U.S. Nuclear Regulatory Commission

Site-Specific RO Written Examination

Applicant Information

Name:	
Date:	Facility / Unit: Oyster Creek
Region: I ☒ II ☐ III ☐ IV ☐	Reactor Type: W ☐ CE ☐ BW ☐ GE ☒
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination, you must achieve a final grade of at least 80.00 percent. Examination papers will be collected 6 hours after the examination begins.

Applicant Certification

All work on this examination is my own. I have neither given nor received aid.

____
Applicant's Signature

Results

Examination Value	________	Points
Applicant's Score	________	Points
Applicant's Grade	________	Percent

OC ILT 07-1 RO NRC Written Exam Required References

Question	**Reference To Be Provided**
1	Attachment 202.1-5
13	Large HCTL, PCPL, CSIL, BIIT, PSP and TLL curves (this represents all curves from PCC EOP)
31	EMG-SP4
33	Drawing 148F723 (**WITH Note 10 DELETED**)
68	Attachment 202.1-2
73	Attachment 203-2

ILT 07-1 NRC Exam - RO

KEY

Question	Answer	Question	Answer	Question	Answer
1.	C	26.	C	51.	D
2.	B	27.	A	52.	C
3.	D	28.	D	53.	C
4.	C	29.	C	54.	D
5.	B	30.	D	55.	C
6.	B	31.	B	56.	B
7.	B	32.	B	57.	A
8.	A	33.	B	58.	B
9.	D	34.	D	59.	D
10.	D	35.	A	60.	D
11.	D	36.	D	61.	A
12.	D	37.	B	62.	B
13.	A	38.	C	63.	A
14.	C	39.	B	64.	A
15.	D	40.	B	65.	B
16.	D	41.	C	66.	C
17.	B	42.	C	67.	B
18.	B	43.	C	68.	D
19.	D	44.	A	69.	B
20.	C	45.	A	70.	C
21.	D	46.	B	71.	B
22.	D	47.	C	72.	B
23.	C	48.	D	73.	C
24.	D	49.	B	74.	C
25.	A	50.	C	75.	B

Name: Key   Date: ______

Originated by N. Patron
Verified by S. Sewell

Question 1

The plant was at 80% power. Recirculation Pump A has just been shutdown and the following valves are closed:

- PUMP SUCTION
- DISCHARGE
- DISCH BYPASS

IAW procedure 202.1, Power Operation, which of the following limits is reduced due to the new operating loop configuration?

A. MCPR, as required by the fuel vendor.

B. FLLLP, as required by the USAR safety analysis.

C. MAPLHGR, as required by Technical Specifications.

D. MLHGR, as required by the Core Operating Limits Report.

Question # Answer	1 C	Question Developer Initials/Date: NTP 11/13/07

Knowledge and Ability Reference Information		RO	SRO
295001 AK3.05 Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: Reduced loop operating requirements	Importance Rating	3.2	3.6

Level	RO	Tier #	1	Group #	1

References	202.1	TS 3.3.F2.a.1	

Explanation:	The question stem shows the plant at > 25% power, with the primary containment inerted, and with one recirculation pump isolated. IAW procedure 202.1, in this configuration, only MAPLHGR must be reduced from the normal 5-loop operating configuration to a 4-loop configuration, with power > 25% and the primary containment interted. A reduction in MAPLHGR is required by Technical Specifications 3.3.F.2.a.1. Answer C is correct. All other distracters are plausible and incorrect.

References to be provided during exam:	202.1 attachment 202.1-5	

Learning Objective	2621.828.0.0038 202-10445 Given a set of system indications or data, evaluate and interpret then to determine limits, trends and system status.

Question Source	Bank		Modified Bank		New	X

Question Cognitive Level:	Memory or Fundamental Knowledge		Comprehension or Analysis	X 3:SPR

10 CFR Part 55 Content:	55.41	5	55.43		

Time to Complete: 1-2 minutes

Question 2

The plant had just been shutdown when a complete loss of offsite power occurred due to a fault on both 34.5 KV power lines.

Which of the following is correct regarding AC power supplies? (Assume **NO** operator actions unless stated)

A. Combustion Turbine #1 can be manually aligned directly to Bus 1A to provide power to Feedwater Pump 1A and Condensate Pump 1A.

B. Emergency Diesel Generator #1 will automatically start and load onto Bus 1C to provide power to Bus 1A2 to provide power to CRD Pump 1A.

C. When the fault has been cleared on Bank 5, breaker S1B will automatically close to provide power to Feedwater Pump 1B and Condensate Pump 1B.

D. Emergency Diesel Generator #2 will automatically start and load onto Bus 1D to provide power to Bus 1B2 to provide power to a Condensate Transfer Pump 1-2.

Question # Answer	2 B	Question Developer Initials/Date: NTP 11/14/07

Knowledge and Ability Reference Information		RO	SRO
295003 AK3.01 Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER: Manual and auto bus transfer	Importance Rating	3.3	3.5

Level	RO	Tier #	1	Group #	1

References	341	USAR 8.3.1.1.1	

Explanation:	The plant is shutdown with power supplied from the 34.5 KV startup transformers. The question stem then describes a loss of offsite power. 4160 Busses 1A, 1B, 1C and 1D will become de-energized. The 34.5 KV lines supply power to the station through startup transformers SA and SB. 34.5 KV Bank 5 supplies SA, and Bank 6 supplies SB. EDGs 1 and 2 will automatically start and load onto their respective busses due to the loss of voltage (EDG1 loads onto Bus 1C and EDG2 loads onto Bus 1D). EDG1 will power Bus 1C and Bus 1A2 will then receive power. CRD Pump 1A will then be powered. CRD can be used as an RPV high pressure injection source and it can also be used to insert control rods during ATWS conditions while at power. Answer B is correct. (condition: loss of AC power; reason: to automatically transfer to EDG1 to supply CRD Pump) Even with the EDGs operating, the combustion turbines (CT) remain available and can be procedurally started and aligned to supply power to the station through 4160 Bus 1B only. Feedwater and condensate pumps 1A are powered from Bus 1A. Thus, the CT cannot directly power Bus 1A. Answer A is incorrect. It is expected that when the fault is cleared on the startup transformer, that it can automatically close onto its respective bus. As stated earlier, Bank 5 supplies startup transformer SA (through breaker S1A) – not startup transformer SB (through breaker S1B). Feedwater/condensate Pumps are powered from Bus 1B. Answer C is incorrect. As stated earlier, EDG2 will automatically start and load onto Bus 1D which will supply power to Bus 1B2. The condensate transfer pumps, which are used to provide makeup capability to the isolation

	condenser shells, are powered from 1B32 – not 1B2. Bus 1B32 remains de-energized under the conditions presented in the question. Answer D is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0013 264-10444 Describe the interlock signals and setpoints for the affected system components and expected system response including power loss or failed components.

Question Source	**Bank**		**Modified Bank**		**New**	**X**

Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:B**	**Comprehension or Analysis**	

10 CFR Part 55 Content:	**55.41**	**5**	**55.43**		

Time to Complete: 1-2 minutes

Question 3

The plant was at rated power when an event occurred. Indications and investigations revealed the following:

- Battery Charger MG Set A Breaker has opened
- Battery A Main Breaker has opened

Which of the following states the proper function of a DC Distribution System Automatic Transfer Switch under the given conditions?

The power to 125 VDC Bus __(1)__ has automatically transferred to

125 VDC Bus __(2)__ .

	(1)	(2)
A.	DC-F	DC-C
B.	DC-1	DC-C
C.	DC-2	DC-B
D.	DC-E	DC-B

Question # Answer	3 D	Question Developer Initials/Date: NTP 11/14/07

Knowledge and Ability Reference Information		RO	SRO
295004 2.1.28 (Partial/complete loss of DC power) Knowledge of the purpose and function of major system components and controls.	Importance Rating	3.2	3.3

Level	RO	Tier #	1	Group #	1

References	D-3033 BR 3028	RAP-9XF4e	ABN-54

Explanation:	The question stem describes a loss of power to 125 VDC Bus DC-A (both the battery charger and battery become disconnected from the Bus). When this bus de-energizes, then automatic transfer switch DC-E swaps from DC-A as the source of input power to 125 VDC Bus DC-B. Answer D is correct. Bus DC-F normally receives power from Bus DC-C, which is not affected by the loss of DC-A. Answer A is incorrect. Bus DC-1 normally receives power from Bus DC-B, which is not affected by the loss of DC-A. Answer B is incorrect. Bus DC-2 normally receives power from Bus DC-C, which is not affected by the loss of DC-A. Answer D is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0012 01121 State potential consequences on plant operation, plant equipment, and environment due to failure of DC electrical system.

Question Source	Bank		Modified Bank	X	New	

Question Cognitive Level:	Memory or Fundamental Knowledge		Comprehension or Analysis	x 3:SPK

10 CFR Part 55 Content:	55.41	7	55.43		

Time to Complete: 1-2 minutes

Question 4

The plant was starting up after an outage. The Operator had just completed synchronizing the main generator to the grid and generator output indicated 130 MWe, when the following annunciator alarmed:

- GENERATOR – FIELD LOST

Which of the following actions is required?

A. Manually scram the reactor and enter ABN-1, Reactor Scram.

B. Manually trip the turbine and enter ABN-10, Turbine Generator Trip.

C. Verify RPV pressure stabilized below 1045 psig with the Turbine Bypass Valves.

D. Control RPV water level 138" – 175" with Condensate/Feedwater and CRD.

Question # Answer	4 C	Question Developer Initials/Date: NTP 11/15/07

Knowledge and Ability Reference Information		RO	SRO
295005 AA2.04 Ability to determine and/or interpret the following as they apply to MAIN TURBINE GENERATOR TRIP: Reactor Pressure	Importance Rating	3.7	3.8

Level	RO	Tier #	1	Group #	1

References	RAP-R3a	ABN-10	

Explanation:	The question stem describes a plant startup and completion of synchronizing the main generator to the grid with electrical output at 130 MWe (which approximates 20% electrical output). With grid synchronization complete, all turbine bypass valves are closed which means that reactor power is also approximately 20%. The loss of field alarm is a main generator trip that also provides a turbine trip. At 20% reactor power, the turbine trip reactor scram is bypassed. A subsequent action in ABN-10 directs that if reactor power was < 30%, then stabilize reactor pressure < 1045 with turbine bypass valves. Answer C is correct. IAW ABN-10, if reactor power was >30% on the turbine-generator trip, then a manual scram IAW ABN-1 is required. Answer A is incorrect. Since the turbine did automatically trip, there is no requirement to manually trip the turbine. Answer B is incorrect. Direction for RPV water level control in ABN-10 directs 155" – 165", not 138" – 175" as in RPV Control – No ATWS EOP. Also, there are no entry conditions into this EOP. Answer D is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0025 248-10445 Given a set of system indications or data, evaluate and interpret then to determine limits, trends, and system status

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X** **3:PEO**
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**			
Time to Complete: 1-2 minutes						

Question 5

Following an automatic scram from rated power, the Operator placed the REACTOR MODE SELECTOR switch in SHUTDOWN.

Which of the following indications, **ALONE**, allows the Reactor Operator to confirm that the reactor will remain shutdown under all conditions without boron?

A. All APRMs indicate < 2% power.

B. All control rods indicate position 04.

C. All LPRM amber lights on Panel 4F are LIT.

D. All control rods full-in **EXCEPT** 2 control rods at position 30.

Question # / Answer	5 B	Question Developer Initials/Date: NTP 11/15/07

Knowledge and Ability Reference Information		RO	SRO
295006 AK2.06 Knowledge of the interrelations between SCRAM and the following: Reactor power	Importance Rating	4.2	4.3

Level	RO	Tier #	1	Group #	1

References	2000-BAS-3200.02 (EOP Users Guide)		

Explanation:	IAW the EOP Users Guide, position 04 is the Maximum Subcritical Banked Withdrawal Position (MSBWP). If all control rods are inserted to at least position 04, the reactor will remain shutdown under all RPV water temperature, xenon, and boron conditions. Answer B is correct. If all APRMs indicate 1.5% (which is less than 2%), then the reactor is not shutdown presently. Answer A is incorrect. LPRM amber lights come on when the LPRMs are less than 2%. Similar to answer A, the reactor cannot be confirmed shutdown by these indications alone. Answer C is incorrect. IAW the reference, all control rods to 04 or beyond or all control rods at position 00 with any single control rod at any position, will ensure the reactor will remain shutdown under all conditions. With all rods full-in except 2 control rods at position 30, these conditions are not satisfied and the control room operator can not by himself guarantee the reactor will remain shutdown under all conditions without boron. The core engineer can be used to make this determination.

References to be provided during exam:	None	

Learning Objective	2621.845.0.0040 3053 Explain the basis for each step of the RPV Control – No ATWS entry conditions.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:B**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	55.41	7	55.43			
Time to Complete: 1-2 minutes						

Question 6

The plant was at rated power for 1 week following a refuel outage when an event occurred that required a manual scram. One hour later, the plant was cooling down with the Turbine Bypass Valves. Current plant conditions are as follows:

- RPV pressure is 600 psig and lowering
- RPV water level is in the normal band
- Primary Containment parameters are normal

An event then occurred which required a Control Room Evacuation (not due to a fire). The Operators were able to accomplish **ALL** Control Room Subsequent Operator Actions IAW ABN-30, Control Room Evacuation, **PRIOR** to leaving the Control Room. All required Shutdown Panels have been activated.

Which of the following indications at the Remote Shutdown Panel is correct?

A. RPV pressure indication will be rising since the MSIVS are closed.

B. RPV pressure indication will be lowering since Isolation Condenser B is in service.

C. RPV water level indication will be rising since the Feedwater/Condensate System is injecting.

D. Isolation Condenser shell water level indication will be lowering since Isolation Condenser A is in service.

Question # Answer	6 B	Question Developer Initials/Date: NTP 11/15/07

Knowledge and Ability Reference Information		RO	SRO
295016 AA2.03 Ability to determine and/or interpret the following as they apply to CONTROL ROOM ABANDONMENT: Reactor pressure	Importance Rating	4.3	4.4

Level	RO	Tier #	1	Group #	1

References	346	ABN-30	

Explanation:	The question describes the plant at rated power for 1 week after a refuel outage, when a manual scram was inserted. With this operating history, decay heat will be small. IAW ABN-30, the actions performed prior to evacuating the control room include the following: scram the reactor, trip all recirculation pumps, close the MSIVs, trip all feedwater pumps, trip the turbine, trip all condensate pumps, initiate isolation condenser B, and defeat the automatic initiation of isolation condenser A. Because there is very little decay heat, and since one isolation condenser can carry approximately 3% power at rated pressure, it is expected that RPV pressure will be lowering as indicated at the RSD from the operation of IC-B. Answer B is correct. Since RPV pressure will be lowering, answer A is incorrect. Answer B is incorrect since all feedwater and condensate pumps were manually tripped in the control prior to evacuating the control room. Answer D is incorrect since its auto start has been defeated by actions in the control room prior to evacuating.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0064 10446 Identify and explain system operating controls/indications under all plant operating conditions.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X 3:PEO**
10 CFR Part 55 Content:	55.41	5	55.43			
Time to Complete: 1-2 minutes						

Question 7

The plant was shutdown and cooled down. An outage activity requires that all main condenser waterboxes be drained and opened.

Which of the following states the required action **PRIOR** to waterbox draining and opening?

A. Lineup Fire Protection to cool the Station Air Compressors.

B. Align the Service Water System to the TBCCW heat exchangers.

C. Place an additional TBCCW heat exchanger in service IAW procedure.

D. Align the Emergency Service Water System to the RBCCW heat exchangers.

Question # Answer	7 B	Question Developer Initials/Date: NTP 11/17/07

Knowledge and Ability Reference Information		RO	SRO
295018 AA1.01 Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER: Backup systems	Importance Rating	3.3	3.4

Level	RO	Tier #	1	Level	RO

References	323	322	

Explanation:	In order to drain and open the condenser waterboxes, the circulating water system must first be secured, The circulating water system provides the normal cooling to the TBCCW heat exchangers. IAW procedure 323, it is first necessary to align service water to the TBCCW heat exchangers. Answer B is correct. IAW ABN-20, TBCCW Failure Response, line-up of fire protection to the station air compressors is performed when TBCCW cooling is impaired, and this action reduces the TBCCW load. It is not the correct action when removing circulating water from service. Answer A is incorrect. IAW ABN-20, TBCCW Failure Response, if TBCCW is impaired and TBCCW temperatures are rising, the procedure directs placing an additional TBCCW heat exchanger in service to supplement the cooling. It is not the correct action when removing circulating water from service. Answer C is incorrect. Emergency service water can be aligned to the service water system, but removal of the circulating water system has no effect on the service water system. Answer D is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0048 274-10450 Describe and interpret procedure sections and steps for plant emergency or off-normal conditions that involve this system including personnel allocation and equipment operation in accordance with plant procedures.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X** **2:DR**
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 8

The plant was at rated power when the following annunciators alarmed:

- TBCCW – DISCH PRESS LO
- TBCCW – SURGE TANK LVL HI/LO
- TURB BLDG SUMP LVLS – LUBE OIL BAY 1-1 LEVEL HI
- TURB BLDG SUMP LVLS – CONDENSATE BAY 1-2 LEVEL HI

The Operator reports TBCCW HX OUTLET PRESS indicates 15 psig and lowering and that the TBCCW Surge Tank indicates low and **CANNOT** be raised.

