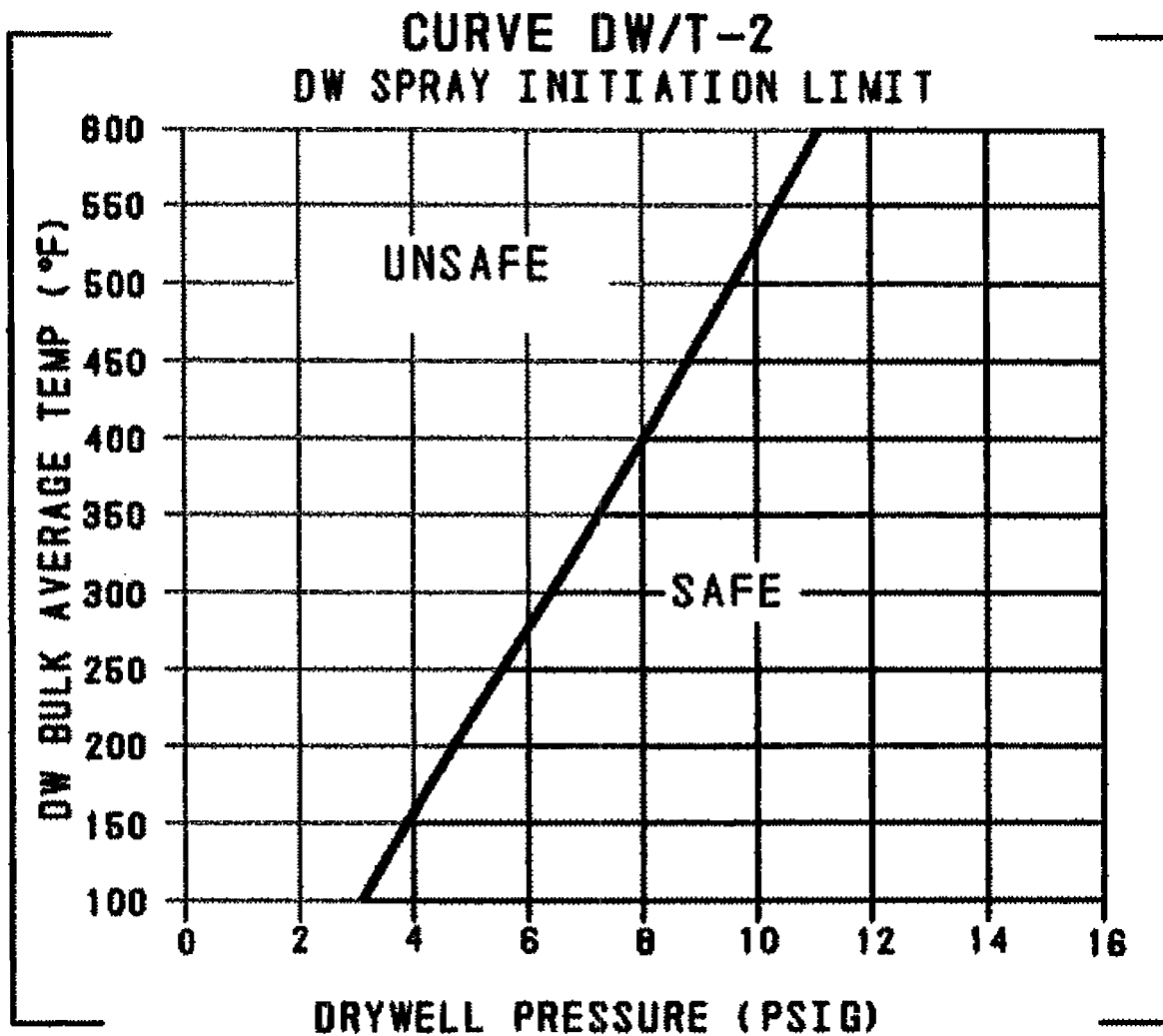
Which statement below is correct for spraying the drywell under these conditions?

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

Spraying the drywell in accordance with T-102 "Primary Containment Control"

_____.

- A. is required and the resulting evaporative cooling pressure drop must be controlled by throttling spray flow
- B. is required and the resulting convective cooling pressure drop must be controlled by terminating spray flow
- C. must NOT be performed since it may result in an evaporative cooling pressure drop to below the high drywell pressure scram setpoint
- D. must NOT be performed since it may result in an evaporative cooling pressure drop greater than the capacity of the Reactor Building-to-Torus vacuum breakers



Answer Key**Question # 83 SRO**

Choice		Basis or Justification
Correct:	C	Drywell temperature and pressure plot on the <u>unsafe</u> side of the DWSIL curve and therefore drywell sprays must not be initiated. Per TRIP Bases, DWSIL is the highest drywell temperature at which initiation of sprays will not result in an evaporative cooling pressure drop to below the high drywell pressure scram setpoint. If drywell sprays are initiated while on the unsafe side of the DWSIL curve, the evaporative cooling pressure drop will reduce drywell pressure below the 2 psig scram setpoint. The 2 psig limit provides margin to preclude containment failure or de-inertion following initiation of drywell sprays.
Distractors:	A	Drywell temperature and pressure plot on the <u>unsafe</u> side of the DWSIL curve. Per T-102 Bases, initiation of drywell sprays can result in a relatively large drop in drywell pressure (due to evaporative cooling) that may occur at a rate faster than can be compensated by the operator. Spraying only when on the safe side of the DWSIL curve ensures this will not occur.
	B	Drywell temperature and pressure plot on the <u>unsafe</u> side of the DWSIL curve. Per T-102 Bases, convective cooling occurs when water is sprayed into a saturated atmosphere (i.e., after evaporative cooling has occurred). Per T-102 Bases, convective cooling occurs at a much slower rate than evaporative cooling and can be controlled by terminating sprays.
	D	Plausible since one of the assumptions for determining DWSIL is that the evaporative cooling transient is complete before the Torus-to-Drywell vacuum breakers operate (not the Reactor Building-to-Torus vacuum breakers), thereby ensuring sufficient margin to avoid de-inerting the primary containment when sprays are initiated.

Psychometrics

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

Source Documentation

Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: ()		
	<input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: ()		
	<input type="checkbox"/> ILT Exam Bank		
Reference(s):	T-102 and Bases; TRIP/SAMP Curves, Tables & Limits Bases		
Learning Objective:	PLOT-1560-7, -9		
K/A System:	295012 – High Drywell Temperature	Importance:	SRO 4.1
K/A Statement:			
AA2.02 – Ability to determine and/or interpret the following as it applies to High Drywell Temperature: Drywell pressure.			
REQUIRED MATERIALS:	NONE		
Notes and Comments:			

84. Unit 3 was operating at 100% power when a feedwater level control malfunction caused RPV level to rise to +90 inches as read on LI-2-2-3-86.

Current plant conditions are as follows:

- All control rods are fully inserted
- RPV pressure is 1060 psig and rising slowly

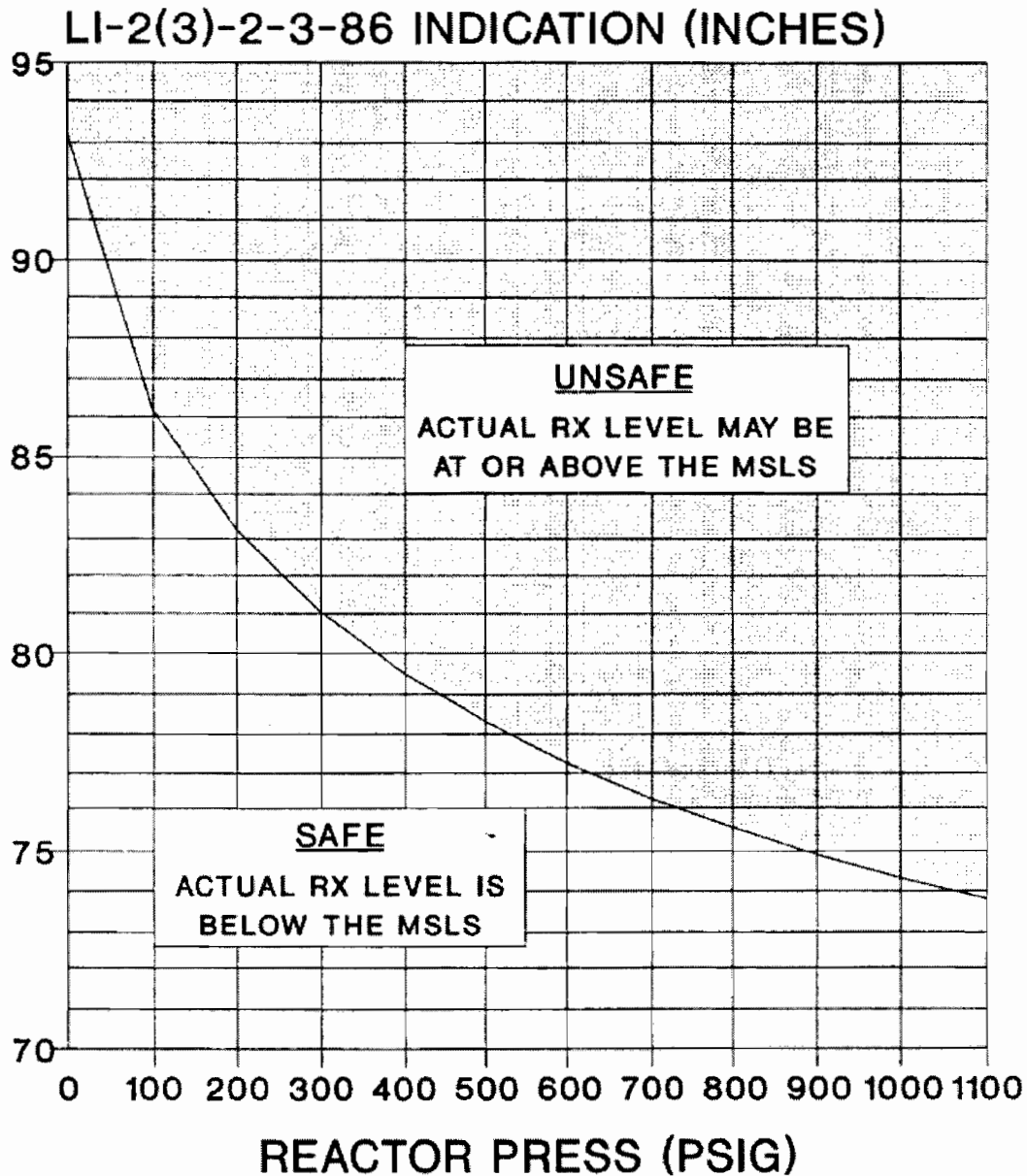
Which one of the following actions is required for RPV pressure control?