Which of the following states the required Subsequent Operator Actions IAW ABN-20, TBCCW Failure Response?

	First Action	Second Action
A.	Manually scram the reactor	Stop all recirculation pumps
B.	Manually scram the reactor	Manually trip the turbine
C.	Secure TBCCW Pumps	Manually scram the reactor
D.	Perform a rapid power reduction	Manually trip the turbine

Question # **Answer**	8 A	**Question Developer Initials/Date: NTP 11/16/07**

Knowledge and Ability Reference Information		**RO**	**SRO**
295018 2.1.23 (Partial/Complete loss of component cooling water) Ability to perform specific system and integrated plant procedures during different modes of plant operation.	**Importance Rating**	**3.9**	**4.0**

Level	**RO**	**Tier #**	**1**	**Group #**	**1**

References	ABN-20	RAP-M4a	

Explanation:	The question stem depicts a major leak in the TBCCW System: low system pressure resulting in auto start of the standby pump, an alarm of the TBCCW surge tank (hi or low), indications of flooding where TBCCW would be present, and a control room indication of lowering TBCCW pressure. Together, these describe a major leak in the TBCCW System. IAW ABN-20, TBCCW Failure Response, a 'major unisolable TBCCW leak' is defined by: 1) a leak exceeding the makeup capacity and 2) a leak which cannot be isolated quickly and 3) a leak that results in imminent loss of the TBCCW system due to loss of NPSH to the TBCCW pumps". Two of the three requirements are clear from what is given (1 and 3). The second can be inferred since the question provides no clues/indications that the leak can be isolated quickly. Also, since the system pressure is lowering, the problem has not been corrected. Therefore, there is a major unisolable TBCCW leak. IAW ABN-20, the first 2 subsequent operator actions while at power, are to scram the reactor and stop all recirculation pumps. Answer A is correct. There are no indications in the question stem that suggest that the turbine will not trip when the reactor is scrammed. Therefore, the turbine will trip when the reactor is scrammed. ABN-1, Reactor Scram, does not require a manual turbine trip following the scram. Answer B is plausible but incorrect. Because there are indications of flooding in the question stem, from apparently the TBCCW System, it is plausible to secure the pumps responsible for the flooding. Answer C is plausible but incorrect. Because the TBCCW system discharge pressure is low, cooling of TBCCW components has been reduced. To minimize the impact, performing a rapid power reduction would help to minimize the TBCCW cooling requirements. Tripping the turbine results in the

	greatest load reduction in TBCCW and is a plausible distractor. Answer D is incorrect.						
References to be provided during exam:	None						
Learning Objective	2621.828.0.0048 274-10450 Describe and interpret procedure sections and steps for plant emergency and off-normal conditions that involve this system including personnel allocation and equipment operation IAW plant procedures.						
Question Source	**Bank**		**Modified Bank**		**New**	**X**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **2:DR**			
10 CFR Part 55 Content:	**55.41**	**2**	**55.43**				
Time to Complete: 1-2 minutes							

Question 9

The plant was at rated power when a total loss of station air pressure occurred.

Which of the following valves has an established backup air system that can be manually connected?

A. CRD Flow Control Valves.

B. Main Feed Regulating Valves.

C. Drywell Vent and Purge Valves.

D. Isolation Condenser Makeup Valves.

Question # Answer	9 D	Question Developer Initials/Date: NTP 11/16/07

Knowledge and Ability Reference Information		RO	SRO
295019 AA1.01 Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR: Backup air supply	Importance Rating	3.5	3.3

Level	RO	Tier #	1	Group #	1

References	307		

Explanation:	The question describes the plant at rated power when all station air pressure is lost. IAW procedure 307, Isolation Condenser System, the Isolation Condenser makeup valves have an established method to supply an alternate/backup air supply. Answer D is correct. All other listed valves are air operated, which makes these distractors plausible, but do not have an alternate/backup air supply. Answers B-D are incorrect. CRD can be used for RPV injection and insertion of control rods. Feedwater can supply high pressure injection into the RPV. The Drywell vent and purge valves can be used to control Primary Containment parameters in the Primary Containment Control EOP. All systems directly provide major support to the RPV or primary containment. The KA is directly matched in that the question provides a loss of air and the question asks about a backup air supply.

References to be provided during exam:	None	

Learning Objective	02029 2621.828.0.0023 Describe the relationships between the Isolation Condenser System and the following: Instrument & Service Air System

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** 1:I	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 10

The plant is shutdown and a cooldown is in-progress with the Shutdown Cooling System. Current plant conditions are as follows:

- Shutdown Cooling Pump B and C are in service
- Shutdown Cooling Pump A is tagged out of service
- RPV water level is 182"
- RPV water temperature is 275 °F and lowering slowly
- All Recirculation Pumps are OFF

The following annunciators then alarmed:

- 1B2 MN BRKR TRIP
- 1B2 MN BRKR OL TRIP

Which of the following actions is required?

A. To control RPV pressure, open the EMRVs and use the Condensate System for makeup.

B. To control RPV pressure, open the EMRVs and use the Control Rod Drive System for makeup.

C. To control the RPV cooldown, raise Reactor Water Cleanup System flow in letdown mode and use the Core Spray System for makeup.

D. To control the RPV cooldown, raise Reactor Water Cleanup System flow in letdown mode and use the Condensate System for makeup.

Question # Answer	10 D	Question Developer Initials/Date: NTP 11/16/07

Knowledge and Ability Reference Information		RO	SRO
295021 AK3.04 Knowledge of the reasons for the following responses as they apply to LOSS OF SHUTDOWN COOLING: Maximizing reactor water cleanup flow	**Importance Rating**	3.3	3.4

Level	RO	Tier #	1	Group #	1

References	ABN-3	303	ABN-48 RAP-Q1c
Explanation:	The question stem describes an overload condition and loss of 480 VAC Bus 1B2, which causes a loss of power to both operating SDC pumps. IAW ABN-3, an acceptable method under the present plant conditions to maintain the cooldown is to initiate RWCU in the letdown mode with makeup through the condensate system. To maximize the cooldown rate through the cleanup system, then cleanup flow rate would need to me raised. Answer D is correct. The use of isolation condensers is not allowed due high RPV water level. Answer A is incorrect. The use of EMRVs is allowed but RPV makeup is by the core spray system – not CRD. Answer A and B are incorrect. Using cleanup system letdown can be done with either condensate or CRD – not core spray. Answer C is incorrect.		
References to be provided during exam:	None		
Learning Objective	2621.828.0.0045 205-10450 Describe and interpret procedure sections and steps for plant emergency and off-normal conditions that involve this system including personnel allocation and equipment operation IAW ABN, EOP & EOP Support Procedures, and EPIPs.		

Question Source	**Bank**		**Modified Bank**	**X**	**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X 3:SPK**		
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**			
Time to Complete: 1-2 minutes						

Question 11

The plant is shutdown for a refuel outage with fuel moves in progress on the refuel floor.

The refuel floor SRO has just notified the Control Room that a fuel bundle has dropped onto the top of the reactor core. The Control Room Operator reports the following radiation monitor readings:

- Radiation Monitor B9 indicates 75 mr/hr
- Radiation Monitor C10 indicates 80 mr/hr
- Reactor Building Ventilation Exhaust Radiation Monitor 1 indicates 20 mr/hr

Which of the following states the status of the RB Ventilation System **AND** the reason for this system status?

	RB Ventilation Status	Reason
A.	Trips and isolates **BUT** is manually restarted	To reduce refuel floor radiation levels as quickly as possible
B.	Trips and isolates **BUT** is manually restarted	To ensure the greatest amount of air dilution prior to discharge
C.	Trips and isolates **AND** remains isolated	The system is not designed for high temperature air
D.	Trips and isolates **AND** remains isolated	Ensure air is discharged through a filtration system

Question # Answer	**11 d**	**Question Developer Initials/Date: NTP 11/17/07**

Knowledge and Ability Reference Information						**RO**	**SRO**
295023 AK3.03 Knowledge of the reasons for the following responses as they apply to REFUELING ACCIDENTS: Ventilation isolation					**Importance Rating**	**3.3**	**3.6**
Level	**RO**	**Tier #**	**1**	**Group #**	**1**		
References	RAP-10F1f	USAR 6.5.1.1					

Explanation:	The question describes a refuel accident during refueling. The indications provide the following information: radiation monitor B9 is above its setpoint (50 mr/hr) and starts a 2-minute delay until the normal RB vent system isolates and SGTS starts; the RB vent radiation monitor is above its setpoint (9 mr/hr) to immediately isolate the normal RB vent system and start SGTS. Therefore, the normal RB vent system is isolated and SGTS has started to ensure the radioactive atmosphere is discharged through a filtration system. Answer D is correct. IAW the station procedures, if ONLY the refuel area radiation monitors B9 or C9 have isolated the normal RB vent system and SGTS initiated, then the EOP directs placing the normal RB vent system back in service. This makes distractors A and B plausible, but not correct and the correct answer less obvious. There is no procedural allowance to override the vent systems when the RB vent monitors cause a valid isolation. Because the radioactivity in the discharged air will be decaying, this decay results in a temperature increase and distractor C is plausible. The KA match is direct in that it matches a refuel accident with the reason for ventilation isolation. An override on the Secondary Containment Control EOP talks about operating RB vent under conditions similar, but not identical, to those in the question. Because the SRO will receive this EOP as a reference and the RO does not, this override will be deleted from the SRO reference. This has been annotated on the SRO Reference Summary.

References to be provided during exam:	None					
Learning Objective	2621.828.0.0042 261-10446 Identify and explain system operating controls/indications under all plant operating conditions.					
Question Source	**Bank**	**X**	**Modified Bank**		**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:F**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**			
Time to Complete: 1-2 minutes						

Question 12

The plant was at rated power when a LOCA occurred. The following conditions currently exist:

- Containment Spray Pump 51A is operating in the DW SPRAY mode
- Containment Spray Pump 51C is operating in the TORUS CLG mode
- Drywell pressure is 13 psig and lowering

The following annunciators then alarmed:

- S1A BRKR TRIP
- BUS 1A U/V

Which of the following states the response of the Containment Spray Pumps 51A and 51C?

	Containment Spray Pump 51A	Containment Spray Pump 51C
A.	Trips **AND** can be re-started immediately after AC power is restored	Trips **AND** can be re-started immediately after AC power is restored
B.	Trips **AND** will automatically restart after a time delay after AC power is restored	Remains running
C.	Remains running	Trips **AND** will automatically restart after AC power is restored
D.	Trips **AND** can be re-started after a time delay after AC power is restored	Remains running

Question # Answer	12 D	Question Developer Initials/Date: NTP 11/17/07

Knowledge and Ability Reference Information		RO	SRO
295024 EA1.17 Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE: Containment spray: Plant-Specific	**Importance Rating**	**3.9**	**3.9**

Level	RO	**Tier #**	1	**Group #**	1

References	237E901 sh 1	BR 3000 RAP-S1f	116B8328 sh. 11a

Explanation:	The question shows that containment spray pump 51A (powered from USS Bus 1A2, which is powered from 4160 VAC Bus 1C) is spraying the drywell, and that containment spray pump 51C (powered from USS Bus 1B2, which is powered from 4160 VAC Bus 1D) is cooling the torus. The alarm given describes a loss of the startup transformer (SA) to Bus 1A and onto Bus 1C (which powers bus 1A2). When this occurs, containment spray pump 51A will trip, and EDG1 will start and load onto bus 1C, which will automatically re-energize bus 1A2. But, there is a 200 second time delay after the EDG has loaded onto the bus to allow for sequenced loading. There is no auto start of the pumps, even if they were previously running when the startup power was lost. Therefore, containment spray pump 51A will trip, and can be manually re-started after a time delay after the bus power is restored. The loss of the startup transformer SA does not impact the running containment spray pump 51C, since it is still powered from the second startup transformer, SB. Therefore, it will remain running. Answer D is correct. All other answers, although plausible, are incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0009 State the pressure and temperature limits of the Primary Containment

	and the consequences of exceeding any of the limits.						
Question Source	**Bank**		**Modified Bank**		**New**	**X**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X 3:SPK**	
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**				
Time to Complete: 1-2 minutes							

Question 13

Which of the following conditions would opening of the EMRVs for RPV depressurization be **UNABLE** to prevent Primary Containment failure?

A. RPV pressure of 1050 psig
Torus temperature of 168 °F
Torus water level of 154"

B. RPV pressure of 700 psig
Torus temperature of 171 °F
Torus water level of 144"

C. Drywell temperature of 350 °F
Drywell pressure of 3 psig

D. Torus pressure of 30 psig
Primary Containment water level of 360"

Question # Answer	13 A	Question Developer Initials/Date: NTP 11/19/07

Knowledge and Ability Reference Information		RO	SRO
295025 EA2.04 Ability to determine and/or interpret the following as they apply to HIGH REACTOR PRESSURE: Suppression pool level	Importance Rating	3.9	3.9

Level	RO	Tier #	1	Group #	1

References	BAS-3200.02 (EOP Users Guide)		

Explanation:	IAW the reference, the heat capacity temperature limit (HCTL) is a function of RPV pressure, torus water temperature, and torus water level. It is the maximum torus water temperature at a given torus water level at which initiation of RPV depressurization will not result in exceeding the torus temperature at which the primary containment pressure limit is reached before the rate of energy transfer from the RPV is within the capacity of either a single 12" (or larger) containment vent or the hardened vent. In other words, the capacity of the containment to either absorb or pass the decay heat of the reactor without failing is measured in terms of torus temperature, RPV pressure, and torus level. The indications in answer A show that the HCTL is violated, and is the correct answer. Under the same torus water temperature, torus water level, but a lower RPV pressure, margin is gained to the HCTL curve. Under given conditions of torus level and temperature, lowering RPV pressure maintains/improves the margin to HCTL and thus to the potential loss of the primary containment failure. HCTL is not violated in answer B, which is an incorrect answer. The responses in answer C show conditions are on the bad side of the containment spray initiation curve, which is not related to RPV depressurization. Answer C is incorrect. The responses in answer D place the plant on the good side of the primary containment pressure limit (PCPL). PCPL is based only on the structural considerations which impact the integrity of the primary containment. RPV depressurization is not one of those considerations. Answer D is incorrect.

References to be provided during exam:	Large HCTL, PCPL, CSIL, BIIT, PSP, and TLL curves (all curves from PCC EOP)	

Learning Objective	2621.845.0.0043 3085 Given the HCTL curves, determine if the HCTL curve is being complied with, being exceeded, or about to be exceeded based upon existing conditions.

Question Source	**Bank**		**Modified Bank**		**New**	X

Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	X 3:SPR

10 CFR Part 55 Content:	55.41	5	55.43		

Time to Complete: 2-3 minutes

Question 14

The plant is at 3% power on a startup after a refuel outage. A pre-job brief is being conducted in preparation for performing Procedure 602.4.003, Electromatic Relief Valve Operability Test. Torus water temperature is currently 88 °F and Torus Cooling is not in service.

An open EMRV raises Torus water temperature by 2 °F/minute. Which of the following states how long the EMRVs can remain open during the surveillance test **UNTIL** a Technical Specification reactor scram requirement is **FIRST** met? (assume a constant heatup rate)

A. 3 ½ minutes

B. 8 ½ minutes

C. 11 minutes

D. 13 minutes

Question # Answer	14 C	Question Developer Initials/Date: NTP 11/19/07

Knowledge and Ability Reference Information						RO	SRO
295026 2.2.22 (Suppression Pool High Water Temperature) Knowledge of limiting conditions for operations and safety limits.					Importance Rating	3.4	4.1
Level	RO	Tier #	1	Group #	1		

References	TS 3.5		

Explanation:	TS 3.5.A.1.c(1) states that during normal power operation, the pool temperature limit is 95 °F. IAW TS 3.5.A.1.c(2): During testing which adds heat to the suppression pool, the water temperature shall not exceed 10 °F above the normal POWER OPERATION limit specified in (1) above, which is 95 °F. Thus the maximum allowed Torus water temperature during this test is 105 °F. TS 3.5.A.1.c(3) states that the reactor shall be scrammed from any power condition if the pool temperature reaches 110 °F. At 2 °F/minute for 11 minutes (= 22 °F), the pool temperature will reach 88 + 22 = 110 °F. Thus, after 11 minutes the scram requirement will be first met. Answer C is correct. Answer A places the torus water temperature at the normal power operation TS temperature limit of 95 °F. Answer B places the torus water temperature at the TS testing temperature limit of 105 °F. Answer D places the torus water temperature above the TS scram temperature limit of 110 °F but is past the time when the scram is first required as in answer B. All distractors are plausible since the values are TS values in some fashion.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0030 01032 Analyze Technical Specification requirements when given applicable sections.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X 3:SPR**
10 CFR Part 55 Content:	**55.41**	**10**	**55.43**			
Time to Complete: 1-2 minutes						

Question 15

A step in the Primary Containment Control EOP requires entry into the RPV Control – No ATWS EOP, prior to reaching 281 °F in the Drywell. What is the basis for this step?

A. This ensures that Drywell Sprays will be effective.

B. This will prevent RPV water level instrument inaccuracies.

C. This ensures the environmental qualification of the EMRVs is not exceeded.

D. This reduces the rate at which heat is transferred from the RPV to the Drywell.

Question # Answer	**15 D**	**Question Developer Initials/Date: NTP 11/19/07**

Knowledge and Ability Reference Information						**RO**	**SRO**
295028 EA2.01 Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE: Drywell temperature					**Importance Rating**	**4.0**	**4.1**
Level	**RO**	**Tier #**	**1**	**Group #**	**1**		
References		BAS-3200.02 (EOP Users Guide)					
Explanation:	IAW the reference, entry into RPV Control – No ATWS allows the Operator to reduce reactor pressure via normal means should Drywell sprays prove unsuccessful in terminating the drywell temperature increase. A reduction in RPV pressure lowers the saturation temperature in the RPV and reduces the rate at which heat is transferred from the reactor to the Drywell. Answer D is correct. Answers A, B, and C are incorrect.						
References to be provided during exam:	None						
Learning Objective	2621.845.0.0042 3000 Using procedure EMG-3200.02, evaluate the technical basis for each step in the procedure, and apply this evaluation to determine correct courses of action under emergency conditions.						

Question Source	**Bank**	**X**	**Modified Bank**		**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**X** **1:B**	**Comprehension or Analysis**		
10 CFR Part 55 Content:	**55.41**	**10**	**55.43**			
Time to Complete: 1-2 minutes						

Question 16

The EOP Users Guide lists several adverse effects of a lowering Torus water level with the reactor at power.

Which of the following is correct if Torus water level were 125" while at power?

A. Added stress to the EMRV downcomers when the EMRVs are opened for emergency depressurization.

B. The Torus will not be able to be vented due to the loss of the ability of the Torus vent valves to function.

C. The use of the EMRVs during an emergency depressurization will result in a direct pressurization of the Torus air space.

D. The Torus water temperature will heat up faster during an Emergency Depressurization and results in a lower heat capacity.

Question # Answer	16 D	Question Developer Initials/Date: NTP 11/19/07

Knowledge and Ability Reference Information		RO	SRO
295030 EK1.01 Knowledge of the operational implications of the following concepts as they apply to LOW SUPPRESSION POOL WATER LEVEL: Steam condensation	**Importance Rating**	3.8	4.1

Level	RO	Tier #	1	Group #	1

References	BS-3200.02 (EOP Users Guide)		

Explanation:	IAW the reference, there are several adverse effects of a lowering torus water level: 1) loss of core spray NPSH; 2) Vortex formation; 3) reduced capacity for condensing steam that is discharged in the torus; and, 4) uncovery of the drywell vent header downcomer (110") and EMRV discharge (90"). At a lower torus water level, there is less water volume to absorb steam energy during an ED. For a given amount of steam energy deposited in the Torus at a lower level, the water temperature will rise faster and the heat capacity goes down (heat capacity = $Q/\Delta T$). Answer D is correct. When torus water level is <90", then the EMRV quenchers are uncovered and the use of the EMRVs is prohibited. The use of the EMRVs at this torus water level will result in a direct pressurization of the torus air space. Answer C is incorrect. The inability to vent the torus can occur when torus water level is high – not low. Answer B is incorrect. The EOP Users Guide makes no mention of additional stresses to the EMRV quenchers on low torus water level. When torus water level is high, then there are added stresses to the EMRV downcomers when the EMRVs are opened. Answer A is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.845.0.042 3000 Using procedure EMG-3200.02, evaluate the technical basis for each step in the procedure, and apply this evaluation to determine correct

	courses of action under emergency conditions.					
Question Source	**Bank**		**Modified Bank**	**X**	**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:I**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**8**	**55.43**			
Time to Complete: 1-2 minutes						

Question 17

The plant was at rated power when an ATWS occurred.

The Unit Supervisor has directed that RPV injection be terminated and prevented, IAW Support Procedure 17, Termination and Prevention of Injection, and that RPV water level be lowered to 30".

Which of the following states the Core Spray Main Pump and Feedwater/Condensate Pump configuration **AFTER** implementation of Support Procedure 17, and the basis for lowering RPV water level?

	Pump Configuration	Basis for 30" RPV Water Level
A.	**All** Core Spray Main Pumps in **PTL** and **ALL** Feedwater/Condensate Pumps **OFF**	The lowered water level will lower reactor power from increased voids
B.	**All** Core Spray Main Pumps in **PTL** and **ALL** Feedwater/Condensate Pumps **OFF EXCEPT** one Condensate Pump **ON**	The lowered water level will reduce subcooling to minimize power oscillations
C.	**ALL** Core Spray Main Pumps in **PTL**; **All** Feedwater/Condensate Pumps **ON** with MFRVs **CLOSED**	The lowered water level will lower reactor power from increased voids
D.	**All** Core Spray Main Pumps **ON** with the Parallel Isolation Valves **CLOSED**; **All** Feedwater/Condensate Pumps **OFF**	The lowered water level will reduce subcooling to minimize power oscillations

Question # Answer	17 B	Question Developer Initials/Date: NTP 11/19/07

Knowledge and Ability Reference Information		RO	SRO
295031 EK1.03 Knowledge of the operational implications of the following concepts as they apply to REACTOR LOW WATER LEVEL: Water level effects on reactor power	Importance Rating	3.7	4.1

Level	RO	Tier #	1	Group #	1

References	EMG-SP17	BAS-3200.02 (EOP Users Guide)	

Explanation:	The question stem describes a high power ATWS (power > 2%) and the requirement to terminate/prevent injection and to lower RPV water level to 30" IAW the ATWS EOP. IAW SP17, all core spray main pumps are placed in pull-to-lock (PTL), and all feedwater/condensate pumps except one are secured. This one pump is required to supply the SJAE condensers to maintain main condenser vacuum. IAW the EOP Users Guide, RPV water level is lowered to minimize feedwater subcooling to prevent large power oscillations that could cause fuel damage. Answer B is correct. The other answers list the incorrect pump configuration or incorrect basis.

References to be provided during exam:	None	

Learning Objective	2621.845.0.0041 3055 Given a copy of RPV Control, describe in detail each step or conditional statement, including technical basis, and how to perform each step as required.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X 1:P**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**8**	**55.43**			
Time to Complete: 1-2 minutes						

Question 18

The plant was at rated power when an event occurred. Present plant conditions are as follows:

- The MSIVs indicate green lights ON
- Reactor power is 60%
- RPS GROUP SCRAM SOLENOIDS white lights are ON
- Both CRD Pumps are running

Which of the following states a method to shutdown the reactor IAW Support Procedure 21, Alternate Insertion of Control Rods?

A. Bypass the automatic reactor scram signals and then reset the scram and manually scram the reactor.

B. Confirm closed the CRD Charging Header Supply valve, V-15-52, and raise CRD cooling water differential pressure.

C. Confirm the REACTOR MODE SELECTOR switch is in SHUTDOWN and manually drive rods with the CRD System.

D. Confirm closed the CRD Cooling Water PCV, V-15-24, and then vent the Control Rod Drive under piston volume.

Question # Answer	18 B	Question Developer Initials/Date: NTP 11/20/07

Knowledge and Ability Reference Information		RO	SRO
295037 EK2.05 Knowledge of the interrelations between SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN and the following: CRD hydraulic system	**Importance Rating**	4.0	4.1

Level	RO	Tier #	1	Group #	1

References	EMG-SP21		

Explanation:	The reactor was at rated power when an event occurred. With the MSIVs indicating closed, the reactor must have scrammed. But with power at 60%, there must also be an ATWS. Since the RPS scram group solenoids are lit (these are lit when there is no scram condition present), then this is an electric ATWS. One method to insert control rods during an electric ATWS is to close the CRD charging header supply valve and to raise CRD cooling water ΔP. Answer B is correct. Bypassing the scram signals, resetting the scram and scramming again are actions for a hydraulic ATWS. Answer A is incorrect. Manually driving control rods is always an option, but the reactor mode selector switch is in refuel – not shutdown. Answer C is incorrect. Venting the CRD over piston volume is an option for an electric ATWS, but answer D calls for venting the under piston volume – not the over piston volume. Answer D is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0011 10450 Describe and interpret procedure sections and steps for plant emergency or off-normal conditions that involve this system including personnel allocation and equipment operation IAW applicable ABNs, EOP & EOP Support procedures and EPIPs.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X** **3:SPK**
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 19

An event has occurred which caused entry into EMG-3200.12, Radioactivity Release Control. This procedure includes the following Conditional Statement:

> **IF** the release is from the Turbine Building,
>
> **THEN** operate available Turbine Building ventilation per Support Procedure 51

Which of the following states the basis for this Conditional Statement?

A. To reduce the amount of radioactivity released.

B. To ensure a greater dilution factor during release.

C. To ensure the release is **ONLY** through an elevated release.

D. To ensure **BOTH** ground and elevated releases are monitored.

Question # Answer	19 D	Question Developer Initials/Date: NTP 11/20/07

Knowledge and Ability Reference Information		RO	SRO
295038 EK2.03 Knowledge of the interrelations between HIGH OFF-SITE RELEASE RATE and the following: Plant ventilation systems	Importance Rating	3.6	3.8

Level	RO	Tier #	1	Group #	1

References	EMG-3200.03 (EOP Users Guide)	EMG-3200.12	ENG-SP51

Explanation:	The EOP for radioactivity release control is entered when an alert emergency classification from offsite release rate has been declared. From the EOP User's Guide: "This Conditional Statement directs the operator to maintain the Turbine Building Ventilation System in service to preserve Turbine Building accessibility, and ensure that any radioactivity is discharged through a monitored release point, either the Main Stack for an elevated release, or via the Turbine Building Stack, which is considered a ground level release. When required, Support Procedure - 51 provides the necessary directions for restarting the Turbine Building Ventilation System." Some of the TB vent systems started discharge to the main stack (elevated release; ie., Exhaust Fan EF 1-7) and some to the TB stack (ground release; ie., exhaust fan EF 1-1). Therefore, answer D is correct. All other distracters are plausible but incorrect.

References to be provided during exam:	None	

Learning Objective	2621.845.0.0012 2483 Using procedure EMG-3200.12, evaluate the technical basis for each step and apply this evaluation to determine the correct course of action under emergency conditions.

Question Source	**Bank**	**X**	**Modified Bank**		**New**	

Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:B**	**Comprehension or Analysis**	

10 CFR Part 55 Content:	**55.41**	7	**55.43**		

Time to Complete: 1-2 minutes

Question 20

An electrical fire started inside the 4160 Volt Switchgear C and D Vault. Which of the following states the fire suppression system and initiation method designed to suppress this fire?

	Suppression System	**Initiation Method**
A.	Halon 1301	Manual
B.	Dry pipe sprinkler	Automatic
C.	Low pressure CO_2	Manual
D.	High pressure CO_2	Automatic

Question # **Answer**	**20 C**	**Question Developer Initials/Date: NTP 11/20/07**

Knowledge and Ability Reference Information		**RO**	**SRO**
600000 AA1.08 Ability to operate and / or monitor the following as they apply to PLANT FIRE ON SITE: Fire fighting equipment used on each class of fire	**Importance Rating**	**2.6**	**2.9**

Level	**RO**	**Tier #**	**1**	**Group #**	**1**

References	333.1	ABN-29	

Explanation:	The low pressure CO2 system protects the 4160 Volt switchgear vault and is manually initiated. Answer C is correct and all other answers are plausible but incorrect. Halon protects 480 volt switchgear rooms A and B. Drypipe systems protects the 4160 A and B vaults. High pressure CO2 protects the turbine generator exciter.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0019 286-10446 identify and explain system operating controls/indications under all plant operating conditions.

Question Source	**Bank**		**Modified Bank**		**New**	**X**

Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:F**	**Comprehension or Analysis**	

10 CFR Part 55 Content:	**55.41**	**10**	**55.43**		

Time to Complete: 1-2 minutes

Question 21

The plant is starting up after an outage. The following conditions currently exist:

- All IRMs are mid-range on Range 8
- Turbine warming is in-progress with **ALL** Turbine Stop Valves open

The Operator reports the following:

- Annunciator COND VAC LO 25 INCHES alarms
- CONDENSER VACUUM 1A, 1B and 1C indicate 24" HG and are lowering at a rate of ½ "HG/minute
- RPV pressure is 590 psig and is rising at a rate of 4 psig/minute

Assume the rates above remain constant and the **ONLY** Operator action is to range the IRMs, if required.

The reactor will scram from which of the following scram signals?

A. The turbine trip in 3 minutes.

B. The turbine trip in 4 minutes.

C. Low condenser vacuum in 3 minutes.

D. Low condenser vacuum in 4 minutes.

Question # Answer	21 D	Question Developer Initials/Date: NTP 11/21/07

Knowledge and Ability Reference Information		RO	SRO
295002 AA2.02 Ability to determine and/or interpret the following as they apply to LOSS OF MAIN CONDENSER VACUUM: Reactor power	**Importance Rating**	3.2	3.3

Level	RO	Tier #	1	Group #	2

References	RAP-J1b	RAP-Q1c	ABN-10

Explanation:	The question stem shows that the reactor is starting up (with the mode switch in STARTUP) with RPV pressure < 600 psig. At this low pressure, the main condenser low vacuum scram signal and the turbine stop valve closure scram signal are bypassed. The low vacuum scram setpoint is 22" hg. In 3 minutes, condenser vacuum be still be above 22", but RPV pressure will be 602 psig and the low vacuum scram is no longer bypassed. In 4 minutes, condenser vacuum drops to 22" hg, the scram and turbine trip setpoint. In this same 4 minutes, RPV pressure has risen to 606 psig. At this pressure, the low vacuum signal is no longer bypassed and the reactor will scram from a low vacuum scram signal. Answer D is correct.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0051 249-10445 Given a set of system indications or data, evaluate and interpret them to determine limits, trends and system status.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X** **2:DR**
10 CFR Part 55 Content:	**55.41**	**10**	**55.43**			
Time to Complete: 1-2 minutes						

Question 22

The plant was at rated power, with the following abnormal lineup:

- Isolation Condenser A DC Condensate Return Valve V-14-34 switch is in the CLOSE position

A turbine trip then occurred. The following indication was noted for 3 seconds:

- EMRV 108A indicated in the VALVE OPEN REGION

Which of the following states the expected indications of the Isolation Condenser System and the reason for this indication?

	Expected IC Indications	Reason
A.	ISOL CONDENSER A LEVEL **AND** ISOL COND B LEVEL begin to lower.	**BOTH** Isolation Condensers have automatically initiated.
B.	ISOL COND A STEAM INLET temperature **AND** ISOL COND B STEAM INLET temperature remain at their initial value.	**NEITHER** Isolation Condenser has automatically initiated.
C.	ISOL CONDENSER A PRESS remains at its initial value and **ONLY** ISOL CONDENSER B PRESS begins to lower.	**BOTH** Isolation Condensers have automatically initiated, **BUT** Isolation Condenser A has automatically isolated.
D.	ISOL COND A STEAM INLET temperature remains at its initial value and **ONLY** ISOL COND B STEAM INLET temperature begin to rise.	Isolation Condenser B has automatically initiated **AND** Isolation Condenser A initiation is defeated.