Figure 1 of OT-110 "Reactor High Level" is PROVIDED ON THE NEXT PAGE.

- A. Restore and maintain reactor pressure below 1053 psig using the Bypass Jack per OT-102 "Reactor High Pressure".
- B. Restore and maintain reactor pressure below 1053 psig using EHC Pressure Set per OT-102 "Reactor High Pressure".
- C. Reduce reactor pressure below 1050 psig using a single SRV and prolonged SRV opening per OT-110 "Reactor High Level".
- D. Reduce reactor pressure below 1050 psig using multiple SRVs and short-duration SRV openings per OT-110 "Reactor High Level".

OT-110 PROCEDURE
Rev. 7
Page 6 of 6

FIGURE 1



Answer Key		
Question # 84 SRO		
Choice		Basis or Justification
Correct:	C	When RPV pressure reaches 1050 psig, OT-110, which is executed concurrently with T-101 "RPV Control", directs manual SRV operation using a single SRV (if possible) and prolonged SRV opening.
Distractors:	A	Per OT-110 Figure 1, an indicated level of +90 inches indicates that actual RPV level may be at or above the main steam lines. OT-110 directs closing the MSIVs if RPV level cannot be maintain below the bottom of the MSIVs (+108 inches), thereby taking away the use of BPVs. In addition, while OT-102 does direct maintaining reactor pressure below 1053 psig, since the reactor is scrammed, OT-102 is no longer applicable. OT-110 is executed concurrently with T-101.
	B	Per OT-110 Figure 1, an indicated level of +90 inches indicates that actual RPV level may be at or above the main steam lines. OT-110 directs closing the MSIVs if RPV level cannot be maintain below the bottom of the MSIVs (+108 inches). In addition, while OT-102 does direct maintaining reactor pressure below 1053 psig, since the reactor is scrammed, OT-102 is no longer applicable. OT-110 is executed concurrently with T-101.
	D	OT-110 directs prolonged SRV opening using a single SRV (or as few as possible) in order to minimize SRV tailpipe loading and the number of SRVs that are effected by higher than normal loads.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2007) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	OT-102; OT-110; T-101		
Learning Objective:	PLOT-1540-4		
K/A System:	295008 – High Reactor Water Level	Importance:	SRO 4.2
K/A Statement: G2.4.11 – Knowledge of abnormal condition procedures.			
REQUIRED MATERIALS:		OT-110 Figure 1 (imbedded)	
Notes and Comments:			

85. Given the following:

- Unit 2 is in MODE 5
- In vessel fuel moves for Core Shuffle I are complete
- Control rod drive mechanism removal and replacement is in progress
- Refuel Floor exhaust ventilation radiation monitors RIS-17-458C and RIS-17-458D are determined to be inoperable

What Technical Specification action, if any, is required in order to continue the current activities?

Technical Specification 3.3.6.2 "Secondary Containment Isolation Instrumentation" is PROVIDED SEPARATELY.

- A. No actions are required; these monitors are NOT required for these conditions.
- B. Place both channels in trip within 12 hours or take the actions required by Condition C.
- C. Place both channels in trip within 24 hours or take the actions required by Condition C.
- D. Restore isolation capability within 1 hour or take the actions required by Condition C.

Answer Key		
Question # 85 SRO		
Choice		Basis or Justification
Correct:	C	Entry into Tech Spec 3.3.6.2 Condition A is required for Function 4 on Table 3.3.6.2-1, which requires placing both channels in trip within 24 hours. This is because 1 channel in each trip system is inoperable but isolation capability is maintained (A and B channels available), and sub-note (a) applies since CRD removal and replacement has a "potential for draining the reactor vessel".
Distractors:	A	This choice is plausible based on the applicant believing the radiation monitors are not required while in Mode 5 and does not correctly apply sub-note (a) on Table 3.3.6.2-1 to the given conditions.
	B	This choice is plausible based on the applicant believing that 1 channel in each trip system is inoperable but isolation capability is maintained, and incorrectly applying Condition A to Function 4 of Table 3.3.6.2-1. The 12-hour requirement applies to Functions 1 and 2 only.
	D	This choice is plausible for the reasons stated above, and if the applicant believes that 1 channel in each trip system is inoperable and that trip capability is NOT maintained.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	Tech Spec 3.3.6.2		
Learning Objective:	PLOT-5040B-8		
K/A System:	295033 – High Secondary Containment Area Radiation Levels	Importance:	SRO 3.2
K/A Statement: EA2.02 – Ability to determine and/or interpret the following as it applies to High Secondary Containment Area Radiation Levels: Equipment operability.			
REQUIRED MATERIALS:		Tech Spec 3.3.6.2 for Unit 2	
Notes and Comments:			

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

- BLOWDOWN VALVES POWER MONITOR (227 C-5) alarms
- The GREEN indicating light for the 'C' and 'D' SRVs are NOT lit
- The GREEN indicating lights for ALL other SRVs are lit
- Subsequent investigation identified blown fuses associated with the 'C' and 'D' SRV solenoids

What is (1) the impact on the ADS System, and (2) the Technical Specification action required for these conditions?

Technical Specifications 3.4.3 and 3.5.1 are PROVIDED SEPARATELY.

- A. (1) NO ADS valves are inoperable
(2) Be in Mode 3 in 12 hours and Mode 4 in 36 hours
- B. (1) ONE ADS valve is inoperable
(2) Restore ADS to Operable status within 14 days
- C. (1) TWO ADS valves are inoperable
(2) Be in Mode 3 in 12 hours and reduce reactor steam dome pressure to ≤ 100 psig in 36 hours
- D. (1) TWO ADS valves are inoperable
(2) Restore ADS to Operable status within 14 days, or be in Mode 3 in 12 hours and reduce reactor steam dome pressure to ≤ 100 psig in 36 hours

Answer Key		
Question # 86 SRO		
Choice		Basis or Justification
Correct:	B	The given conditions show a loss of power to the solenoids for SRV 'C' and 'D'. 'C' SRV is an ADS-SRV; 'D' is a non-ADS SRV. Therefore, 'C' is inoperable per Tech Spec 3.5.1, requiring entry into Condition E for 1 ADS valve inoperable. 'D' SRV remains operable per Tech Spec 3.4.3 since Tech Spec Bases for SR 3.4.3.2 states: "If the valve fails to actuate due only to the failure of the solenoid, but is capable of opening on overpressure, the safety function of the SRV is considered OPERABLE."
Distractors:	A	The choice is based on applicant believing two non-ADS SRVs are inoperable and require solenoid actuation to be considered operable per Tech Spec 3.4.3.
	C	The choice is based on applicant believing two ADS SRVs are inoperable and correctly applying the required actions of Tech Spec 3.5.1.
	D	The choice is based on applicant believing two ADS SRVs are inoperable and incorrectly applying the required actions of Tech Spec 3.5.1.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	ARC-227 C-5; Tech Spec 3.4.3 and 3.5.1; M-1-S-52		
Learning Objective:	PLOT-5001A-8, -9		
K/A System:	218000 – Automatic Depressurization System	Importance:	SRO 3.6
K/A Statement: A2.05 – Ability to (a) predict the impact 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: Loss of A.C. or D.C. power to ADS valves.			
REQUIRED MATERIALS:		Tech Spec 3.4.3 and 3.5.1 – Unit 2 w/ NO Surveillance Requirements	
Notes and Comments:			

87. Given the following:

- Unit 2 is operating at 100% power
- APRM '1' is inoperable and bypassed
- APRM DOWNSCALE (211 C-2) is received
- The ODA for APRM '4' indicates downscale

Which one of the following describes (1) how these conditions impact the Reactor Protection System and (2) what action is required?

Technical Specification 3.3.1.1 "RPS Instrumentation" is PROVIDED SEPARATELY.