Question # Answer	22 D	Question Developer Initials/Date: NTP 11/21/07

Knowledge and Ability Reference Information		RO	SRO
295007 AK3.01 Knowledge of the reasons for the following responses as they apply to HIGH REACTOR PRESSURE: Isolation condenser operation	**Importance Rating**	4.0	4.2

Level	RO	Tier #		Group #	

References	307 RAP-C1a	420	RAP-C5a

Explanation:	The question shows the plant at rated power with the isolation condenser A DC condensate return valve switch in the closed position. This valve is normally closed with the switch in the auto position. With this switch in the closed position, IC A will not auto initiate. With this lineup, an event occurs which results in EMRV NR108A opening for 3 seconds (due to a high RPV pressure). The pressure setpoint is above the setpoint for auto IC initiation for longer than the IC time delay (3 seconds EMRV and 1.5 second TD for IC initiation). Therefore, a condition existed where the ICs should have auto initiated. But since IC A is defeated, only IC B will initiate. When only the IC B initiates, the steam inlet temperatures rise but remain the same for IC A. Answer D is correct. Answer A is incorrect since this is the expected response if both ICs initiated. Since IC B auto initiated, answer B is incorrect. Regardless of which IC initiated, (but not isolated), the IC pressure will follow RPV pressure as it lowers. Answer C is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0023 02030 Describe the isolation condenser features and/or interlocks which provide the following: 1) automatic system initiation; 2) automatic system isolation.

Question Source	**Bank**		**Modified Bank**		**New**	**X**

Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **2:DR**

10 CFR Part 55 Content:	55.41	5	55.43		

Time to Complete: 1-2 minutes

Question 23

The plant was at rated power when an event occurred. Present plant conditions are as follows:

- All control rods indicate green backlight **EXCEPT** 6 control rods which indicates position 04
- Drywell pressure indicates 3.3 psig
- RPV water level is 144" and rising
- The following annunciators are in alarm:
  - o S1A BRKR OL TRIP/BRKR PERM OPN
  - o S1B BRKR OL TRIP/BRKR PERM OPN
- Reactor Building ΔP indicates -0.1"

Which of the following states the Abnormal Procedures (ABNs) and EOPs that should be implemented under the given conditions? (Other than ABN-1, Reactor Scram)

A. RPV Control – No ATWS EOP
ABN-37, Station Blackout
Secondary Containment Control EOP

B. RPV Control – With ATWS EOP
ABN-36, Loss of Offsite Power
Primary Containment Control EOP

C. RPV Control – No ATWS EOP
ABN-36, Loss of Offsite Power
Primary Containment Control EOP

D. RPV Control – No ATWS EOP
ABN-37, Station Blackout
Primary Containment Control EOP

Question # **Answer**	**23 C**	**Question Developer Initials/Date: NTP 11/21/07**

Knowledge and Ability Reference Information		**RO**	**SRO**
295010 2.4.4 (High drywell pressure) Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	**Importance Rating**	**4.0**	**4.3**

Level	**RO**	**Tier #**	**1**	**Group #**	**2**

References	EMG-3200.01A	EMG-3200.02	ABN-36

Explanation:	The question stem shows that the reactor is shutdown by control rods, and that drywell pressure is above the entry condition for Primary Containment Control EOP and RPV Control – No ATWS. It also shows that the startup transformers have been lost (by annunciation). With the loss of only the startup transformers (with the turbine off-line), ABN-36 entry and implementation is required. The RB ΔP is below the entry into the Secondary Containment Control EOP. Answer C is correct.

References to be provided during exam:	None	

Learning Objective	2621.845.0.0042 3025 Given key plant parameters, determine if entry conditions for the EOPs have been met. 2621.845.0.0040 3052 State plant conditions requiring entry into RPV Control – No ATWS.

Question Source	**Bank**		**Modified Bank**	**X**	**New**	

Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:P**	**Comprehension or Analysis**	

10 CFR Part 55 Content:	**55.41**	**10**	**55.43**		

Time to Complete: 1-2 minutes

Question 24

The plant was at rated power when the Offgas Radiation Monitor readings rose slightly, and a small increase in the Stack RAGEMS was also observed. Chemistry has confirmed that a very small, but greater than normal, amount of fission products are present in the reactor coolant. Both Offgas Radiation Monitors and Stack RAGEMS readings are now currently trending down very slowly.

An explosion in the Offgas System then occurred. The following conditions are noted:

- OFFGAS ISOL ACT I **AND** OFFGAS ISOL ACT II annunciators in alarm
- CONDENSER OFF GAS AIR EXTRACTION VALVES V-7-1 through V-7-6 indicate closed

If another similarly sized fuel failure were to occur now, under the plant conditions above, which of the following states the expected response of the Offgas Radiation Monitors and Stack RAGEMS? (**NEGLECT** any impact from the Steam Seal Exhauster Blower)

	Offgas Radiation Monitors	Stack RAGEMS
A.	Rise	Continue to Lower
B.	Continue to Lower	Rise
C.	Rise	Rise
D.	Continue to Lower	Continue to Lower

Question # Answer	24 D	Question Developer Initials/Date: NTP 11/24/07

Knowledge and Ability Reference Information		RO	SRO
295017 AA1.07 Ability to operate and/or monitor the following as they apply to HIGH OFF-SITE RELEASE RATE: Process radiation monitoring system	**Importance Rating**	3.4	3.6

Level	RO	Tier #	1	Group #	2

References	BR 2008, 2009 sh 2	RAP-10F1a	

Explanation:	The question stem shows that slight fuel failures have resulted in an increase in the offgas radiation monitors and the stack radiation monitoring system (RAGEMS). The radiation monitors are currently lowering. Offgas discharges to the stack, after being processed in the offgas system. The alarms provided in the stem describe an event which resulted in either high pressure or high temperature in the offgas system (in both sensor channels I and II), and this has resulted in an offgas system isolation from the main condenser, and offgas system flow goes to 0. With the offgas system isolated from the condenser, the offgas radiation monitors will not detect further fuel failures and the offgas radiation monitors will continue to lower. Likewise, since there is no further offgas flow to the stack, the stack RAGEMS will also continue to lower. Answer D is correct.

References to be provided during exam:	None	

Learning Objective	2621.828.0.033A 273-10435 Given plant operating conditions, describe or explain the purpose/function of the system and its components.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X 3:SPK**
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 25

Consider the following two plant conditions:

1. **Condition 1**: The plant is at 800 psig during a startup
2. **Condition 2**: The plant is at rated power

Which of the following is correct regarding a reactor scram from the **SUSTAINED** loss of both CRD Pumps?

	Condition	Action A reactor scram is required **IMMEDIATELY** due to the ...
A.	1	**LOWER** RPV pressure.
B.	2	**HIGHER** RPV pressure.
C.	1	**REDUCED** control rod worth.
D.	2	**FASTER** CRD seal degradation.

Question # Answer	25 A	Question Developer Initials/Date: NTP 11/24/07

<table>
<tr><th colspan="2">Knowledge and Ability Reference Information</th><th>RO</th><th>SRO</th></tr>
<tr><td>295022 AK1.02
Knowledge of the operational implications of the following concepts as they apply to LOSS OF CRD PUMPS: Reactivity control</td><td>Importance Rating</td><td>3.6</td><td>3.7</td></tr>
</table>

Level	RO	Tier #		Group #	2

References	RAP-H1c		

Explanation:	With the sustained loss of both CRD pumps, charging water has also been lost to the CRD accumulators. On a scram, the accumulators provide the initial force to insert the control rods. As the accumulator pressure decays away, the HCU check valve will re-position to allow RPV pressure to provide the force to complete the insertion of the control rods. When the charging supply is lost at lower RPV pressures, the driving force from the RPV has been reduced, and this can impact control rod scram times. The RAP requires a scram if charging water cannot be immediately restored, with RPV pressure < 850 psig. Answer A is correct. At rated power (or any pressure > 850 psig), the scram can be delayed until 2 accumulator alarms are received. Answer B is incorrect. Rod worth and seal failures are not the correct reason. Answers C and D are incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0011 10444 State the function and interpretation of system alarms, alone and in combination, as applicable, in accordance with the system RAPs.

Question Source	**Bank**	**X**	**Modified Bank**		**New**		
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X** **2:DR**	
10 CFR Part 55 Content:	**55.41**	**8**	**55.43**				
Time to Complete: 1-2 minutes							

Question 26

The plant is shutdown for a refuel outage in mid-July. The following conditions currently exist:

- Fuel shuffling is underway
- SGTS Fan 2 is out of service

An event occurred on the refuel floor that resulted in the following radiation monitoring annunciators alarming:

- AREA MON HI
- NORTH WALL C10 HIGH
- OPER FLOOR B9 HI VENT TRIP
- RX BLDG – VENT HI

Which of the following states the plant impact of these conditions?

A. Turbine Building ΔP will immediately begin to lower.

B. Refuel floor radiation levels will begin to lower in two minutes.

C. Reactor Building general area temperatures will begin to rise.

D. Total air flow through the Main Stack has dropped to 2600 SCFM.

Question # Answer	26 C	Question Developer Initials/Date: NTP 11/24/07

Knowledge and Ability Reference Information		RO	SRO
295034 EK1.02 Knowledge of the operational implications of the following concepts as they apply to SECONDARY CONTAINMENT VENTILATION HIGH RADIATION: Radiation releases	**Importance Rating**	4.1	4.4

Level	RO	Tier #	1	Group #	2

References	RAP-10F1f	BR 2011	

Explanation:	The question stem describes an event on the refuel floor that has initiated an immediate signal to start SGTS and trip RB normal ventilation, and a signal to perform these same functions after a 2-minute time delay. Thus, SGTS has immediately started and the normal RB ventilation system has immediately secured and isolated. Normal RB vent flow is 76,700 SCFM. The flow through one SGTS fan is 2600 SCFM. Cooling for the RB is from an air wash system on the inlet air supply to the normal RB ventilation fans. Since the normal fans have tripped, there is no longer any air flow through the air wash system. The SGTS provides no cooling to the RB atmosphere. Thus, with the air cooling function removed, RB general air temperatures will begin to rise. Answer C is correct. The events described in the question stem only impact the RB atmosphere. Turbine Building ΔP compares pressures in the TB to the outside pressure, not against the RB inside pressure. The event in the question stem does not impact either the TB inside pressure (since TB vent is not impacted) nor the outside pressure. Answer A is incorrect. As stated, one train of SGTS flows 2600 SCFM and it does discharge to the main stack. But the TB vent system, which was not affected by the event, is still operating and discharging to the main stack. Thus main stack flow is 2600 + TB vent flow, not just 2600 SCFM from SGTS. Answer D is incorrect. The radiation levels on the refuel floor are due the source of the radiation. It may be incorrectly concluded that SGTS will start after the 2-minute time delay and that this will impact the radiation levels on the floor. Since SGTS is already running and the radiation source is not impacted, radiation levels will not change in 2 minutes. Answer B is incorrect.

References to be provided during exam:	None							
Learning Objective	2621.828.0.0042 261-10445 Given a set of system indications or data, evaluate and interpret them to determine limits, trends, and system status.							
Question Source	**Bank**		**Modified Bank**		**New**	**X**		
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **3:SPK**				
10 CFR Part 55 Content:	**55.41**	**8**	**55.43**					
Time to Complete: 1-2 minutes								

Question 27

Which of the following states why **BOTH** hydrogen and oxygen levels in the Primary Containment are monitored during accident conditions?

A. Inadequate core cooling during a LOCA could result in combustible levels of both hydrogen and oxygen.

B. Exceeding LHGR prior to a LOCA could result in combustible levels of both hydrogen and oxygen from radiolysis.

C. Both hydrogen and oxygen concentrations need to be known to accurately determine amount of fuel damage.

D. The uranium-water reaction generates large amounts of both hydrogen and oxygen that could lead to Primary Containment failure.

Question # Answer	27 A	Question Developer Initials/Date: NTP 11/26/07

Knowledge and Ability Reference Information		RO	SRO
500000 EK2.02 Knowledge of the interrelations between HIGH CONTAINMENT HYDROGEN CONCENTRATIONS the following: Containment oxygen monitoring systems	**Importance Rating**	3.1	3.5

Level	RO	Tier #	1	Group #	2

References	BAS-3200.02 (EOP Users Guide)		

Explanation:	IAW the reference, a LOCA resulting in inadequate core cooling could result in the generation of large amounts of hydrogen. Combined with oxygen, a combustible mixture could result. Answer A is correct. IAW the reference, radiolysis does produce hydrogen at rates that are generally not of concern. Answer B is incorrect. Other methods exist to determine the amount of fuel damage other than by knowing H2/O2 levels. If these levels are not known, fuel damage can still be estimated. Answer C is incorrect. IAW the reference, a combustible mixture could fail the Primary Containment, but hydrogen generation is from the metal-water (clad-water) reaction, not a uranium-water reaction. Answer D is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.845.0.0042 3000 Using procedure EMG-3200.02, evaluate the technical basis for each step in the procedure, and apply this evaluation to determine the correct courses of action under emergency conditions.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**x 1:F**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 28

The plant is shutdown and a cooldown is in-progress with the Shutdown Cooling system. Present plant conditions are as follows:

- RPV coolant temperature is 325 °F and lowering
- RPV water level is 155"
- Shutdown Cooling Pumps A, B, and C are in-service

Which of the following annunciators would indicate a condition in which **ALL** Shutdown Cooling Pumps are automatically tripped?

A. TORUS/DRYWELL – DW PRESS HI/LO

B. SHUT DN CLG – SD HX PUMP RM TEMP HI

C. REACTOR LEVEL – RX LVL LO I **AND** RX LVL LO II

D. CORE SPRAY – SYSTEM 1 AUTOSTART **AND** SYSTEM 2 AUTOSTART

Question # Answer	28 D	Question Developer Initials/Date: NTP 11/26/07

Knowledge and Ability Reference Information			RO	SRO
205000 K5.02 Knowledge of the operational implications of the following concepts as they apply to SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE): Valve operation		Importance Rating	2.8	2.9

Level	RO	Tier #	2	Group #	1

References	EMG-SP1 RAP-C8d	RAP-H5e RAP-B3g	RAP-B1e RAP-C2d

Explanation:	The question stem shows the reactor shutdown and cooling down with SDC. All pumps trip when SDC inlet isolation valve V-17-19 closes. SDC receives an isolation signal at RPV water level lo-lo (90") or high drywell pressure (>3.0 psig). This will close the SDC inlet/outlet isolation valves V-17-19 and V-17-54. The closure of the SDC inlet isolation valve will trip all SDC pumps. Core spray will initiate from either RPV water level lo-lo **OR** drywell high pressure. The receipt of Core Spray System 1 Autostart (or 2) annunciator will start core spray and the EDGs. These same parameters will close SDC inlet isolation valve, which will trip all SDC pumps. Answer D is correct. The drywell hi/lo pressure alarm alarms at 1.4 psig, which is not high enough to cause a SDC isolation of 3 psig. Answer A is incorrect. There is no automatic action if a SDC leak is detected in the SDC pump room. Answer B is incorrect. The RPV low water level annunciator alarms at about 138", which is above the lo-lo level setpoint to isolate SDC. Answer C is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0045 205-10440 Given the system logic/electrical drawings, describe the system nauto isolation signals, setpoints, and expected system response including

	power loss or failed components.						
Question Source	**Bank**		**Modified Bank**		**New**	**X**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X** **2:DR**	
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**				
Time to Complete: 1-2 minutes							

Question 29

The plant was at rated power when an event occurred. Present plant conditions are as follows:

- RPV pressure is 700 psig and lowering
- RPV water level is 80"
- Core Spray has auto started
- The MSIVs are closed
- Drywell pressure is 2 psig and rising slowly
- ABN-1, Reactor Scram, Immediate Operator Actions have been performed

Which of the following will ensure that the Isolation Condensers maintain the **MAXIMUM** heat transfer capability?

A. Verifying the Isolation Condenser vent valves remain open to prevent air binding in the condensers.

B. Verifying the Isolation Condenser vent valves remain open to prevent shell pressurization from non-condensable gases.

C. Ensuring the Isolation Condenser shell water levels are properly maintained as required, from the Condensate Transfer System.

D. Ensuring the Isolation Condenser shell water levels are properly maintained as required, from the Demineralized Water System.