- A. (1) An RPS channel trip will occur
(2) Perform AO 60F.2-2 for up to 6 hours then, if operability is not restored, place ARPM '4' in the tripped condition using GP-25
- B. (1) An RPS channel trip will occur
(2) Perform AO 60F.2-2 for up to 12 hours then, if operability is not restored, place ARPM '4' in the tripped condition using GP-25
- C. (1) An RPS channel trip will NOT occur
(2) Place ARPM '4' in the tripped condition using GP-25 within 6 hours
- D. (1) An RPS channel trip will NOT occur
(2) Place ARPM '4' in the tripped condition using GP-25 within 12 hours

NOTE:

- AO 60F.2-2 is titled "Defeat of an RPS Half Scram"
- GP-25 is titled "Installation of Trips/Isolations to Satisfy Tech Spec/TRM Requirements for Inoperable Instrumentation"

Answer Key		
Question # 87 SRO		
Choice		Basis or Justification
Correct:	D	An RPS trip will not occur since (1) an APRM downscale condition does not cause an RPS trip (rod block only) and (2) the 2-out-of-4 logic (voter) modules must see two of the same trip input signals to cause an RPS trip. With APRM 1 bypassed, any trip signals generated by APRM 1 are removed. Tech Spec Table 3.3.1.1-1 requires 3 APRM channels per trip system in Mode 1. Since only 2 channels per trip system are available, Condition A applies, which requires placing the channel (APRM 4) in trip within 12 hours. This is done using GP-25, Appendix 24.
Distractors:	A	Part 1 is incorrect; part 2 is correct (if a scram were to occur). Plausible if applicant believes the given conditions are sufficient to cause a trip of the 2-out-of-4 logic (voter) modules, which if were true, would result in a reactor scram.
	B	Part 1 is incorrect; part 2 is incorrect. Plausible if applicant believes the given conditions are sufficient to cause a trip of the 2-out-of-4 logic (voter) modules and the trip resulted in a half scram vice a full scram, which is not the case.
	C	Part 1 is correct; part 2 is incorrect. Plausible if applicant believes Tech Spec 3.3.1.1 Condition B applies. This might occur if applicant incorrectly applies note 'c' on Table 3.3.1.1-1 (each APRM channel provides inputs to both trip systems) and misses the note for Condition B, which states the condition does not apply for Functions 2a, 2b, 2c, 2d or 2f.

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

Source Documentation		
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank	
Reference(s):	ARC-211 C-2; Tech Spec 3.3.1.1; GP-25; AO 60F.2-2	
Learning Objective:	PLOT-5060C-8	
K/A System:	212000 – Reactor Protection System	Importance: SRO 3.7
K/A Statement: A2.04 – Ability to (a) predict the impact of the following on the Reactor Protection System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Nuclear instrument system failure.		
REQUIRED MATERIALS:	Tech Spec 3.3.1.1 (Unit 2)	
Notes and Comments:		

88. Units 2 and 3 are operating at 100% power with the following conditions present:

- The 'A' SBTG Filter Train is INOPERABLE due to water intrusion
- The 'B' SBTG Filter Train is unaffected and OPERABLE
- The damaged filter is expected to be returned to service within 96 hours
- A Prompt Investigation has been initiated

Which of the following are required, if any, for these conditions?

- (1) Prompt notification to the NRC due to "Loss of System Safety Function"
- (2) Notification to the NRC as a "Condition Prohibited by Plant Technical Specifications"
- (3) Notifications per OP-AA-106-101 "Significant Event Reporting"

A portion of Technical Specification 3.6.4.3 "Standby Gas Treatment (SGT) System" is PROVIDED ON THE NEXT PAGE.

- A. (1) and (3) ONLY
- B. (2) and (3) ONLY
- C. (3) ONLY
- D. No reports required

SGT System
3.6.4.3

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Standby Gas Treatment (SGT) System

LCO 3.6.4.3 Two SGT subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of RECENTLY IRRADIATED FUEL assemblies in
the secondary containment,
During operations with a potential for draining the reactor
vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SGT subsystem inoperable.	A.1 Restore SGT subsystem to OPERABLE status.	7 days

Answer Key		
Question # 88 SRO		
Choice		Basis or Justification
Correct:	C	Initiation of a Prompt Investigation requires notifications IAW OP-AA-106-101 (see Attachment 1, Page 1 of 2).
Distractors:	A	SBGT is common to both units, however only ONE filter train has been impacted. Per Tech Spec Bases, since the filter trains share a common inlet plenum, each unit is allowed to claim the remaining filter train for purposes of satisfying the LCO. The safety function has NOT been lost.
	B	SBGT is common to both units, however only ONE filter train has been impacted. Per Tech Spec Bases, since the filter trains share a common inlet plenum, each unit is allowed to claim the remaining filter train for purposes of satisfying the LCO. 7 days is allowed for restoration of the inoperable subsystem.
	D	Initiation of a Prompt Investigation requires notifications IAW OP-AA-106-101 (see Attachment 1, Page 1 of 2).

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	Unit 2 & Unit 3 Tech Spec 3.6.4.3 and Bases; OP-AA-106-101; LS-AA-1020		
Learning Objective:	PLOT-5009A-8, -9		
K/A System:	261000 – Standby Gas Treatment System	Importance:	SRO 4.1
K/A Statement: G2.4.30 – Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:		Based on Plant OPEX from May of 2003 (IR 160784).	

89. Given the following conditions:

- Unit 2 is operating at 100% power
- The 2A RBCCW pump is blocked for maintenance
- B REACT BLDG COOLING WATER PUMP OVLD (216 B-1) alarms
- The temperatures for components cooled by RBCCW are beginning to rise

Which one of the following describes the actions required by ON-113 "Loss of RBCCW" for the current plant conditions?

- A. Shutdown the running RWCU pumps and lower power per GP-9-2 "Fast Reactor Power Reduction" to reduce RBCCW System heat load.
- B. Perform GP-4 "Manual Reactor Scram" and trip both Recirc pumps to prevent exceeding Recirc pump motor bearing and/or seal cavity temperature limits.
- C. Trip one Recirc pump and execute OT-112 "Unexpected/Unexplained Change in Core Flow" concurrently to prevent exceeding Recirc pump motor bearing temperature limits.
- D. Reduce the speed of both Recirc pumps per GP-9-2, remove one Recirc pump from service and enter single loop operation per GP-5 "Power Operations" to reduce RBCCW System heat load.

Answer Key		
Question # 89 SRO		
Choice		Basis or Justification
Correct:	A	Per ON-113 Step 2.2, if restoration of RBCCW is not imminent, RWCU pumps are shutdown and reactor power is lowered in accordance with GP-9-2. Per ON-113 Bases, the reason for these actions is to reduce the heat load on the RBCCW system and allow more time to diagnose and correct the cause of the RBCCW problem.
Distractors:	B	For the given conditions, this action is premature and does not follow the guidance given in ON-113. Direction to perform GP-4 is only given if it is necessary to trip both Recirc pumps, which is based on reaching certain motor bearing and/or seal cavity temperature limits.
	C	This action is not taken unless a Recirc pump motor bearing temperature exceeds 194 degrees F.
	D	This action is not taken unless a Recirc pump seal temperature exceeds 200 degrees F, and lowering pump speed does not reduce seal temperature to below 180 degrees F.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	ON-113 and Bases		
Learning Objective:	PLOT-PBIG-1550-3, -18a, -18b		
K/A System:	400000 – Component Cooling Water	Importance:	SRO 3.0
K/A Statement: A2.03 – Ability to (a) predict the impacts of the following on the CCWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: High/low CCW temperature.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

90. The following conditions exist:

- Both units are operating at 100% power
- Offsite electrical sources are in a normal lineup
- 3SU Transformer Load Tap Changer (LTC) is in MANUAL
- The Main Supply Fan for the E-1 Diesel Generator is blocked

What action, if any, is required for these conditions?

Technical Specification 3.8.1 “AC Sources-Operating” is PROVIDED SEPARATELY.

- A. Enter Tech Spec 3.8.1 Condition A for both units.
- B. Enter Tech Spec 3.8.1 Condition B for both units.
- C. Enter Tech Spec 3.8.1 Condition E for both units.
- D. No Technical Specification action is required.

Answer Key		
Question # 90 SRO		
Choice		Basis or Justification
Correct:	B	Based on the given conditions, the E-1 diesel is inoperable. Tech Spec 3.8.1 Bases requires the main supply fan to be operable in order to consider the diesel generator operable. Although the 3SU transformer is inoperable when its LTC is in manual, per Tech Spec Bases, this is not a required offsite source. Since there are two qualified offsite sources available, Tech Spec 3.8.1 Condition B (1 EDG inoperable) applies.
Distractors:	A	Based on the given conditions, two qualified offsite sources are available. Plausible if the applicant (1) does not recall the EDG main supply fan must be operable for its EDG to be operable, and (2) believes the 3SU source must be aligned with its LTC in automatic to meet Tech Spec 3.8.1 requirements.
	C	Based on the given conditions, two qualified offsite sources are available. Plausible if the applicant believes the 3SU source must be aligned with its LTC in automatic to meet Tech Spec 3.8.1 requirements.
	D	Based on the given conditions, the E-1 diesel is inoperable. Plausible if the applicant does not recall the EDG main supply fan must be operable for its EDG to be operable.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> ILT Exam Bank		<input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Other Exam Bank: ()
Reference(s):	Tech Spec 3.8.1 and Bases; E-1		
Learning Objective:	PLOT-5051-8, -9; PLOT-5052-8, -9		
K/A System:	262001 – A.C. Electrical Distribution	Importance:	SRO 4.7
K/A Statement: G2.2.22 – Knowledge of limiting conditions for operations and safety limits.			
REQUIRED MATERIALS:		Tech Spec 3.8.1 for BOTH Units	
Notes and Comments:			

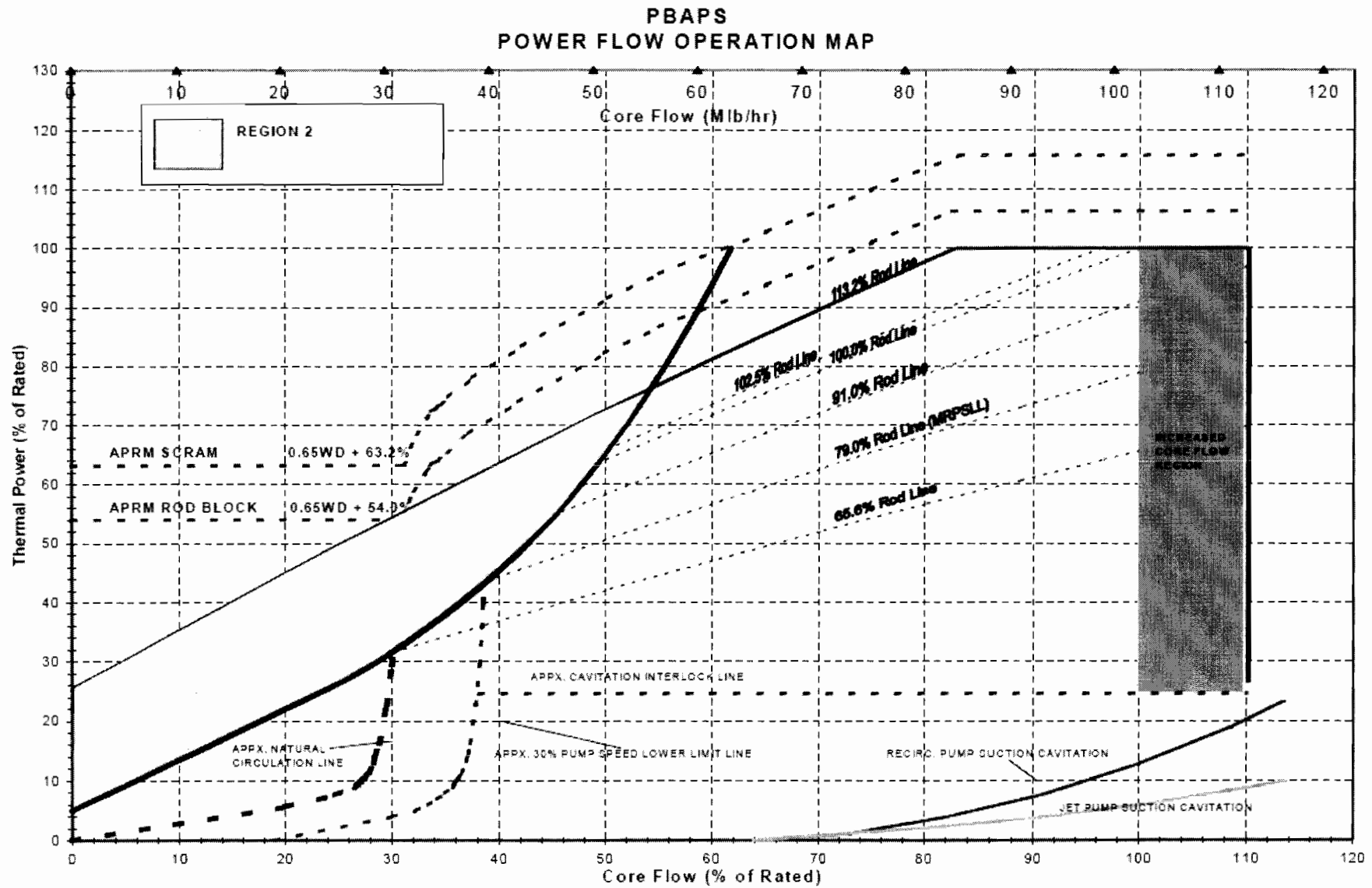
91. Unit 2 was initially at 100 % power when the following transient occurred:

- Feedwater Heater String A3/4/5 isolated
- Reactor power rose to 106%
- Core flow is 91%
- Thermal Limit/FLLLP values are as follows:
 - MFLCPR – 0.979
 - MFLPD – 0.955
 - MAPRAT – 0.945
 - FLLLP – 1.009

Which one of the following describes (1) the impact of these conditions and (2) the required action to be taken?

GP-5-1 “PBAPS Power Flow Operation Map” is PROVIDED ON THE NEXT PAGE.

- A. (1) Core operation is outside the analyzed region of the Power to Flow Map.
(2) Reduce reactor power IAW GP-9-2 “Fast Power Reduction” to less than 90% per OT-104 “Positive Reactivity Insertion”.
- B. (1) Core operation is outside the analyzed region of the Power to Flow Map.
(2) Reduce reactor power by insertion of GP-9-2 Appendix 1 rods to less than 90% per OT-104 “Positive Reactivity Insertion”.
- C. (1) A Thermal Limit / FLLLP violation has occurred.
(2) Reduce reactor power using Recirc flow IAW GP-5 “Power Operations” until FLLLP is less than 1.000 per GP-13 “Resolution of Thermal Limit Violations”.
- D. (1) A Thermal Limit / FLLLP violation has occurred.
(2) Reduce reactor power IAW GP-3 “Normal Plant Shutdown” such that thermal power is less than 25% RTP within 4 hours.



FR-2(3)-02-3-095 (Black pen) OR B015(B315)

CM-1

Answer Key		
Question # 91 SRO		
Choice		Basis or Justification
Correct:	A	Per the given conditions, the core is operating outside of the analyzed region of the Power to Flow Map. OT-104, step 3.5.1 direction for these conditions is to lower reactor power IAW GP-9-2 as necessary to maintain APRM power within the analyzed region of the Power-to-Flow Map and at least 10% below the pre-transient power level. For the given conditions, this will require reducing Recirc flow to < 90% power.
Distractors:	B	Part 1 is correct; Part 2 is incorrect. OT-104 directs reducing power IAW GP-9-2, which will involve an initial flow reduction. Plausible if applicant believes insertion of control rods to restore acceptable point on the Power-Flow map is required, as is the case if operating in Region 2.
	C	Part 1 is correct; Part 2 is incorrect. A FLLP violation has occurred, however OT-104 specifically directs GP-13 entries to be evaluated AFTER power reduction is performed per step 3.5.1. In addition, GP-13 requires power reduction using <u>control rods only</u> until FLLP is less than 1.000.
	D	Part 1 is correct; Part 2 is incorrect. A FLLP violation has occurred, however the action in Part 2 is required by GP-13 ONLY IF unable to restore thermal limits or FLLP to less than 1.000 within 2 hours.

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

Source Documentation		
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank	
Reference(s):	OT-104 and Bases; GP-9-2; GP-13	
Learning Objective:	PLOT-PBIG-1540-4	
K/A System:	256000 – Reactor Condensate System	Importance: SRO 2.9
K/A Statement: A2.17 – Ability to (a) predict the impacts of the following on the Reactor Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Feedwater heater string trip.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

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

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

Which one of the following describes (1) the automatic plant response and (2) the correct procedural direction for this event?

- A. (1) The turbine and generator remain online; the reactor does NOT scram
(2) Perform applicable sections of SO 1B.2.A-2 "Main Turbine Generator Shutdown"
- B. (1) Generator lockout, turbine trip and reactor scram
(2) Enter T-100 "Scram"
- C. (1) Generator lockout and turbine trip ONLY
(2) Halt GP-2 "Startup"
- D. (1) Reactor scram ONLY
(2) Enter T-100 "Scram"

Answer Key		
Question # 92 SRO		
Choice		Basis or Justification
Correct:	C	If the PLU circuit (part of EHC logic) energizes, a generator lockout and turbine trip will occur. Since reactor power is < 29.5% RTP (turbine 1st stage pressure is < 138.4 psig), 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 operating at 25% power with the turbine-generator off-line. Per HU-AA-104-101, "Procedure Use and Adherence", steps 4.1.5 and 4.1.7, halting progress on the startup per GP-2 is required due to conditions changing which would necessitate re-evaluation of the procedure against the new plant conditions.
Distractors:	A	The PLU circuit will produce a generator lockout and turbine trip. Plausible if applicant does not understand PLU circuit function/design.
	B	The reactor does not automatically scram. The Recirc pumps will not trip either since house loads are not transferred to the unit auxiliary transformer until 210 A-2 is clear. Plausible if the applicant does not recognize the turbine trip auto scram is bypassed, believes the relay failure will cause the scram to occur anyway, or believes a scram will occur due to high reactor pressure or high neutron flux.
	D	PLU circuit actuation causes a rapid closure of turbine control and intercept valves, which is functionally like a turbine trip. Turbine control valve closure results in a reactor scram if power is above 29.5%, as measured by turbine 1 st stage pressure. In this case, the scram is bypassed as indicated by annunciator 210 A-2. Plausible if the applicant does not recognize the turbine trip auto scram is bypassed, believes the relay failure will cause the scram to occur anyway, or believes a scram will occur due to high reactor pressure or high neutron flux.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input type="checkbox"/> Modified Bank Item <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	ARC-206 B-1; GP-2; Tech Spec 3.3.1.1 Bases		
Learning Objective:	PLOT-5001B-6a		
K/A System:	241000 – Reactor/Turbine Pressure Regulating System	Importance:	SRO 3.8
K/A Statement: A2.17 – Ability to (a) predict the impacts of the following on the Reactor/Turbine Pressure Regulating System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Turbine trip.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

93. The following conditions exist on Unit 2:

- Reactor is shutdown
- Reactor level is -200 inches
- Reactor pressure is 100 psig
- RHR Loop 'A' is unavailable
- RHR Loop 'B' is injecting at 18,000 GPM
- Core Spray Loops 'A' and 'B' have failed to inject
- Drywell temperature is 300 degrees F
- Drywell pressure is 8 psig
- Torus pressure is 6 psig
- Torus level is 17 feet and steady
- Containment H₂ and O₂ concentrations require performing step DW/G-3 of T-102 "Primary Containment Control"

Containment Spray must ____ (1) ____ based on ____ (2) ____.