Question # Answer	29 C	Question Developer Initials/Date: NTP 11/26/07

Knowledge and Ability Reference Information		RO	SRO
207000 K5.03 Knowledge of the operational implications of the following concepts as they apply to ISOLATION (EMERGENCY) CONDENSER: Heat transfer	Importance Rating	2.7	3.0

Level	RO	Tier #	2	Group #	1

References	307		

Explanation:	The question describes an event where RPV water level is below the lo-lo setpoint: with drywell pressure at 2 psig and core spray running, then RPV water level must be below the lo-lo setpoint. With water level at this level and lowering (and core spray is not injecting due to RPV pressure), then the isolation condensers have also auto initiated (RPV lo-lo level or high RPV pressure). When the ICs auto initiate, the IC vent valves close. To maximize heat transfer of the ICs, the tube bundles must remain covered with water. Makeup to the ICs, when they are in service, is from the condensate transfer system. Answer C is correct. Makeup from demineralized water is used when the ICs are in a standby condition. Answer D is incorrect. Since the IC vent valves have auto closed, answers A and B are incorrect. The vent valves do not close on a automatic system isolation.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0023 10457 Describe the sequence of operation of the isolation Condenser System when an initiation signal is received. 2621.828.0.0023 02029 Describe the relationship between the Isolation Condenser System and the following: Condensate transfer System

Question Source	**Bank**		**Modified Bank**	**X**	**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X** **2:DR**
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**			
Time to Complete: 1-2 minutes						

Question 30

The plant was at rated power when a manual scram was inserted. A fire has disabled USS 1B3 and the plant is now shutdown and is cooling down with Isolation Condenser B in service. The following annunciator then alarmed:

- ISOL COND – SHELL B LVL HI/LO

The Operator reports the ISOL CONDENSER B LEVEL indicates 7' 2" and that ISOL COND B SHELL temperature indicates 104 °F.

Which of the following states the impact on the Isolation Condensers from this alarm and the action IAW the RAP?

	Isolation Condenser B Impact	Required Action
A.	The shell level is high	Verify ISOLATION CONDENSER MAKEUP valves closed; perform those actions to drain the IC B shell IAW Procedure 307, Isolation Condenser System.
B.	The shell level is high	Verify ISOLATION CONDENSER MAKEUP valves closed; request Chemistry to sample the IC B shell water, and isolate Isolation Condenser B if evidence of a tube leak exists.
C.	The shell level is low	Add makeup to the Isolation Condenser B using the preferred water source; use of the associated ISOLATION CONDENSER MAKEUP valve is **NOT** required.
D.	The shell level is low	Add makeup to the Isolation Condenser B using the alternate water source (**NOT** local hoses); use of the associated ISOLATION CONDENSER MAKEUP valve is required.

Question # Answer	30 D	Question Developer Initials/Date: NTP 11/26/07

Knowledge and Ability Reference Information		RO	SRO
207000 A4.06 Ability to manually operate and/or monitor in the control room: Shell side makeup valves	Importance Rating	3.8	4.0

Level	RO	Tier #	2	Group #	1

References	307	RAP-C6b	

Explanation:	The question stem describes the plant cooling down with the isolation condenser B, with USS 1B3 inoperable due to a fire. The indications provided show a low level in the IC shell, not high. A high level could occur from a tube leak. Because the IC B is in-service, a higher shell temperature is expected and normal. Because the isolation condenser is in service, makeup to the shell is normally provided by condensate transfer (preferred source) or fire water (alternate source) (through the normal path or through the use of fire hoses). Because USS 1B3 is de-energized, both condensate transfer pumps are lost and thus the normal preferred makeup method utilizing condensate transfer is lost. Using fire protection (the alternate water source) (not local hoses) is available, and the lineup includes both in-plant manipulations and control room manipulations. When the isolation condenser is in standby, makeup requires no control room manipulations. Answer D is correct. Answers A and B are incorrect since the shell level is low – not high. On a high level, the answers provided are plausible and IAW procedure. Answer C is incorrect since condensate transfer is not available.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0023 02029 Describe the relationship between the Isolation Condenser System and the following: Condensate transfer System, Demineralized Water System.

Question Source	**Bank**		**Modified Bank**		**New**	**X**

Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **3:SPK**

10 CFR Part 55 Content:	**55.41**	**7**	**55.43**		

Time to Complete: 1-2 minutes

Question 31

The plant was operating at rated power. A reactor recirculation leak has caused an automatic scram. The following conditions currently exist:

- Core Spray Pumps NZ01A/NZ03A are injecting into the RPV at 4000 GPM
- Core Spray Pumps NZ01B/NZ03B are injecting into the RPV at 4200 GPM
- Torus water temperature is 150° F
- Torus water level is 120"
- RPV water level is 98" TAF and rising
- (Torus Pressure – STRAINER) equals -2.9 psig

Which of the following, if any, is required regarding the Core Spray System?

A. Secure Core Spray Booster Pump NZ03A.

B. Secure Core Spray Booster Pump NZ03B.

C. No actions regarding Core Spray are required.

D. Secure **BOTH** Core Spray Booster Pumps NZ03A and NZ03B.

Question # Answer	31 B	Question Developer Initials/Date: NTP 11/26/07

Knowledge and Ability Reference Information		RO	SRO
209001 A2.09 Ability to (a) predict the impacts of the following on the LOW PRESSURE CORE SPRAY 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	**Importance Rating**	3.1	3.3

Level	RO	Tier #	2	Group #	1

References	EMG-SP4		

Explanation:	From the reference provided, it can be ascertained that core spray system B is on the bad side of the core spray NPSH limit curve, and will be secured. Answer B is correct.

References to be provided during exam:	EMG-SP4	

Learning Objective	2621.845.0.0040 10445 Given a set of system indications or data, evaluate and interpret then to determine limits, trends, and system status.

Question Source	Bank		Modified Bank	X	New	

Question Cognitive Level:	Memory or Fundamental Knowledge		Comprehension or Analysis	X 3:SPR

10 CFR Part 55 Content:	55.41	5	55.43		

Time to Complete: 1-2 minutes

Question 32

The plant was at rated power when an event occurred. Present plant conditions are as follows:

- Drywell pressure is 3.6 psig and rising
- RPV water level is 120" and rising
- FEED PUMPS DISCHARGE PRESSURE indicates 800 psig

The Operator notes the following Core Spray System indications:

- MAIN PUMP AMPS NZ01A indicates 50 AC AMPERES
- MAIN PUMP AMPS NZ01D indicates 0 AC AMPERES
- SYS 1 FLOW indicates approximately 100 GPM
- SYS 2 PUMP DISCH PRESS BOOSTERS indicates approximately 330 psig

Which of the following is correct regarding the observed Core Spray indications?

A. Core Spray Pump NZ01D has tripped.

B. Core Spray Pump NZ01A is currently running on minimum flow.

C. Core Spray System 2 is **NOT** currently indicating the expected discharge head.

D. Core Spray System 1 **CANNOT** provide core cooling when the RPV depressurizes.

Question # Answer	32 B	Question Developer Initials/Date: NTP 11/28/07

Knowledge and Ability Reference Information		RO	SRO
209001 A4.11 Ability to manually operate and/or monitor in the control room: System flow	Importance Rating	3.7	3.6

Level	RO	Tier #	2	Group #	1

References	341	USAR 6.3.1.3.3	RAP-B1e RAP-B2e

Explanation:	The question stem describes the plant at power when an event resulted in a low RPV water condition and a high drywell pressure condition. Under the given conditions, core spray 1 (main pump A and booster pump a) and core spray 2 (main pump B and booster pump B) will start. With feedwater discharge pressure at 800 psig, then RPV pressure is close to this value. With core spray running at an RPV pressure > 305 psig, the core spray parallel isolation valves are closed and core spray is running on minimum flow back to the torus. This flow is approximately 100 gpm. Therefore, core spray A is running on minimum flow. Answer B is correct. As stated, core spray A and B start on their signals. Core spray C and D will still be in standby (off), unless a preferred core spray system fails. Since there is no indication of this in the question stem, then core spray D will be off and no amps is the expected condition – not tripped. Answer A is incorrect. With core spray system B running on minimum flow, the discharge pressure is approximately as listed in answer C. Answer C is incorrect. Answer D is incorrect since the provided indications are the expected indications, and core spray A will provide core cooling, as designed, when RPV pressure drops < 305 psig. Answer D is incorrect.

References to be provided during exam:	None	

Learning	2621.828.0.0010 209-10444

Objective	Describe the interlock signals and setpoints for the affected system components and expected system response including power loss or failed components.

Question Source	**Bank**		**Modified Bank**		**New**	**X**

Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **3:SPK**

10 CFR Part 55 Content:	55.41	7	55.43		

Time to Complete: 1-2 minutes

Question 33

The plant is at rated power.

If Standby Liquid Control System (SLC) manual valve V-19-25 (SLC System Discharge Header Isolation Valve) is in the closed position when the Operator placed the STANDBY LIQUID CONTROL switch to the FIRE SYS 2 position, which of the following states the expected plant response?

	Reactor Water Cleanup System	SLC System 2 SQUIBS Light	SLC PUMP DISCH PRESS
A.	**NOT** isolated	Off	< RPV pressure
B.	**NOT** isolated	On	> RPV pressure
C.	Isolated	Off	0 psig
D.	Isolated	On	> RPV pressure

Question # Answer	33 B	Question Developer Initials/Date: NTP 11/28/07

Knowledge and Ability Reference Information		RO	SRO
211000 A1.09 Ability to predict and/or monitor changes in parameters associated with operating the STANDBY LIQUID CONTROL SYSTEM controls including: SBLC system lineup	Importance Rating	4.0	4.1

Level	RO	Tier #	2	Group #	1

References	GE 148F723	RAP-G1b	NOTE: DELETE Note 10 on P&ID

Explanation:	With the SLC discharge header isolation valve closed when SLC is activated, there will be no SLC flow to the RPV. Also, RWCU does not isolate as expected since the flow switch necessary to isolate RWCU is downstream of the header isolation valve and it does not see any SLC flow. When the SLC system is activated, the normally OFF squibs light will energize. With the SLC flow path isolated, and SLC pumps are positive displacement pumps, the pump pressure will be greater than RPV pressure. The pressure transmitter is upstream of the isolation valve and will indicate SLC system pressure. Answer B is correct. Answer A is incorrect since the squibs light is on. Answers C and D are incorrect since RWCU will not isolate in this condition when SLC is initiated.

References to be provided during exam:	GE 148F723	

Learning Objective	2621.828.0.0046 211-10438 Using the system P&ID, locate each of the system components and explain its operation and limitations within the system.

Question Source	**Bank**	**X**	**Modified Bank**		**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X 3:SPR**		
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**			
Time to Complete: 1-2 minutes						

Question 34

Which of the following pairs of instruments, when their trip setpoint is **EXCEEDED**, will result in de-energizing **ALL** RPS SCRAM SOLENOID GROUPS?

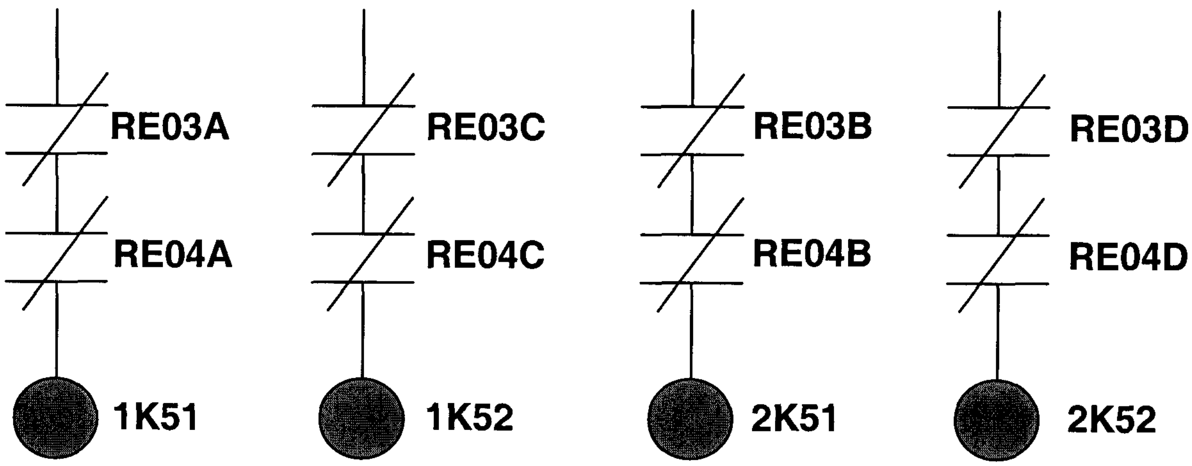
- RPV Pressure RE03A, B, C, D
- Drywell Pressure RE04A, B, C, D

A. RE03A **AND** RE03C

B. RE03B **AND** RE04D

C. RE03D **AND** RE04D

D. RE03C **AND** RE04B



Question # Answer	34 D	Question Developer Initials/Date: NTP 11/29/07

Knowledge and Ability Reference Information		RO	SRO
212000 K5.02 Knowledge of the operational implications of the following concepts as they apply to REACTOR PROTECTION SYSTEM: specific logic arrangements	**Importance Rating**	3.3	3.4

Level	RO	Tier #	2	Group #	1

References	237E566 sh 1, 3, 5, 7		

Explanation:	RPS scram logic is 1 out of 2 taken twice logic. RPV pressure instruments RE03A and RE03C input into RPS1, as do drywell pressure instruments RE04A and RE04C. A trip of any of these instruments will generate a ½ scram, regardless of how many have tripped. RPV pressure instruments RE03B and RE03D input into RPS2, as do drywell pressure instruments RE04B and RE04D. A trip of any of these instruments will generate a ½ scram, regardless of how many have tripped. A reactor scram requires a trip in RPS1 and in RPS2. Whan a scram signal is generated, all RPS SCRAM SOLENOID GROUPS will be de-energized (lights out). The only combination that trips both RPS1 and RPS2 is answer D. All others generate a ½ scram only.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0037 212-10445 Given a set of system indications or data, evaluate and interpret them to determine limits, trends, and system status.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X 3:SPK**
10 CFR Part 55 Content:	55.41	5	55.43			
Time to Complete: 1-2 minutes						

Question 35

The plant is starting up after an outage. All IRMs are approximately mid-scale on Range 6 and steady.

The following annunciator then alarmed:

- NEUTRON MONITORS – IRM DNSCL

The Operator reports that the IRM ALL IN light is **EXTINGUISHED** and IRM 11 indicates downscale on Range 6.

Which of the following states the cause of these indications and the plant response?

	Cause	Plant Response
A.	IRM 11 has been driven out of the core	Control rod withdrawal block **ONLY**
B.	IRM 11 has been driven out of the core	Control rod withdrawal block **AND** a ½ scram
C.	IRM 11 has failed downscale	Control rod withdrawal block **ONLY**
D.	IRM 11 has failed downscale	Control rod withdrawal block **AND** a ½ scram

Question # Answer	35 A	Question Developer Initials/Date: NTP 11/29/07

Knowledge and Ability Reference Information						RO	SRO
215003 K6.03 Knowledge of the effect that a loss or malfunction of the following will have on the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM: Detector drive motor					Importance Rating	2.8	2.9
Level	RO	Tier #	2	Group #	1		

References	RAP-H7a	RAP-G4e	

Explanation:	The question describes a plant startup (with power ascension halted) with the reactor mode switch in startup and power being monitored by the IRMs. Two indications are then provided: an IRM is downscale, along with the IRM all in light OUT. The all in light is expected to be lit under a normal startup. This would show that all IRMs are fully inserted. With the all in light out, then at least one IRM is not fully inderted. Therefore, one IRM has been driven out of the core. As the IRM is driven out of the core, the count rate would go down, thus the IRM downscale annunciator. A downscale IRM will generate a control rod withdraw block. Answer A is correct. A failed downscale IRM would give the annunciator in the stem but it would not explain the all in light. There is no ½ scram from a downscale IRM. Other answers are plausible but incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0029 215-10444 Describe the interlock signals and setpoints for the affected system components and expected system response including power loss or failed components.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X** 3:PEO
10 CFR Part 55 Content:	55.41	7	55.43			
Time to Complete: 1-2 minutes						

Question 36

The plant is starting up after an outage. The Operator is withdrawing control rods with the reactor subcritical. Current plant conditions are as follows:

- SRM 21 indicates 100 CPS　　SRM 22 indicates 120 CPS
- SRM 23 indicates 110 CPS　　SRM 24 indicates 115 CPS
- All IRMs indicate downscale

The following annunciators then alarm:

- NEUTRON MONITORS – SRM DNSCL
- NEUTRON MONITORS – SRM HI-HI

The SRMs indications are as follows:

- SRM 21 indicates 0 CPS　　SRM 22 indicates 120 CPS
- SRM 23 indicates 110 CPS　　SRM 24 indicates 1E6 CPS

Which of the following states the impact on RPS and/or RMCS from this event?