Portions of T-102 are PROVIDED ON THE NEXT TWO PAGES.

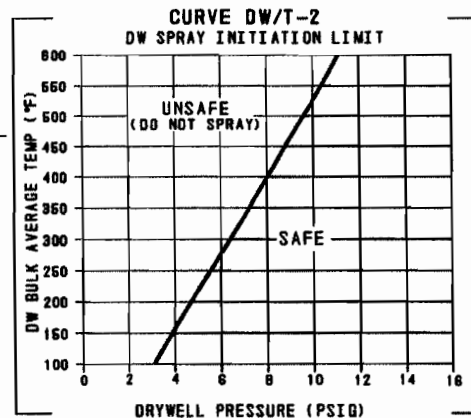
- A. (1) NOT be initiated
(2) lack of adequate core cooling
- B. (1) NOT be initiated
(2) Drywell Spray Initiation Limit curve
- C. (1) be initiated
(2) drywell temperature exceeding design limit
- D. (1) be initiated
(2) potential for loss of Primary Containment integrity

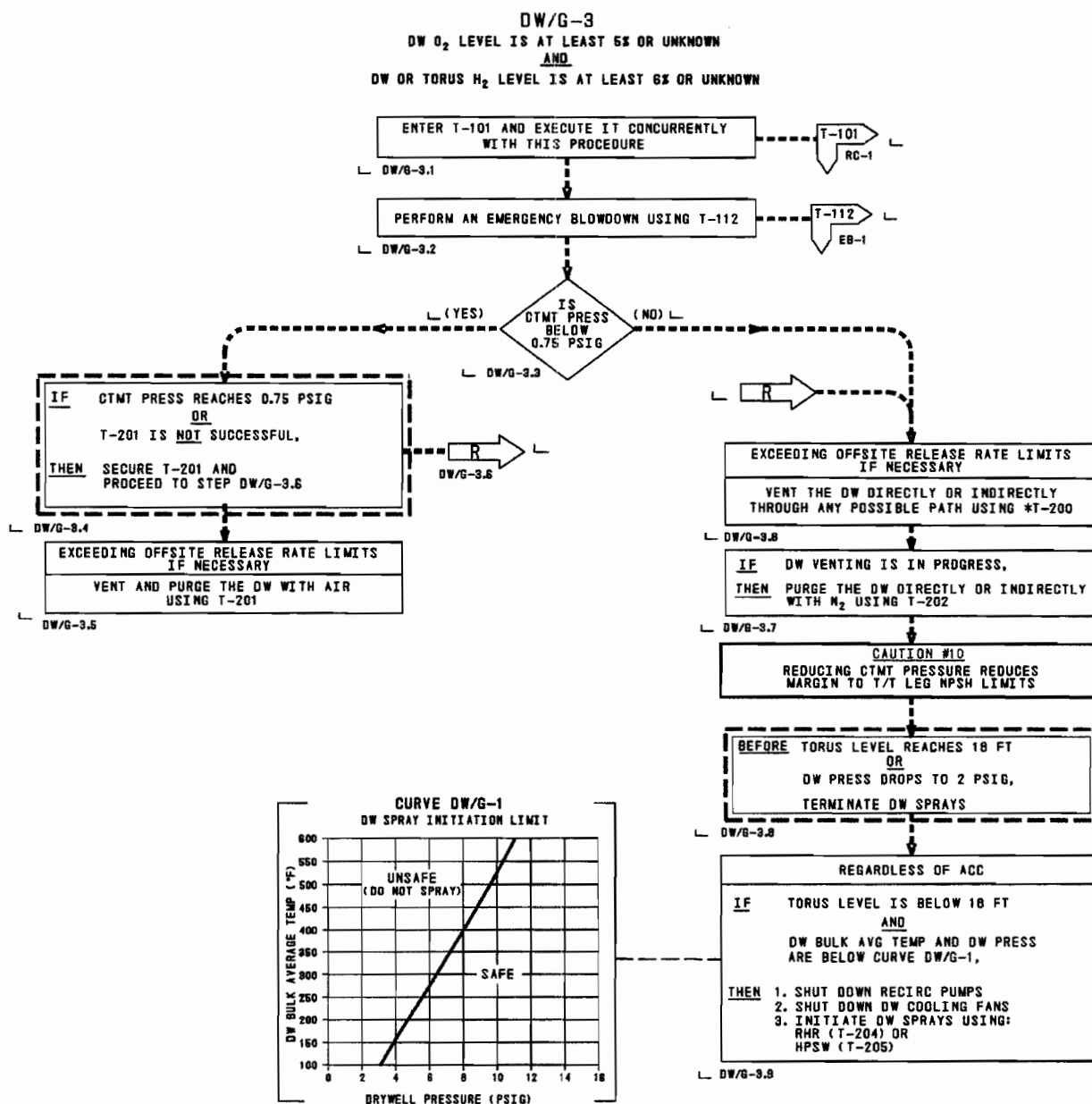
L DW/T-12

IF TORUS LEVEL IS BELOW 18 FT
AND
DW BULK AVG TEMP AND DW PRESS
ARE BELOW CURVE DW/T-2,
THEN BEFORE DW BULK AVG TEMP
REACHES 281° F:
1. SHUT DOWN RECIRC PUMPS
2. SHUT DOWN DW COOLING FANS
3. INITIATE DW SPRAYS USING:
RHR (T-204) OR
HPSW (T-205)
USE ONLY THOSE PUMPS NOT
CONTINUOUSLY REQUIRED TO ASSURE ACC

L DW/T-13

#27





Answer Key		
Question # 93 SRO		
Choice		Basis or Justification
Correct:	D	Based on the given conditions, and the guidance of T-102 Step DW/G-3.9, containment sprays are required regardless of ACC. Per T-102 Step DW/G-3.9 Bases, spraying the drywell is performed regardless of ACC because of the potential for deflagration, which could result in a loss of primary containment integrity leading, in turn, to a loss of core cooling capability.
Distractors:	A	Although T-102 Step DW/T-13 directs spraying only with those pumps not continuously required to assure ACC, and using the only available loop of RHR would jeopardize ACC, T-102 Step DW/G-3.9 directs spraying regardless of ACC.
	B	Drywell Spray Initiation Limit (DWSIL) curve is NOT exceeded. Plausible if applicant uses torus pressure to plot the DWSIL curve.
	C	Although drywell temperature has exceeded the design limit of 281 degrees F, this is not the reason containment spray is required since this guidance comes from the DW/T leg of T-102; the reason containment spray is required is based on the guidance in the DW/G leg of T-102.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	T-102		
Learning Objective:	PLOT-PBIG-2102-5a, -6		
K/A System:	226001 – RHR/LPCI: Containment Spray System Mode	Importance:	SRO 4.6
K/A Statement: G2.1.20 – Ability to interpret and execute procedure steps.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

94. Unit 2 is in day 2 of a refueling outage with the following conditions present:

- The Reactor is in Mode 4
- RHR Loop 'B' is in Shutdown Cooling
- C RHR PUMP ROOM FLOOD (224 C-5) is in alarm
- TORUS WATER LEVEL OUT OF NORMAL RANGE (226 A-4) is in alarm
- 'C' RHR Pump Room water level is reported to be 18 inches
- Torus level is 14.5 feet and lowering

What is the highest EAL classification, if any, for these conditions?

T-103 "Water Level-Alarm and Action Levels" table is PROVIDED ON THE NEXT PAGE. EP-AA-1007 Table PBAPS 3-1 "EAL Matrix" is PROVIDED SEPARATELY.

- A. Unusual Event per FU1
- B. Unusual Event per HU5
- C. Alert per HA5
- D. No EAL classification

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 # 94 SRO		
Choice		Basis or Justification
Correct:	C	The threshold value for HA5 is met since the 2C RHR pump room is a Table H3 area and water level (at 18 inches) is above the T-103 Action Level of 1 foot, 3 inches (15 inches).
Distracters:	A	This choice is based on the applicant believing a Torus leak indicates a loss or potential loss of the Primary Containment Barrier. However, none of the threshold values for FU1 apply to a Torus water leak. This includes "Emergency Director Judgment". In addition, FU1 only shows up on the EAL Hot Matrix and is therefore only applicable in Modes 1, 2 and 3. Plausible if the applicant makes some incorrect assumptions and applies the wrong (Hot) matrix for the given conditions.
	B	The applicant may consider the HU5 threshold value met based on the given conditions. However, a single operable loop of RHR (B in this case) meets the Tech Spec requirements for ECCS and Shutdown cooling in Mode 4. Therefore, flooding in the 2C RHR pump room does not meet HU5 criteria since 2C RHR is not needed for the current operating mode. In addition, HU5 is not the <u>highest</u> EAL classification.
	D	The criteria for HA5 are met. Plausible if applicant evaluates the T-103 Action Level table incorrectly (i.e., wrong pump room and/or wrong unit).

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	EP-AA-1007, Table PBAPS 3-1 and Table PBAPS 3-2		
Learning Objective:	G6-8		
K/A System:	G2.1 – Conduct of Operations	Importance:	SRO 4.2
K/A Statement:			
G2.1.25 – Ability to interpret reference materials, such as graphs, curves, tables, etc.			
REQUIRED MATERIALS:	EP-AA-1007 Table PBAPS 3-1 (EAL MATRIX)		
Notes and Comments:			

95. Both units are operating at 100% power.

A breach is being planned for the Cable Spreading Room Return Ducting that passes through the Control Room Envelope (CRE).

The breach size has been calculated to:

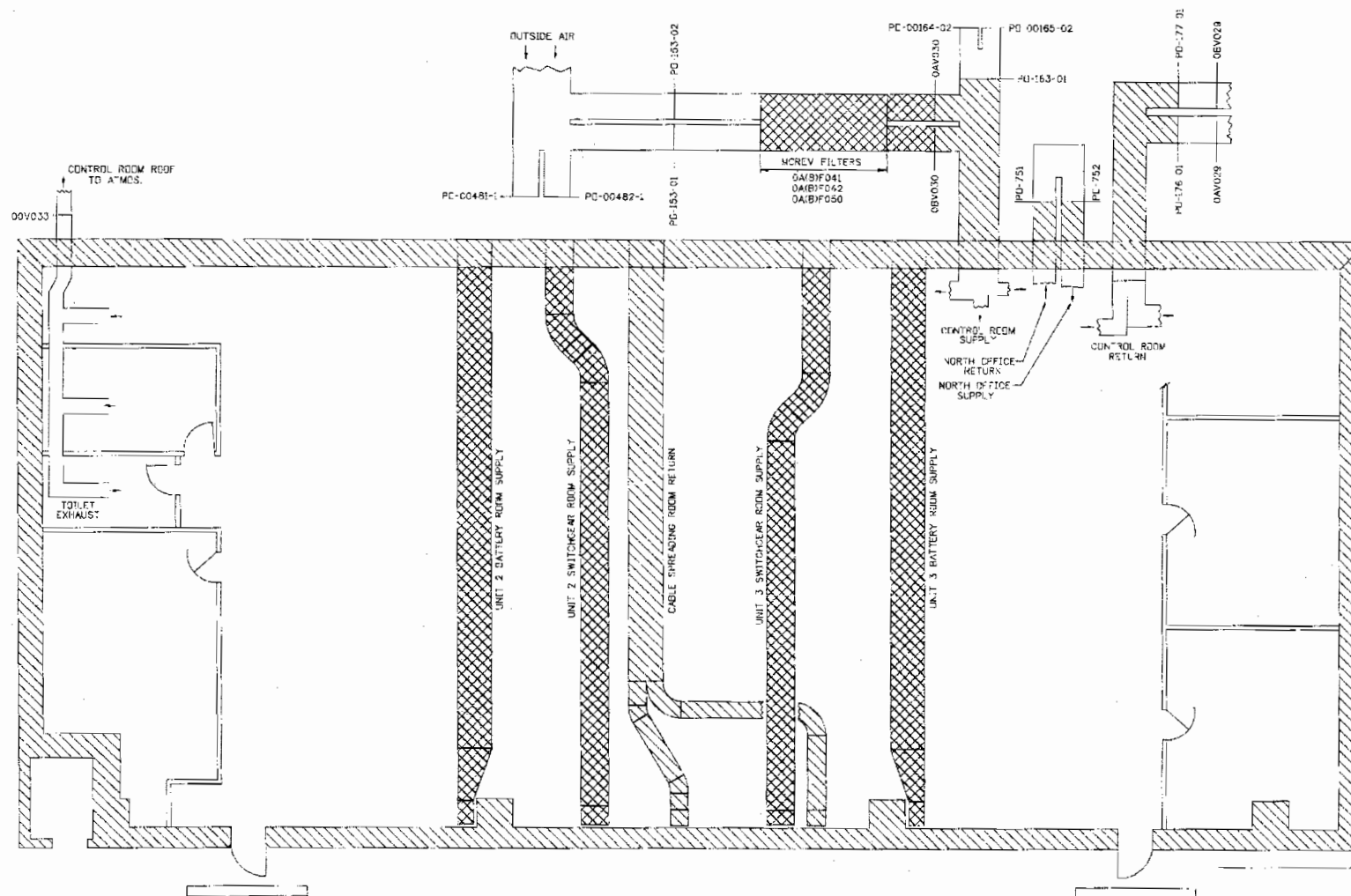
- be equivalent to 144 in² in the 12 inch thick wall
- result in an additional 400 cfm of leakage burden

This breach will result in __ (1) __ MCREV train becoming INOPERABLE, due to excessive ____ (2) ____.

These items are PROVIDED ON THE FOLLOWING PAGES:

1. CRE section of A-487
2. Current CRE Temporary Breach Log
3. CRE Boundary Operability discussion from GP-30

- A. (1) A
(2) out-leakage
- B. (1) A
(2) in-leakage
- C. (1) B
(2) out-leakage
- D. (1) B
(2) in-leakage



CONTROL ROOM ENVELOPE PLAN

CONTROL ROOM ENVELOPE INCLUDES - WALLS,
FLOOR & CEILING OF CONTROL ROOM

LEGEND:

- OUT-LEAKAGE BARRIER
- UNFILTERED IN-LEAKAGE BARRIER

PORTIONS OF THIS DRAWING
MAY NOT BE LEGIBLE AT
A REDUCED SIZE

From A-487

Page _____

ATTACHMENT A"A" MCREV TRAIN CONTROL ROOM ENVELOPE TEMPORARY BREACH LOG

Breach Number	(1) Breach Added DATE/TIME	(2) Breach Restored DATE/TIME	(3) CALCULATED INLEAKAGE (CFM)	(4) TOTAL INLEAKAGE (CFM)	TOTAL INLEAKAGE < 500 CFM Y or N?	(5) CALCULATED BREACH AREA (FT ²)	(6) TOTAL BREACH AREA (FT ²)	TOTAL BREACH AREA < 4.128 FT ² Y or N?
				450			2.122	

ATTACHMENT B"B" MCREV TRAIN CONTROL ROOM ENVELOPE TEMPORARY BREACH LOG

Breach Number	(1) Breach Added DATE/TIME	(2) Breach Restored DATE/TIME	(3) CALCULATED INLEAKAGE (CFM)	(4) TOTAL INLEAKAGE (CFM)	TOTAL INLEAKAGE < 500 CFM Y or N?	(5) CALCULATED BREACH AREA (FT ²)	(6) TOTAL BREACH AREA (FT ²)	TOTAL BREACH AREA < 4.128 FT ² Y or N?
				50			3.556	

From GP-30 CONTROL ROOM ENVELOPE BOUNDARY INTEGRITY

"The CRE boundary may become inoperable due to inleakage and/or outleakage that lowers the ability of the MCREV system to protect MCR personnel from radioactive material during an accident. Depending on the location of the leakage, one or both trains of MCREV may be affected. Generally, the CRE boundary can become inoperable due to any of the following:

- o Unfiltered inleakage above 500 cfm for either the "A" OR "B" train of MCREV. Work activities will be assigned a value for Calculated Inleakage . . . as shown on A-487, "Barrier Plans Elev 165-0". Work activities not affecting this equipment may have an assigned value of 0 (zero) for Calculated Inleakage.
- o Inability to maintain positive pressure within the CRE boundary due to a breach (i.e., a breach in the physical CRE boundary other than in the equipment described for unfiltered inleakage). . . The maximum breach area that will maintain positive pressure in 12" thick portions of the CRE boundary is calculated to be 4.128 ft². Breaches in the CRE boundary will be assigned a value for Calculated Breach Area. Work activities not affecting this equipment may have an assigned value of 0 (zero) for Calculated Breach Area."

Answer Key		
Question # 95 SRO		
Choice		Basis or Justification
Correct:	C	As indicated on A487, the Cable Spread Room Return ducting forms part of the OUT-LEAKAGE Barrier – the integrity of the OUT-LEAKAGE Barrier is required to ensure the ability to maintain a positive pressure in the MCR. Provided this barrier breach area is less than 4.128 sq ft, operability is maintained. If greater than this area, operability is NOT maintained, as discussed in the portion of GP-30 provided. The candidate must correctly identify the barrier on the A-487 print and then translate this correctly to the GP-30 table, and arrive at the conclusion that the "B" train OUT-LEAKAGE Barrier will be compromised.
Distracters:	A	Candidate may select this option if they do not correctly identify the boundary type or misapply the leakage type.
	B	Candidate may select this option if they do not correctly identify the boundary type or misapply the leakage type.
	D	Candidate may select this option if they do not correctly identify the boundary type or misapply the leakage type.

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

Source Documentation			
Source:	<input checked="" type="checkbox"/> New Exam Item <input type="checkbox"/> Previous NRC Exam: () <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input type="checkbox"/> ILT Exam Bank		
Reference(s):	GP-30; A-487		
Learning Objective:	PLOT-DBIG-1530-1, -2, 3		
K/A System:	G2.2 – Equipment Control	Importance:	SRO 4.3
K/A Statement: G2.2.15 – Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

96. While operating at power, OT-101 is entered due to rising drywell pressure with the following conditions:

- Drywell pressure is 0.7 psig and rising slowly
- Drywell temperature is 137 degrees F and rising slowly
- The drywell is being vented using SO 7B.3.A-2 "Containment Atmosphere Pressure Control and Nitrogen Makeup"
- Drywell radiation suddenly spikes to $2.5 \times 10^{-1} \mu\text{Ci/cc}$ and continues to rise

Based on the above conditions, what action must be taken and why?