	Impact from SRM 21	Impact from SRM 24
A.	Rodblock **ONLY**	Rodblock **ONLY**
B.	Rodblock **ONLY**	Rodblock **AND** ½ scram
C.	Rodblock **AND** ½ scram	Rodblock **AND** ½ scram
D.	None	Rodblock **ONLY**

Question # **Answer**	**36 D**	**Question Developer Initials/Date: NTP 11/29/07**

Knowledge and Ability Reference Information		**RO**	**SRO**
215004 K4.01 Knowledge of SOURCE RANGE MONITOR (SRM) SYSTEM design feature(s) and/or interlocks which provide for the following: Rod withdrawal blocks	**Importance Rating**	**3.7**	**3.7**

Level	**RO**	**Tier #**	**2**	**Group #**	**1**

References	RAP-G5d	RAP-H7a	

Explanation:	The question stem describes a plant startup when 2 SRMs fail: one fails downscale and one fails upscale. Plant impacts from SRM failures are not bypassed since IRMs are downscale. A downscale SRM has no impact (it does provide a rod block if not fully inserted; all SRMs are fully inserted at this point in the startup) and an upscale SRM provides a rod block only. Answer D is correct. Neither type of SRM failure produces a scram signal.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0029 Describe the interlock signals and setpoints for the affected system components and expected system response including power loss or failed components.

Question Source	**Bank**		**Modified Bank**		**New**	**X**

Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:F**	**Comprehension or Analysis**	

10 CFR Part 55 Content:	**55.41**	**7**	**55.43**		

Time to Complete: 1-2 minutes

Question 37

The plant was at rated power, with APRM 1 bypassed, when the following annunciator alarmed:

- NEUTRON MONITORS – LPRM HI

The Operator reports that LPRM 28-33A (input into APRM 1) indicates upscale.

Which of the following states the impact of this failure to APRM 1 indicated reactor power on Panel 4F **AND** to reactor power as calculated by heat balance?

	Impact on APRM 1 Indicator/Recorder on Panel 4F	Impact on Heat Balance
A.	Indicates higher	Indicates higher
B.	Indicates higher	No impact
C.	No impact	Indicates higher
D.	No impact	No impact

<table>
<tr><td>Question #
Answer</td><td>37 B</td><td>Question Developer Initials/Date: NTP 12/2/07</td></tr>
</table>

<table>
<tr><td colspan="4">Knowledge and Ability Reference Information</td><td>RO</td><td>SRO</td></tr>
<tr><td colspan="3">215005 K1.07
Knowledge of the physical connections and/or cause/effect relationships between AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM and the following: Process computer, performance monitoring system</td><td>Importance Rating</td><td>2.6</td><td>2.9</td></tr>
<tr><td>Level</td><td>RO</td><td>Tier #</td><td>2</td><td>Group #</td><td>1</td></tr>
<tr><td>References</td><td>RAP-G6f</td><td>NF-AB-770</td><td colspan="3"></td></tr>
<tr><td>Explanation:</td><td colspan="5">The question stem describes the plant at rated power when a single LPRM (which inputs into APRM 1) fails upscale. This will cause ARPM 1 to indicate a higher average reactor power. This failure will have no impact on the calculated reactor power from a heat balance since LPRM inputs is not a direct input to the heat balance calculation. Bypassing the APRM has no impact on the ability of APRM to indicate. Answer B is correct. All other answers are incorrect.</td></tr>
<tr><td>References to be provided during exam:</td><td colspan="2">None</td><td colspan="3"></td></tr>
<tr><td>Learning Objective</td><td colspan="5">2621.828.0.0029 215-10445
Given a set of system indications or date, evaluate and interpret then to determine limits, trends or system status.</td></tr>
</table>

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X 1:I**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**2**	**55.43**			
Time to Complete: 1-2 minutes						

Question 38

The plant was at rated power. Current plant conditions are as follows:

- RECIRC TOTAL FLOW on Panel 4F indicates 150.0 X 10^3 GPM
- Reactor Recirculation Pump C is in local manual control, and is locked at its present speed
- All recirculation pump flows are matched

Which of the following would result in a flow comparator alarm and ROD BLOCK?

A. Division 1 total reactor recirculation flow output fails to 140 x 10^3 GPM.

B. Division 2 total reactor recirculation flow output fails to 160 x 10^3 GPM.

C. Reactor Recirculation Pump B flow transmitter FT-IA60B fails to 0 GPM.

D. Reactor recirculation flow is lowered 10% by the MASTER RECIRC SPEED CONTROLLER.

Question # Answer	38 C	Question Developer Initials/Date: NTP 12/1/07

Knowledge and Ability Reference Information		RO	SRO
215005 A3.05 Ability to monitor automatic operations of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM including: Flow converter/comparator alarms	Importance Rating	3.3	3.3

Level	RO	Tier #	2	Group #	1

References	USAR 7.5.1.8.7	RAP-H7a RAP-G5f	

Explanation:	The question stem describes the plant at rated power with one recirculation pump locked in local manual control. The speed of this pump is not affected by the master recirc speed controller. The comparator mismatch alarm is received at 10% or 16,000 GPM difference between the division 1 total reactor recirculation flow and the division 2 total recirculation flow. The original total flow is 150,000 GPM, and with all pumps matched at 30,000 GPM. Each recirculation loop has 2 flow transmitters. One set of 5 transmitters input into division 1 total recirculation flow and the second set of 5 transmitters input into division 2 total recirculation flow. When one individual lopp flow transmitter fails in only 1 division, that division will drop by 30,000 gpm for a total loop flow of 120,000 and a drop of 30,000. Div 2 still sees 150,000 gpm. This difference is greater than that required for a flow comparator trip. Answer C is correct. Answer A total flow drops by only 10,000 and answer B only rises by 10,000. Both are too small and there is no flow comparator trip. Answers A and B are incorrect. In answer D, recirculation flows are changed in 4 recirculation pumps. This would result in the flows being unbalanced among the pumps, but division 1 flow would still equal division 2 flow and no comparator alarm/rodblock is present. Answer D is incorrect.

References to be provided during exam:	None	

Learning	2621.828.0.0029 215-10445

Objective	Given a set of system indications or date, evaluate and interpret them to determine limits, trends, and system status.						
Question Source	**Bank**		**Modified Bank**		**New**	X	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	X 3:SPK			
10 CFR Part 55 Content:	55.41	7	55.43				
Time to Complete: 1-2 minutes							

Question 39

The plant was at rated power when a failure resulted in the following annunciator:

- ADS SV/EMRV – EMRV POWER LOST/DISABLED

Investigation has revealed that control power from 125 VDC Panel F to the EMRVs has been lost. Which of the following states the impact of this event if an Emergency Depressurization (ED) became necessary?

A. **NO** EMRVs will function. ED can be accomplished with the Turbine Bypass Valves and/or the Isolation Condensers.

B. **ALL** EMRVs will function. There is no need to supplement ED with the Turbine Bypass Valves and/or the Isolation Condensers.

C. EMRVs NR108A and NR108B **ONLY** will function. ED can be supplemented with the Turbine Bypass Valves and/or the Isolation Condensers.

D. EMRVs NR108C, NR108D and NR108E **ONLY** will function. ED can be supplemented with the Turbine Bypass Valves and/or the Isolation Condensers.

Question # Answer	39 B	Question Developer Initials/Date: NTP 12/3/07

Knowledge and Ability Reference Information		RO	SRO
218000 A2.05 Ability to (a) predict the impacts of the following on the AUTOMATIC DEPRESSURIZATION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of A.C. or D.C. power to ADS valves	**Importance Rating**	**3.4**	**3.6**

Level	**RO**	**Tier #**	**2**	**Group #**	**1**

References	729E182	RAP-B5g	

Explanation:	The alarm in the question stem comes in when a DC supply to EMRV logic control has been lost or an EMRV is placed in DISABLE. EMRV logic has 2 DC power supplies (DC-D, DC-F). When one of these power supplies is lost, the second DC power supply will automatically perform the required functions. Sine the EMRVs have 2 DC control power supplies, it can sustain the loss of one and still perform all required functions. Answer B is correct. All other answers are incorrect because all EMRVs can still function. If the EMRVs could not function, then ICs and TBVs will facilitate the ED.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0005 00369 State how the following systems interrelate with ADS: Vessel and Primary Containment instrumentation; Core Spray; NSSS; Vital AC Power; and 125 VDC Power.

Question Source	Bank		Modified Bank		New	X
Question Cognitive Level:	Memory or Fundamental Knowledge	X 1:I	Comprehension or Analysis			
10 CFR Part 55 Content:	55.41	5	55.43			
Time to Complete: 1-2 minutes						

Question 40

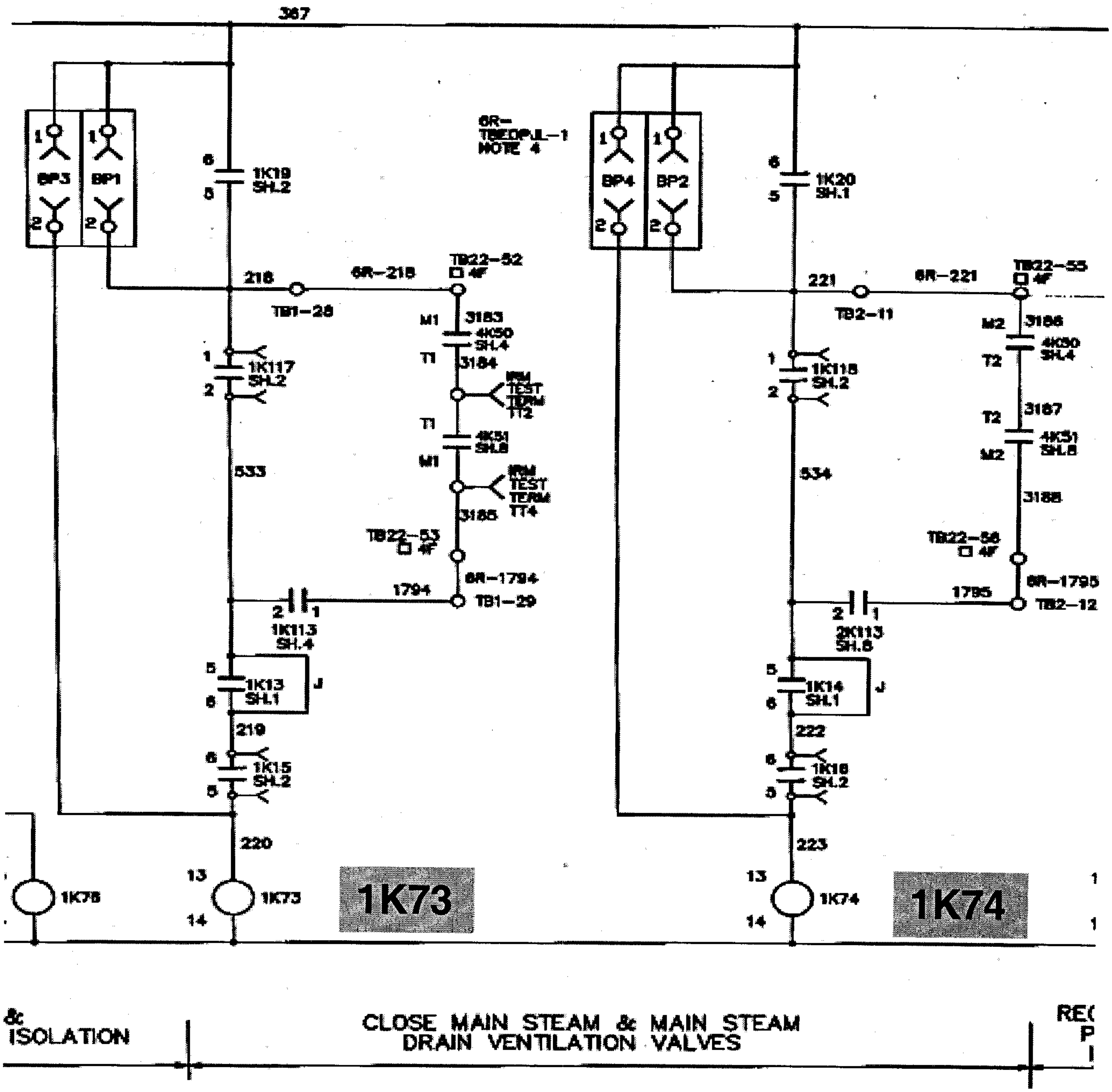
The plant was at rated power when the turbine tripped and all Turbine Bypass Valves failed open. With **NO** Operator action, which of the following states the ultimate status of the RPS MSIV relays 1K73, 1K74, 2K73, and 2K74? (see attached drawing)

A. All relays will be energized.

B. All relays will be de-energized.

C. **ONLY** 1K73 and 2K73 relays will be de-energized.

D. **ONLY** 1K74 and 2K74 relays will be de-energized.


367
BP3
BP1
1K19
SH.2
6R-
TBEDPJL-1
NOTE 4
BP4
BP2
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SH.1
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TERM
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SH.8
IRM
TEST
TERM
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SH.1
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1K16
SH.2
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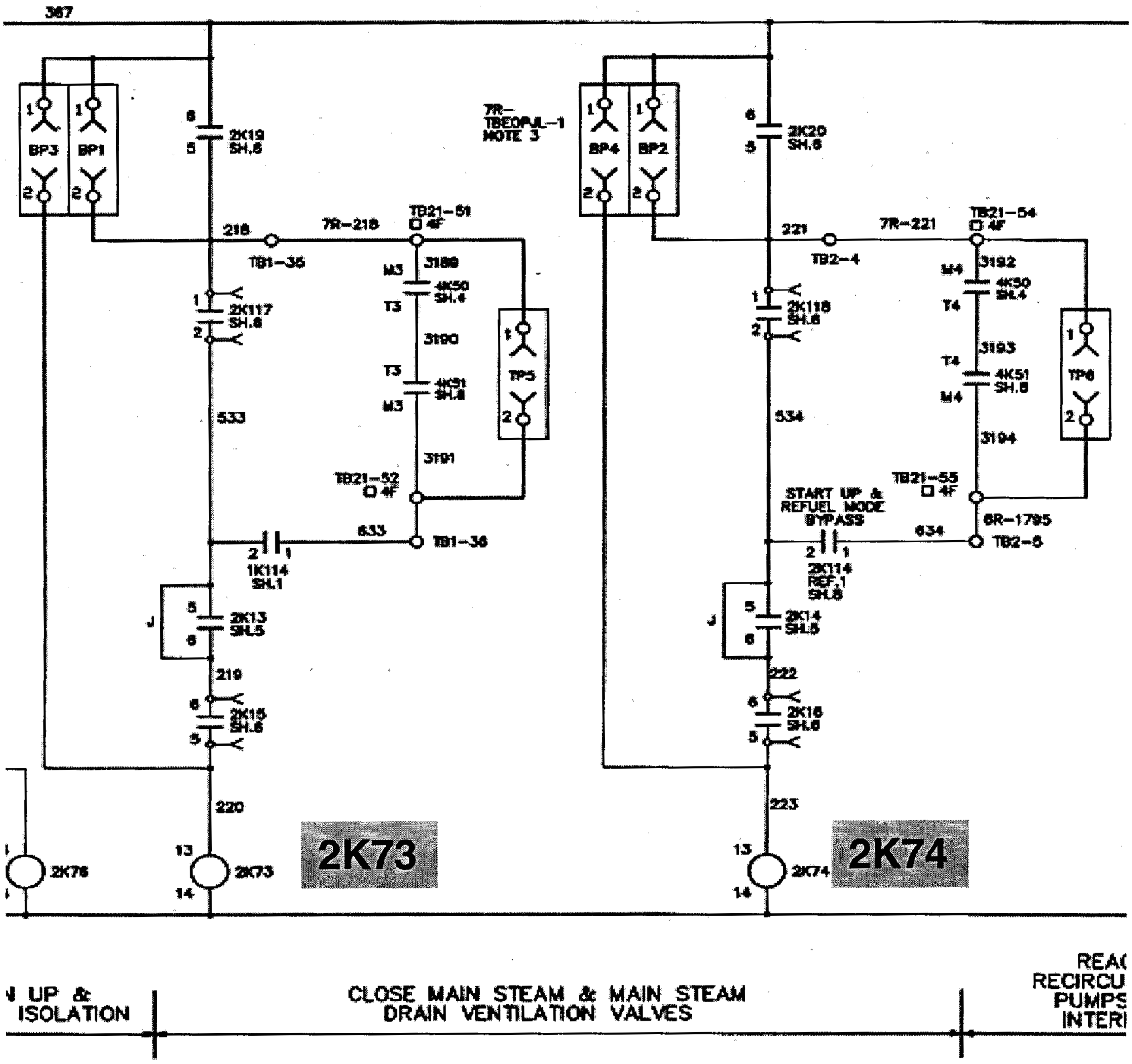
1K74
1K74
& ISOLATION
CLOSE MAIN STEAM & MAIN STEAM DRAIN VENTILATION VALVES



387
BP3
BP1
2K19
SH.6
7R-
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NOTE 3
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BP2
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2K117
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TP5
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3191
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2K13
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2K76
2K73
2K73
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7R-221
TB21-54
TB2-4
3192
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SH.4
2K118
SH.6
3193
4K51
SH.8
TP6
534
3194
TB21-55
START UP &
REFUEL MODE
BYPASS
6R-1795
634
TB2-5
2K114
REF.1
SH.8
2K14
SH.5
222
2K16
SH.6
223
2K74
2K74
UP &
ISOLATION
CLOSE MAIN STEAM & MAIN STEAM
DRAIN VENTILATION VALVES
REA
RECIRCU
PUMPS
INTERI

Question # Answer	40 B	Question Developer Initials/Date: NTP 12/3/07

Knowledge and Ability Reference Information		RO	SRO
223002 A1.04 Ability to predict and/or monitor changes in parameters associated with operating the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF controls including: Individual system relay status	Importance Rating	2.6	2.8

Level	RO	Tier #	2	Group #	1

References	237E566 sh 2, 3, 6, 7, 12, 13		

Explanation:	When the turbine trips from rated power, the turbine bypass valves (TBVs) usually act to control RPV pressure. When the TBVs fail open, and no operator action, the RPV will depressurize. Since the Reactor Mode switch is still in RUN, the RPV will depressurize to less than 825 psig, at which time the MSIVs will automatically close to stop the rapid cooldown. RPS relays 1K117, 1K118, 2K117, and 2K118 will de-energize which cause relays 1K73, 1K74, 2K73, and 2K74 to de-energize. The relays must be energized to open the MSIVs, and de-energized to close. With these relays de-energized, the MSIVs will automatically close. Answer B is correct.