- A. Re-align the vent path to the Torus to "scrub" the release.
- B. Terminate venting to ensure ODCM release limits are not exceeded.
- C. Perform a GP-15 "Local Evacuation" of the Radwaste Building.
- D. Direct Rad Protection to perform dose calculations from Main Stack data.

Answer Key		
Question # 96 SRO		
Choice		Basis or Justification
Correct:	B	Per OT-101 Bases, venting is required to be terminated to ensure the ODCM release limits are not exceeded.
Distractors:	A	This is not in accordance with the direction in OT-101, but may be confused with the guidance for venting in T-200.
	C	Evacuation of the Radwaste Building is not required for this venting operation. This would only be true for T-200 venting.
	D	Offsite dose calculations are not required since terminating the venting operation ensures ODCM (and Tech Spec) limits are not exceeded.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
MEMORY	3.5	3	10CFR55.43(b)(4)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2002) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	OT-101; SO 7B.3.A-2		
Learning Objective:	PLOT-1540-04		
K/A System:	G2.3 – Radiation Control	Importance:	SRO 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:			

97. The following conditions exist on Unit 2 following fuel failure with a Primary System breach in the Reactor Building:

- Reactor power is 40% and lowering
- Control rods are being inserted per GP-9-2 “Fast Reactor Power Reduction”
- 2 VENT EXH STACK RAD MONITOR HI-HI A (218 B-4) is in alarm
- 2 VENT EXH STACK RAD MONITOR HI-HI B (218 C-4) is in alarm
- Vent Stack radiation on RI-2979A(B) is $3.63 \text{ E}+04 \text{ } \mu\text{Ci/sec}$ and rising
- MAIN STACK RADIATION HIGH-HIGH (003 D-1) is in alarm
- Main Stack radiation on RI-050A(B) is $4.17 \text{ E}+07 \text{ } \mu\text{Ci/sec}$ and rising
- The Primary System breach has NOT been isolated

Which one of the following describes the actions required by T-104 “Radioactivity Release” for these conditions?

____(1)____ based on ____ (2) ____.

- A. (1) Manually scram and depressurize per T-101 “RPV Control”
(2) Main Stack effluent
- B. (1) Manually scram and depressurize per T-101 “RPV Control”
(2) Vent Stack effluent
- C. (1) Perform T-112 “Emergency Blowdown”
(2) Main Stack effluent
- D. (1) Perform T-112 “Emergency Blowdown”
(2) Vent Stack effluent

EP-AA-1007, Table R1

Table R1 -- Effluent Monitor Thresholds				
Release Path	General Emergency	Site Area Emergency	Alert	Unusual Event
Main Stack (RI-0-17-050A/B Common)	$5.57 \text{ E}+09 \text{ } \mu\text{Ci/sec}$	$5.57 \text{ E}+08 \text{ } \mu\text{Ci/sec}$	$6.36 \text{ E}+07 \text{ } \mu\text{Ci/sec}$	$6.36 \text{ E}+05 \text{ } \mu\text{Ci/sec}$
Vent Stack (RI-2979A/B Unit 2 or RI-3979A/B Unit 3)	$3.36 \text{ E}+08 \text{ } \mu\text{Ci/sec}$	$3.36 \text{ E}+07 \text{ } \mu\text{Ci/sec}$	$3.83 \text{ E}+06 \text{ } \mu\text{Ci/sec}$	$3.83 \text{ E}+04 \text{ } \mu\text{Ci/sec}$

Answer Key		
Question # 97 SRO		
Choice		Basis or Justification
Correct:	A	Main Stack effluent is approaching the Alert level; Vent Stack effluent is above the Unusual Event level but well below the Alert level. For these conditions, step RR-10 of T-104 requires a manual scram, T-101 entry, and depressurization per T-101.
Distracters:	B	Vent Stack effluent is below the Unusual Event level.
	C	Although the primary system breach has not been isolated, Main Stack effluent is well below the GE threshold. An emergency blowdown is not warranted for the given conditions.
	D	Although the primary system breach has not been isolated, Vent Stack effluent is well below the GE threshold. An emergency blowdown is not warranted for the given conditions.

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
HIGH			10CFR55.43(b)(4)

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2009) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	EP-AA-1007, Table PBAPS 3-1; T-104 and Bases	
Learning Objective:	PLOT-PBIG-2100-3	
K/A System:	G2.4 – Emergency Procedures / Plan	Importance: SRO 4.7
K/A Statement: G2.4.4 – Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:		

98. Equipment Operators need to enter a locked high radiation area to manually operate Primary Containment Isolation Valves in order to satisfy a Technical Specification required action. The highest dose rate in the area is 16,000 mR/hr (16 R/hr).

Per RP-PB-460-1001 "Radiation Protection Controlled Keys", which one of the following describes the type of Locked High Radiation Area and the highest level of authorization required for issuing the key?

	<u>Type of LHRA</u>	<u>Highest Authorization Required</u>
A.	Level 1	Radiation Protection Manager
B.	Level 1	Plant Manager
C.	Level 2	Radiation Protection Manager
D.	Level 2	Plant Manager

Answer Key		
Question # 98 SRO		
Choice		Basis or Justification
Correct:	C	Per RP-PB-460-1001, Level 2 LHRA is an area with dose rates > 15R/hr. The RP Manager must provide authorization for this entry.
Distracters:	A	The level is incorrect. The area is a Level 2 (>15R/hr), which requires authorization from the RP Manager for issuing the key.
	B	The level is incorrect, and the Plant Manager's authorization is NOT required. Plausible since the Plant Manager can authorize a key for access to a Very High Radiation Area (VHRA).
	D	While the level is correct, the RP Manager must provide authorization for this entry. Plausible since the Plant Manager can authorize a key for access to a Very High Radiation Area (VHRA).

Psychometrics			
Level of Knowledge	Difficulty	Time Allowance (minutes)	SRO
MEMORY			10CFR55.43(b)(4)

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2008) <input type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	RP-AA-460; RP-PB-460-1001		
Learning Objective:	PLOT-1770-3		
K/A System:	G2.3 – Radiation Control	Importance:	SRO 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:			

99. A small steam leak inside the Drywell occurred on Unit 2.

The reactor was depressurized in accordance with T-112 "Emergency Blowdown" due to being unable to restore and maintain drywell temperature below 281 degrees F.

The following conditions existed at the start of the blowdown:

- Indicated RPV level was -140 inches
- All high-pressure feed sources were unavailable

The following conditions exist at the completion of the blowdown:

- RPV pressure is 35 psig
- RPV level is -175 inches
- Drywell temperature is 295 degrees F (TI-2501 points 126 and 127)
- Multiple failures prevented LPCI and Core Spray systems from injecting

What action is required for these conditions?

Portions of T-102 "Primary Containment Control" AND T-112 "Emergency Blowdown" are PROVIDED ON THE NEXT TWO PAGES.

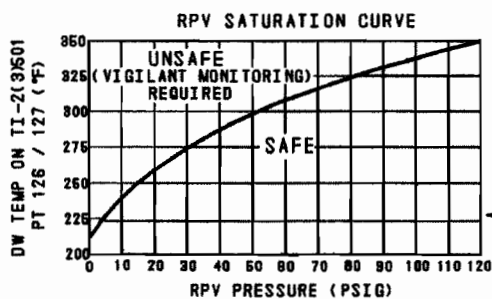
- A. Enter and execute T-116 "RPV Flooding".
- B. Establish Shutdown Cooling per T-112 "Emergency Blowdown".
- C. Restore RPV level above -172 inches per T-111 "Level Restoration".
- D. Restore RPV level to between +5 and +35 inches per T-101 "RPV Control".

T-102 "Primary Containment Control"

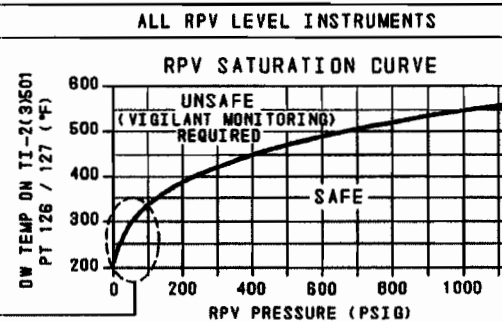
TABLE DW/T-1
RPV LEVEL INSTRUMENT STATUS

AN RPV LEVEL INSTRUMENT MAY BE USED TO DETERMINE RPV LEVEL
ONLY WHEN THE FOLLOWING CONDITIONS ARE SATISFIED:

NOTE: USE AVAILABLE POINTS (126 / 127 OF TI-2(3)501) TO DETERMINE RPV LEVEL INSTRUMENT STATUS



SEE DETAIL



IF DW TEMP AND RPV PRESS ARE ON THE UNSAFE SIDE OF
THE RPV SATURATION CURVE
AND AN INSTRUMENT EXHIBITS AN UNEXPLAINED TREND OR
OSCILLATION,
THEN THAT INSTRUMENT IS UNAVAILABLE

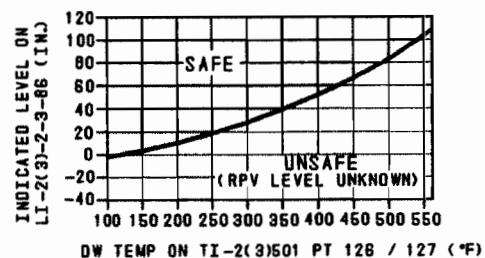
WIDE AND NARROW RANGE INSTRUMENTS ONLY

FOR EACH OF THE INSTRUMENTS IN THE TABLE, THE INSTRUMENT
READS ABOVE THE MIN INDICATED LEVEL OR THE TEMP NEAR
THE DW REFERENCE LEG VERTICAL RUNS (TI-2(3)501
PT 126 / 127) ARE BELOW THE MAX RUN TEMP.

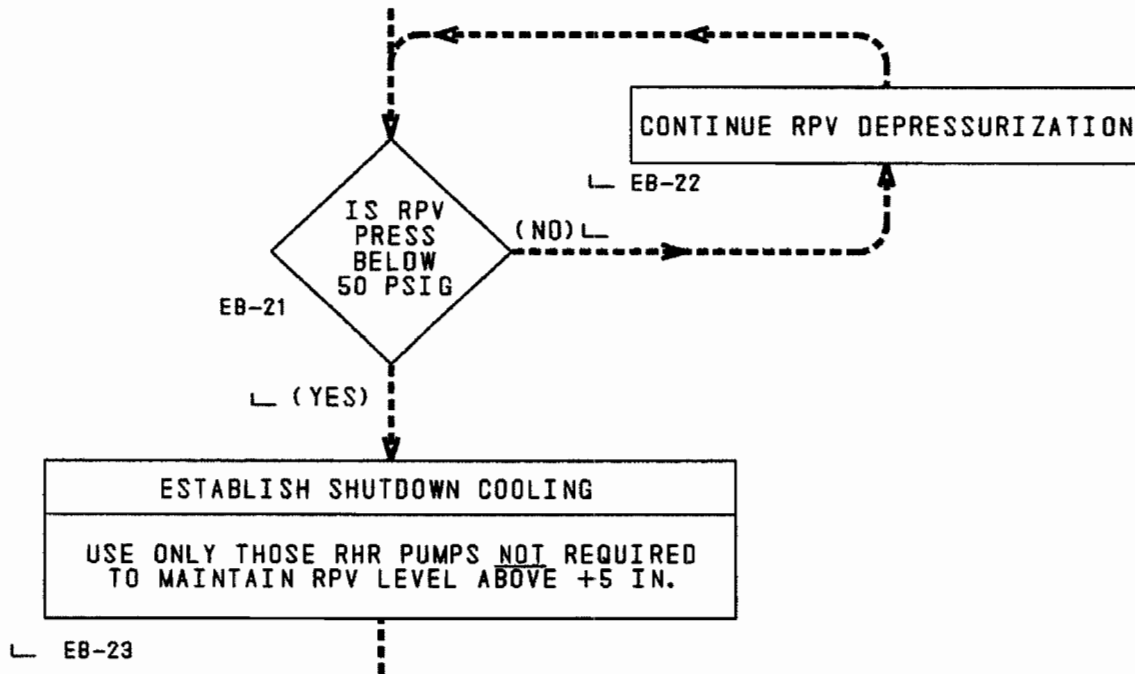
INSTRUMENT	MIN INDICATED LEVEL IS ABOVE	QR	MAX RUN TEMP IS BELOW
NARROW RANGE	10 IN.	<u>QR</u>	450°F
WIDE RANGE	-120 IN.	<u>QR</u>	500°F

SHUTDOWN RANGE INSTRUMENT LI-2(3)-2-3-86 ONLY

LI-2(3)-2-3-86 READS ON THE SAFE SIDE OF THE CURVE



T-112 "Emergency Blowdown"



Answer Key		
Question # 99 SRO		
Choice		Basis or Justification
Correct:	C	With RPV level at -175 inches, the only on-scale level indicators are Fuel Zone. Per T-102, Table DW/T-1, fuel zone level plots on the UNSAFE side of the RPV saturation curve. But since there are no unexplained trends or oscillations, level is NOT unknown. Level restoration per T-111 is required.
Distracters:	A	Level is not unknown. Plausible if applicant incorrectly applies Table DW/T-1 and/or believes the given conditions show an "unexplained trend".
	B	Level is known to be below the point at which T-111 "Level Restoration" actions are required. In addition, SDC cannot be established until RPV level is restored. Plausible based on the T-112 excerpt provided with question.
	D	Level is known to be below the point at which T-111 "Level Restoration" actions are required. Plausible if applicant does not recall the level control strategies of T-101 versus T-111; if level cannot be maintained above -172 inches (as is the case here), T-101 must be exited and entry into T-111 is required. Once level is restored above -172 inches, T-101 is reentered from T-111.

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

Source Documentation			
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2008) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank <input checked="" type="checkbox"/> ILT Exam Bank		
Reference(s):	T-101; T-102; T-112; T-116		
Learning Objective:	PLOT-1560-11		
K/A System:	G2.1 – Conduct of Operations	Importance:	SRO 4.3
K/A Statement: G2.1.45 – Ability to identify and interpret diverse indications to validate the response of another indicator.			
REQUIRED MATERIALS:		NONE	
Notes and Comments:			

100. Unit 2 pre-startup preparations are in progress in accordance with GP-2 “Normal Plant Startup”.

- The RWM is inoperable and bypassed in accordance with AO 62A.1-2 “Rod Worth Minimizer System Manual Bypass...”
- The conditions of Technical Specification 3.3.2.1 “Control Rod Block Instrumentation” are met

With the RWM inoperable, Technical Specification 3.3.2.1 requires verification that movement of control rods is in compliance with the analyzed rod position sequence.

To comply with Tech Spec 3.3.2.1 and AO 62A.1-2, this must be performed by a:

1. Licensed Operator
2. Reactor Engineer
3. Shift Manager

A. 1 ONLY

B. 2 ONLY

C. BOTH 1 and 2

D. BOTH 2 and 3

Answer Key		
Question # 100 SRO		
Choice		Basis or Justification
Correct:	A	With the RWM inoperable, Tech Spec 3.3.2.1 requires control rod movement to be verified in "compliance with the analyzed rod position sequence by a second licensed operator or other qualified member of the technical staff." Tech Spec 3.3.2.1 Bases further defines this as either a Reactor Operator or Senior Reactor Operator. Since there is no defined program to qualify members of the technical staff at Peach Bottom, a second licensed operator is the only correct choice.
Distractors:	B	Plausible since Tech Spec 3.3.2.1 requires a licensed operator or "other qualified member of the technical staff" and the applicant may believe a Reactor Engineer meets this requirement. However, per AO 62A.1-2, use of a qualified member of the station technical staff is not allowed since no program is in place to qualify individuals for this role.
	C	Plausible since Tech Spec 3.3.2.1 requires a licensed operator or "other qualified member of the technical staff" and the applicant may believe a Reactor Engineer meets this requirement. However, per AO 62A.1-2, use of a qualified member of the station technical staff is not allowed since no program is in place to qualify individuals for this role.
	D	Plausible since Tech Spec 3.3.2.1 requires a licensed operator or "other qualified member of the technical staff", and since GP-2 "Normal Plant Startup" previously required a 2 nd licensed operator and the Shift Manager to independently verify the control rod pattern matches the approved startup sequence instructions. Plausible since this could be construed to require a qualified member of the technical staff and the Shift Manager.

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

Source Documentation		
Source:	<input type="checkbox"/> New Exam Item <input checked="" type="checkbox"/> Previous NRC Exam: (PB 2009) <input checked="" type="checkbox"/> Modified Bank Item <input type="checkbox"/> Other Exam Bank: () <input checked="" type="checkbox"/> ILT Exam Bank	
Reference(s):	GP-2; AO 62A.1-2; Tech Spec 3.3.2.1 and Bases	
Learning Objective:	PLOT-5062A-9	
K/A System:	G2.2 – Equipment Control	Importance: SRO 4.4
K/A Statement: G2.2.1 – Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.		
REQUIRED MATERIALS:	NONE	
Notes and Comments:	NOTE: The procedural requirement for verification of the control rod sequence was different in the 2009 NRC Exam time frame—it used to require the Shift Manager to perform an ADDITIONAL verification.	

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98	A B C D E
99	A B C D E
100	A B C D E

IMPORTANT

USE NO. 2 PENCIL ONLY

- EXAMPLE: A B C D E
- MAKE **DARK** MARKS
- ERASE **COMPLETELY** TO CHANGE
- MAKE NO STRAY MARKS

KEY

STATION PB / LGS / TMI / OC
FORM

EXELON NUCLEAR
COURSE TITLE *key*
senior Reader Operator

key - 520 - key

NAME PRINT last first mi

SOCIAL SECURITY NUMBER

COMPANY / EXELON PAYROLL #

DATE

I HAVE REVIEWED AND UNDERSTAND THE CORRECTED QUIZ; ALL WORK ON THIS EXAMINATION IS MY OWN, I HAVE NEITHER GIVEN NOR RECEIVED ASSISTANCE

signature

RESCORE

KEY 100

SCORE

(T) (F)

VERIFY

RESCORE ☐ R ☐

(T) (F)

(T) (F)

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RESCORE

SCORE

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- EXAMPLE: $\llcorner A \llcorner B \llcorner C \llcorner D \llcorner E$
- MAKE **DARK** MARKS
- ERASE **COMPLETELY** TO CHANGE
- MAKE NO STRAY MARKS

STATION PB / LGS / TMI / OC

EXELON NUCLEAR
COURSE TITLE
FLT 09-1 REACTOR OPERATOR
STATION
FORM

EXELON NUCLEAR

COURSE TITLE

NAME _____

PRINT

SOCIAL SECURITY NUMBER

COMPANY / EXELON PAYROLL #

DATE _____

HAVE REVIEWED AND UNDERSTAND THE CORRECTED QUIZ; ALL WORK ON THIS EXAMINATION
S MY OWN, I HAVE NEITHER GIVEN NOR RECEIVED ASSISTANCE _____

signature