References to be provided during exam:	Attached drawings	

Learning Objective	2621.828.0.0030 02456 Describe RPS isolation logic trip signals and function, including the following: purpose/design basis; setpoints; conditions that allow bypassing isolation signals; how bypassing isolation signals is accomplished.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X 3:SPK**
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**			
Time to Complete: 1-2 minutes						

Question 41

The plant was at 80% power and shutting down, with the following abnormal switch configuration:

- AUTO DEPRESS VALVE NR108A switch is in the OFF position
- The NORMAL/DISABLE switch for EMRV NR108B is in the DISABLE position

Which of the following states those EMRVs which can function in the Pressure Relief Mode to control RPV pressure and/or in the ADS Mode during a LOCA?

	Pressure Relief Mode	ADS Function
A.	EMRVs B, C, D and E **ONLY**	All EMRVs
B.	EMRVs A, C, D and E **ONLY**	All EMRVs
C.	EMRVs C, D and E **ONLY**	EMRVs A, C, D and E **ONLY**
D.	EMRVs C, D and E **ONLY**	EMRVs B, C, D and E **ONLY**

Question # Answer	41 C	Question Developer Initials/Date: NTP 12/3/07

Knowledge and Ability Reference Information		**RO**	**SRO**
239002 K3.02 Knowledge of the effect that a loss or malfunction of the RELIEF/SAFETY VALVES will have on following: Reactor over pressurization	**Importance Rating**	**4.2**	**4.4**

Level	**RO**	**Tier #**	**2**	**Group #**	**1**

References	729E182		

Explanation:	The plant is at power an abnormal switch configuration. For an EMRV to open, its solenoid must energize. With the front control panel switch in OFF, the affected EMRV will not function in the pressure relief mode, but will function in the ADS mode. With the interior panel switch in DISABLE, the solenoid will not energize at all: the affected EMRV will not function in the pressure relief mode or the ADS mode. Therefore, all EMRVs will function in the ADS mode, except that EMRV which is in DISABLE (NR018B). All EMRVs, except NR108A and NR108B, will function in the pressure relief mode. Answer C is correct. *This question is a bank question that was used on the last NRC exam.*

References to be provided during exam:	None	

Learning Objective	2621.828.0.0005 00368 Describe the EMRV initiation logic for both over pressure operation and operation in the ADS mode. Include the following: initiation signals and setpoints; timer and setpoints; control switches; and panel indications.

Question Source	**Bank**	**X**	**Modified Bank**		**New**		
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X 3:SPK**	
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**				
Time to Complete: 1-2 minutes							

Question 42

The plant was at rated power when an event occurred. Current conditions are as follows:

- RPV pressure has risen to 1078 psig
- RPV water level has lowered to 70"
- Drywell pressure has risen to 17 psig

Which of the following is correct regarding the actuation of the EMRVs and the effect of RPV pressure?

A. No EMRVS are open since their setpoint has not yet been reached, and the ADS signal is bypassed. Reactor pressure continues to rise.

B. 5 EMRVs indicated in the VALVE OPEN REGION and remained open until manually bypassed, resulting in a lowering RPV pressure until closed.

C. 2 EMRVs indicated in the VALVE OPEN REGION resulting in a lowering RPV pressure. The EMRVs close automatically when RPV pressure lowers.

D. 3 EMRVs indicated in the VALVE OPEN REGION resulting in a lowering RPV pressure. The EMRVs close automatically when RPV pressure lowers.

Question # Answer	**42 C**	**Question Developer Initials/Date: NTP 12/3/07**

Knowledge and Ability Reference Information						**RO**	**SRO**
239002 A3.06 Ability to monitor automatic operations of the RELIEF/SAFETY VALVES including: Reactor pressure					**Importance Rating**	**4.1**	**4.1**
Level	**RO**	**Tier #**	**2**	**Group #**	**1**		

References	420	RAP-B3g	RAP-B1g
Explanation:	The question stem describes the plant at rated when some event occurred that resulted in a peal RPV pressure of 1075 psig and RPV water level lowering to 60". Either of these conditions should have scrammed. AN RPV pressure of 1065 psig (from one reference) or 1074 psig (from another reference) will result in the opening of 2 EMRVs in the pressure relief mode. When pressure drops to their close setpoint, the valves will auto close. Answer C is correct. An ADS signal of 64.6" AND high drywell pressure of 2.9 psig will result in all 5 EMRVs opening, which can be closed by manual bypass. Since the RPV level setpoint has not been reached, then ADS will not automatically actuate.		
References to be provided during exam:	None		
Learning Objective	2621.828.0.0005 00368 Describe the EMRV initiation logic for both over-pressure operation and operation in the ADS mode. Include the following: initiation signals and setpoints, timer and setpoints, control switches, and panel indications.		

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X 3:PEO**
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 43

The plant is at rated power when the main steam flow transmitter FT-ID0033A, which inputs into the Digital Feedwater Control System (DFCS), fails to a 0 output. Which of the following states the impact on the DFCS?

This will cause....

A. a bump-less transfer to the alternate DCC.

B. the in-service DCC to control using the last good value of steam flow.

C. the in-service DCC to double the steam flow input from FT-ID0033B.

D. both DCCs to halt and transfer feedwater level control to the Moore Stations.

Question # **Answer**	43 C	**Question Developer Initials/Date: NTP 12/5/07**

Knowledge and Ability Reference Information						**RO**	**SRO**
259002 K4.10 Knowledge of REACTOR WATER LEVEL CONTROL SYSTEM design feature(s) and/or interlocks which provide for the following: Three element control (main steam flow, reactor feedwater flow and reactor water level provide input)					**Importance Rating**	3.4	3.4
Level	RO	**Tier #**	2	**Group #**	1		

References	MDD-OC-625, page 20 of 70		

Explanation:	The plant is at power when 1 of 2 steam flow transmitters fails (1 per steam line). When this occurs, the DFCS will ignore the bad signal and double the good signal from the second steam flow transmitter, and will continue to operate with the in-service digital control computer. Answer C is correct. Other answers are plausible but incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0018 259-10444 Describe the interlock signals and setpoints for the affected system components and expected system response including power loss and failed components.

Question Source	**Bank**		**Modified Bank**		**New**	X

Question Cognitive Level:	**Memory or Fundamental Knowledge**	X 1:I	**Comprehension or Analysis**	

10 CFR Part 55 Content:	55.41	7	55.43		

Time to Complete: 1-2 minutes

Question 44

The plant was at rated power when the following annunciators alarmed:

- MAIN STEAM – FLOW HI/MN STM LINE AREA TEMP HI-HI I
- MAIN STEAM – FLOW HI/MN STM LINE AREA TEMP HI-HI II

Current plant conditions are as follows:

- RPV water level is 188" and rising slowly
- RPV pressure is 950 psig and rising slowly
- Primary Containment parameters are normal

ABN-1, Reactor Scram, has been entered. Which of the following states an action to control either RPV pressure or RPV water level, given the conditions above?

A. Trip all operating Feedwater Pumps to prevent injecting into the RPV.

B. Augment RPV pressure control with use of the Isolation Condensers Vents.

C. Stabilize RPV pressure below 1045 psig using the Main Turbine Bypass Valves.

D. Trip all operating Feedwater Pumps **AND** Condensate Pumps to prevent injecting into the RPV.

Question # Answer	44 A	Question Developer Initials/Date: NTP 12/5/07

Knowledge and Ability Reference Information						RO	SRO
259002 2.4.6 (Reactor water level control) Knowledge symptom based EOP mitigation strategies.					Importance Rating	3.1	4.0
Level	RO	Tier #	2	Group #	1		
References		ABN-1		RAP-J3a			

Explanation:	The plant was at rated power when the hi-hi temperature alarms result in the closure of the MSIVs, which generated a scram signal. ABN-1, reactor Scram, is then entered. When RPV water level cannot be restored and maintained below 170", all operating feedwater pumps are tripped. Answer B is correct. The use of isolation condensers vents is not allowed since the IC should be manually isolated due to RPV high water level. Since the IC cannot be used, the vents also become unavailable. Answer B is incorrect. The use of the turbine bypass valves is not allowed since the MSIVs have closed. Answer C is incorrect. Tripping of feedwater pumps and condensate pumps is only done on high RPV water level and RPV pressure is low (<350 psig; the condensate pump shutoff head). Answer D is incorrect.
References to be provided during exam:	None
Learning Objective	2621.845.0.00 200-10445 Given a set of system indications or data, evaluate and interpret them tp determine limits, trends, and system status.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X 3:SPK**
10 CFR Part 55 Content:	**55.41**	**10**	**55.43**			
Time to Complete: 1-2 minutes						

Question 45

The plant was at rated power with the STANDBY GAS SELECT switch in SYS 2, when the following radiation monitoring annunciator alarmed:

- AREA/VENT DNSCL

Investigation revealed that REACTOR BUILDING VENT MANIFOLD NO. 1 radiation monitor indicates downscale. Which of the following states the impact on the Standby Gas treatment System (SGTS)?

A. **Both** SGTS Fans are in standby and **BOTH** can auto start.

B. **Both** SGTS Fans have auto started and will remain running.

C. **ONLY** SGTS Fan 2 has auto started and will remain running.

D. **BOTH** SGTS Fans have auto started and SYS 1 fan will shutdown after a time delay.

Question # Answer	45 A	Question Developer Initials/Date: NTP 12/5/07

Knowledge and Ability Reference Information		RO	SRO
261000 K6.04 Knowledge of the effect that a loss or malfunction of the following will have on the STANDBY GAS TREATMENT SYSTEM: Process radiation monitoring	Importance Rating	2.9	3.1

Level	RO	Tier #		Group #	

References	RAP-10F1f	RAP-10F4g	651.4.001

Explanation:	The question stem describes a downscale indication of the #1 RB vent manifold radiation monitor (of which there are 2). The logic for SGTS auto initiation is for either vent manifold radiation monitor to exceed the upscale trip point. When this occurs, both SGTS fans start. When it has been assured that the selected fan is functioning properly, the secondary fan will auto secure after a time delay. The impact of a single vent manifold radiation monitor downscale failure is there is none. The SGTS remains in standby and will auto initiate as designed when the operable radiation monitor detects an upscale trip. Answer A is correct. Answer B, C, D and are incorrect since no SGTS fans have started. The logic for SGTS auto start is independent of which radiation monitor senses an upscale trip to start both SGTS fans – radiation monitor #1 (2) is not dedicated to the auto start of SGTS fan #1 (#2).

References to be provided during exam:	None	

Learning Objective	2621.828.0.0042, 02456 Describe the RPS indication logic trip signals and functions, including the following: purpose/design basis; setpoints; conditions that allow bypassing isolation signals; how bypassing isolation signals is accomplished.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X 1:I**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 46

The plant was at rated power when the following event occurred:

- An electrical fault on Bus 1D caused the Main Breaker 1D to automatically open
- Annunciator MN BRKR 1D 86 LKOUT TRIP alarmed

Which of the following states the response of EDG 2?

EDG 2 will.....

A. idle start.

B. **NOT** start.

C. fast start and load onto Bus 1D.

D. fast start but **NOT** load onto Bus 1D.

Question # Answer	46 B	Question Developer Initials/Date: NTP 12/5/07

Knowledge and Ability Reference Information		RO	SRO
262001 K1.01 Knowledge of the physical connections and/or cause/effect relationships between A.C. ELECTRICAL DISTRIBUTION and the following: Emergency generators	Importance Rating	3.8	4.3

Level	RO	Tier #	2	Group #	1

References	RAP-T2e		

Explanation:	The plant is at power when a fault occurs on 4160 VAC Bus 1D. EDG 2 can idle start from a LOCA signal (the EDG accelerates to 400 RPM) and does not load onto the bus. A loss of voltage to the bus will cause EDG 2 to fast start (accelerate to 900 RPM) and load onto bus 1D (normally). But since there is a fault (lockout) on bus 1D, the EDG is prevented from fast starting and loading onto the bus. Answer B is correct. Other answers are plausible but incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0013 264-10445 Given a set of system indications or data, evaluate and interpret them to determine limits, trends, and system status.

Question Source	Bank		Modified Bank		New	X

Question Cognitive Level:	Memory or Fundamental Knowledge	X 1:I	Comprehension or Analysis	

10 CFR Part 55 Content:	55.41	5	55.43		

Time to Complete: 1-2 minutes

Question 47

The plant is at 4% power during a startup. Current plant conditions are as follows:

- Feedwater Pump 1C is in-service
- Condensate Pumps 1B and 1C are in-service
- Reactor Recirculation Pump B is in IDLE
- Power ascension is in-progress

The following annunciators then alarm:

- STARTUP XFMRS – LKOUT RELAY 86/S1B TRIP
- STARTUP XFMRS – S1B VOLTS LO

Which of the following IMMEDIATE OPERATOR ACTIONS is required?

A. Manually insert CRAM rods due to reduced core flow.

B. Manually scram the reactor due to reduced core flow.

C. Manually scram the reactor due to reduced feedwater flow.

D. Manually reduce recirculation flow due to reduced feedwater flow.

Question # Answer	47 C	Question Developer Initials/Date: NTP 12/6/07

Knowledge and Ability Reference Information						RO	SRO
262001 2.4.49 (AC Electrical Distribution) Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.					Importance Rating	4.0	4.0
Level	RO	Tier #		Group #			

References	202.1 Power Ops. Curve	ABN-2	ABN-17
Explanation:	The question stem describes the plant starting up with a single feedwater pump and 2 condensate pumps running (all powered from 4160 VAC bus 1B). Bus 1B also powers 2 recirculation pumps: pump B (which is currently off) and D. Under the given conditions, power to the station is provided by the startup transformers SA and SB. SB powers bus 1B. Thus the alarms provided show a loss of startup transformer SB and the loss of bus 1B. The running feedwater pump, both running condensate pumps and recirculation pump D will trip. IAW ABN-17, the trip of multiple condensate pumps requires an immediate operator action to scram the plant. Answer C is correct. Inserting cram rods is not the correct immediate action for a single recirculation pump trip (Cram rods could be required if the exclusion zone was entered. But power is below the exclusion zone and would not be entered upon the recirculation pump trip). Answer A is incorrect. IAW ABN-2, the trip of multiple recirculation pumps would require an immediate scram. Answer B is incorrect. If a single feedwater pump or single condensate pump trips, then lowering power with recirculation flow is required IAW ABN-17. This is an incorrect action for multiple pump trips. Answer D is incorrect.		
References to be provided during exam:	None		

Learning Objective	2621.828.0.0017 256-10450 describe and interpret procedure sections and steps for plant emergency or off-normal conditions that involve this system including personnel allocation and equipment operation in accordance with

	ABN, EOP & EOP Support Procedures and EPIPs.					
Question Source	**Bank**		**Modified Bank**	**X**	**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**		**X 2:RI**	
10 CFR Part 55 Content:	**55.41**	**10**	**55.43**			
Time to Complete: 1-2 minutes						

Question 48

The plant was at rated power. An over-voltage condition resulted in the loss of a power supply. The following annunciators alarmed:

- RPS – SCRAM CONTACTOR OPEN
- RPS – RPS MG SET 1 TRIP
- PWR LOST – PROT SYS PNL 1 PWR LOST
- STATION BAT/CHG – BAT CHG C1 TROUBLE

The Operator notes that RBCCW 1-1 is still running.

Which of the following states the plant impact and the required action?

	Plant Impact	Required Action
A.	RPS MG Set 1 has tripped	Place RPS MG Set 1 on the alternate power supply
B.	VMCC 1A2 has tripped	Verify that the Rotary Inverter has transferred to the alternate power supply
C.	USS 1A2 has tripped	Secure the Reactor Building Ventilation system and start the Standby Gas Treatment System
D.	VMCC 1A2 has tripped	Verify Vital Lighting Distribution Panel VLDP-1 has transferred to the alternate power supply

Question # Answer	48 D	Question Developer Initials/Date: NTP 12/6/07

Knowledge and Ability Reference Information		RO	SRO
262002 A2.02 Ability to (a) predict the impacts of the following on the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Over voltage	Importance Rating	2.5	2.7

Level	RO	Tier #	2	Group #	1

References	3013	ABN-50	

Explanation:	The plant is at power when an electrical power loss occurs. USS 1A2 supplies power to VMCC 1A2, and VMCC 1A2 supplies power to RPS MG Set 1 and to battery chargers C1 and C2 (only 1 charger is in-service at a time). The first three alarms provided point to the loss of: USS 1A2, or VMCC 1A2, or RPS MG Set 1. The last alarm, charger C1 trouble, alarms when AC power is lost to the in-service charger, or DC output is low. Since the charger is powered from VMCC 1A2 (which is powered from USS 1A2), the possible plant impact is either the loss of USS 1A2 or VMCC 1A2. The question stem also says that the RBCCW pump 1-1 is still running (which is powered from USS 1A2), and therefore, the plant impact must be the loss of VMCC 1A2. When VMCC 1A2 is lost, VLDP-1 (which is normally powered from VMCC 1A2), then the input power automatically transfers to VMCC 1B2. ABN-50 requires verification of power transfer for VDLP-1. Answer D is correct. It is correct in Answer A, that RPS MG Set 1 has tripped. But, the loads on the RPS MG are manually transferred to another power supply – not the power to the MG itself. Answer A is incorrect. Answer B is incorrect since power to the rotary inverter (which is normally powered from VMCC 1B2) is not affected and no transfer takes place. Answer B is incorrect. Since USS 1A2 has not been lost, then answer C is incorrect. The action is correct for the loss of USS 1A2.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0056 212-10445 Given a set of system indications or data, evaluate and interpret them to determine limits, trends, and system status.

Question Source	**Bank**		**Modified Bank**		**New**	**X**

Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **3:SPK**

10 CFR Part 55 Content:	**55.41**	**5**	**55.43**		

Time to Complete: 1-2 minutes

Question 49

The plant was at rated power when the following annunciator alarmed:

- DC PWR LOST – BUS C UV

Bus DC-C was confirmed to have 0 volts.

Which of the following states the impact on the plant?

A. 125 VDC Power Panel E (DC-E) will de-energize.

B. 4160 VAC Bus 1A will **NOT** transfer to transformer SA on a scram.

C. 4160 VAC Bus 1B will **NOT** transfer to transformer SB on a scram.

D. 125 VDC Power Panel F (DC-F) will transfer to an alternate power supply.

Question # Answer	49 B	Question Developer Initials/Date: NTP 12/8/07

Knowledge and Ability Reference Information		RO	SRO
263000 K3.03 Knowledge of the effect that a loss or malfunction of the D.C. ELECTRICAL DISTRIBUTION will have on following: Systems with D.C. components (i.e. valves, motors, solenoids, etc.)	Importance Rating	3.4	3.8

Level	RO	Tier #	2	Group #	1

References	ABN-55	3033	3028 sh. 1

Explanation:	The plant is at rated power when indications of the loss of 125 VDC Bus C occurs. This bus normally provides DC power to the breakers on 4160 VAC Bus 1A. When the reactor scrams, breaker 1A (aux. transformer supply to bus 1A) will automatically open and breaker S1A (startup transformer SA supply to bus 1A) will automatically close. With the loss of breaker power, this transfer does not occur. Answer B is correct. DC-E is normally supplied from DC-A and is unaffected by the DC loss. Answer A is incorrect. Bus 1B breaker power supply is normally from bus DC-B and is unaffected by the DC loss. Answer C is incorrect. DC-F is powered from DC-C and is affected by the DC loss, but unlike many DC panels, there is no alternate DC power supply and DC-F is de-energized. Answer D is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0012 01121 Given a set of system indications or data, evaluate and interpret them to determine limits, trends, and system status.

Question Source	**Bank**	**X**	**Modified Bank**		**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:I**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 50

The plant was at rated power when a total Loss of Offsite Power (LOOP) occurred. Three minutes later, EDG 1 experienced an overspeed condition.

Which of the following states the Core Spray System Pumps and Containment Spray System Pumps that are able to perform their function in this condition?

	Core Spray System Pumps	Containment Spray System Pumps
A.	A and B	A and B
B.	D and A	B and C
C.	B and C	C and D
D.	C and D	D and A

Question # Answer	50 C	Question Developer Initials/Date: NTP 12/7/07

Knowledge and Ability Reference Information		RO	SRO
264000 K3.03 Knowledge of the effect that a loss or malfunction of the EMERGENCY GENERATORS (DIESEL/JET) will have on following: Major loads powered from electrical buses fed by the emergency generator(s)	**Importance Rating**	**4.1**	**4.2**

Level	RO	Tier #	2	Group #	1

References	RAP-T4b	3001C 3000	3002 sh. 2

Explanation:	The plant was at rated power when all offsite power was lost. Both EDG 1 and EDG 2 will start and load onto their respective busses (1C and 1D). Loads on bus 1C (EDG 1) are: core spray loops A & D (main pumps); and USS 1A2, which powers core spray loops A & D (booster pumps) and containment spray loops A & B. Loads on bus 1D (EDG 2) are: core spray loops C & B (main pumps); and USS 1B2, which powers core spray loops C & B (booster pumps) and containment spray loops C & D. Many trips for the EDGs are bypassed if they are started due to loss of bus voltage (fast start). EDG overspeed is not bypassed and does result in an EDG trip. Therefore, EDG 1 trips and EDG 2 only, continues to run and power the loads: core spray loops C & B; and containment spray loops C & D. Answer C is correct. All others are the incorrect arrangement of pumps.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0013 262-10445 Given a set of system indications or data, evaluate and interpret them to determine limits, trends, and system status.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** 1:F	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 51

The plant is at rated power with the following air system lineup:

- COMPRESSOR 1 is in **LEAD** and indicates red light ON (Panel 7F)
- COMPRESSOR 2 is in **LAG** and indicates green light ON (Panel 7F)
- COMPRESSOR 3 is in standby

The following annunciator then alarms:

- SERVICE AIR – COMPR 1 TRIP

Which of the following describes the impact on the Instrument Air Compressors?

A. When air pressure drops to 95 psig, Air Compressor #2 will automatically swap to the **LEAD** Compressor.

B. When air pressure drops to 90 psig, Air Compressor #3 will automatically swap to the **LAG** Compressor.

C. Air Compressor #2 automatically swapped to the **LEAD** Compressor when Air Compressor #1 tripped.

D. Air Compressor 2 will remain as the **LAG** Compressor until manually transferred to the **LEAD** Compressor.

Question # Answer	51 D	Question Developer Initials/Date: NTP 12/8/07

Knowledge and Ability Reference Information						RO	SRO
300000 K4.01 Knowledge of (INSTRUMENT AIR SYSTEM) design feature(s) and or interlocks which provide for the following: Manual/automatic transfers of control					Importance Rating	2.8	2.9
Level	RO	Tier #	2	Group #	1		

References	334		

Explanation:	The question shows that air compressor #1 is the lead compressor, and controls air pressure 105-120 psig. Air compressor #2 is the lag compressor, and is designed to maintain pressure 95-110 psig. Establishing Lead (air pressure controlling band) and Lag (a different air pressure controlling band) compressors is performed locally. Under normal air usage conditions, one air compressor is lead, one is lag, and one is in standby. When air pressure gets low enough, the lag compressor will start. When the lead compressor trips, air pressure will fall until the lead compressor gets signaled to start. The lag compressor will remain in lag until locally swapped to lead. When air compressor 1 trips, the lag compressor will start and control air pressure at the lag pressure band. Air compressor 3 will remain in standby and will start and load at a lower pressure. Answer D is correct. It is plausible that following the air compressor trip, the lag compressor will become the lead at a higher pressure and that compressor #3 become the new lag compressor at a lower pressure. But since placing a compressor in lead/lag is a manual manipulation, all answers which specify transfer to a different mode automatically is incorrect. Air compressor #3, stated in the stem to be in standby, is a recognized and understood mode of operation: it is not currently operating, but is powered and ready to function if required.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0043, Service, Instrument and Breathing Air 10441, Given the system logic/electrical drawings, describe the system trip signals & setpoints and expected system response including

	power loss or failed components.						
Question Source	**Bank**		**Modified Bank**	**X**	**New**		
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**X** **1:I**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**				
Time to Complete: 1-2 minutes							

Question 52

The plant was at rated power when Motor Control Center 1B21A was de-energized.

Which of the following systems has valve operators that are directly affected by this power loss?

A. ESW

B. TBCCW

C. RBCCW

D. Circulating Water

Question # Answer	52 C	Question Developer Initials/Date: NTP 12/8/07

Knowledge and Ability Reference Information		RO	SRO
400000 K2.02 Knowledge of electrical power supplies to the following: CCW valves	Importance Rating	2.9	2.9

Level	RO	Tier #	2	Group #	1

References	3004 sh. 3		

Explanation:	The plant was at power when MCC 1B21A was de-energized. Of the systems listed, only RBCCW has motor operators powered from this bus. Answer C is correct.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0035 0005 State how service water, shutdown cooling, RWCU, primary containment, AC electrical distribution and chemical treatment systems interrelate with the RBCCW system.

Question Source	Bank		Modified Bank		New	X

Question Cognitive Level:	Memory or Fundamental Knowledge	X 1:F	Comprehension or Analysis	

10 CFR Part 55 Content:	55.41	7	55.43		

Time to Complete: 1-2 minutes

Question 53

The plant was at rated power when an event occurred, resulting in the following annunciators alarming:

- REACTOR LEVEL – RX LVL LO-LO I **AND** RX LVL LO-LO II
- DW PRESS – DW PRESS HI-HI I **AND** DW PRESS HI-HI II
- STARTUP XFMRS – LOCKOUT RELAY 86/S1A TRIP
- STARTUP XFMRS – LOCKOUT RELAY 86/S1B TRIP

Which of the following states the response of the RBCCW Pumps?

Both RBCCW Pumps are OFF and.....

A. will automatically start after a 60 second time delay.

B. will automatically start after a 166 second time delay.

C. receive an automatic trip signal but can be bypassed and manually started.

D. receive an automatic trip signal but can be manually started **WITHOUT** being bypassed.

Question # Answer	53 C	Question Developer Initials/Date: NTP 12/8/07

Knowledge and Ability Reference Information		RO	SRO
400000 A3.01 Ability to monitor automatic operations of the CCWS including: Setpoints on instrument signal levels for normal operations, warnings, and trips that are applicable to the CCWS	**Importance Rating**	3.0	3.0

Level	RO	Tier #	2	Group #	1

References	223R0173 sh. 1a	116B8328 sh. 13	341

Explanation:	The plant is at power when a LOCA occurs (Drywell pressure > 3 psig and RPV water level < 86") and a loss of offsite power (startup transformers SA and SB are locked-out). This will start and load both EDGs. Under LOOP conditions only, both RBCCW pumps will automatically start after a 166 second time delay following EDG start/load. But with the LOCA as well, the pumps do not receive a start signal, but do receive a trip signal. The pumps can however be manually started from the control room, but only after a switch located at the respective pump breakers is placed in the bypass position (which bypasses the trip signal). This will allow manual pump start from the control room. Answer C is correct. Other answers are plausible but incorrect. The CRD Pumps receive a start signal with a 60 second time delay during LOOP LOCA conditions.
References to be provided during exam:	None
Learning Objective	2621.828.0.0035 0006 Explain the logic for the RBCCW pump breakers for a loss of power with and without a LOCA.

Question Source	**Bank**	**X**	**Modified Bank**		**New**		
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X 3:SPK**	
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**				
Time to Complete: 1-2 minutes							

Question 54

With **NO** control rod manipulations in-progress, the in-service CRD FCV (NC30A) indicated red light **ON** and green light **OFF**.

Which of the following states the system impact and the required action IAW Procedure 235, Determination and Correction of Control Rod Drive System Problems?

	System Impact	Required Action
A.	Indicated DRV WTR/REACTOR ΔP rises	Place CRD DRIVE WATER PRESS CONTROL switch to CLOSE
B.	Indicated CLG WTR/REACTOR ΔP lowers	Place CRD COOLING WATER PRESS CONTROL switch to OPEN
C.	Stabilizer Valve flow will lower	Place the alternate CRD FCV (NC30B) in service
D.	Indicated CHARGING WATER PRESS lowers	Place the alternate CRD FCV (NC30B) in service

Question # Answer	54 D	Question Developer Initials/Date: NTP 12/8/07

Knowledge and Ability Reference Information		RO	SRO
201001 A2.11 Ability to (a) predict the impacts of the following on the CONTROL ROD DRIVE HYDRAULIC SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Valve openings	Importance Rating	2.6	2.7

Level	RO	Tier #	2	Group #	2
References		235		237E487	

Explanation:	The plant is at rated power when the in-service CRD FCV shows indications of full open. Normally the valve displays intermediate position (red and green). With this valve full open, charging pressure will be reduced (since charging comes off upstream of the valve), and cooling water/reactor ΔP and drive water/reactor ΔP have risen (since they come off downstream of the valve). IAW procedure, the correct action to correct a reduction in charging pressure due to a failed FCV is to place the alternate FCV in service. Answer D is correct. Since drive water/reactor ΔP rises, placing the CRD drive switch to close will result in a greater ΔP. Answer A is incorrect. Since cooling water/reactor ΔP rises, answer B is incorrect. The Stabilizer Valves come off downstream of the CRD FCV, so that they too would see a higher pressure and could result in greater flow – not less.
References to be provided during exam:	None
Learning Objective	2621.828.0.0011 10450 Describe and interpret procedure sections and steps for plant emergency of off-normal conditions that involve this system including personnel allocation and equipment operation IAW applicable ABN, EOP & EOP Support Procedures and EPIPs.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X** **3:SPK**
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**			
Time to Complete: 1-2 minutes						

Question 55

The plant was at rated power when the following annunciator alarmed:

- ROD CNTRL – ROD DRIFT

The Operator attempts to insert the control rod back to its original position, but it withdraws to the full out position. The Operator then scrams the control rod IAW procedure by placing the appropriate toggle switch to the open (scram) position (up position).

Which of the following states the control rod position indication **(1)** after the control rod has completed drifting, and, **(2)** after the control rod is scrammed **BUT** before the toggle switch is taken to the closed position (down position).

	(1) Indication after Drift	(2) Indication after Scram
A.	blank-blank	00 with green backlight
B.	Red backlight **ONLY**	00 with green backlight
C.	48 with red backlight	Green backlight **ONLY**
D.	Red backlight **ONLY**	Green backlight **ONLY**

Question # Answer	55 C	Question Developer Initials/Date: NTP 12/8/07

Knowledge and Ability Reference Information		RO	SRO
201003 A3.01 Ability to monitor automatic operations of the CONTROL ROD AND DRIVE MECHANISM including: Control rod position	Importance Rating	3.7	3.6

Level	RO	Tier #	2	Group #	2

References	ABN-6	302.2	

Explanation:	The plant was at rated when a control rod drifted to the full out position. Indication at this position is 48 with a red backlight. When the scram signal is still applied and the control rod scrams, the control rod will past full in and will show only a green backlight. Answer C is correct. A rod that is at any non-fully inserted position (except 48) will show the number with no red/green backlight. A control rod that is uncoupled and past position 48 will display only the red backlight. A control rod at 00 (but not in a scram state) will show 00 with green backlight. Answer A is incorrect since the 00 would not be displayed. Answer B is incorrect since the control rod is not uncoupled. Answer D is incorrect since 48 will have a red backlight.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0011 00079 Describe the backlighting scheme on the full core display for the following: overtravel in; full in; full out; and, overtravel out.

Question Source	**Bank**		**Modified Bank**	**X**	**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X 3:SPK**
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 56

The plant is starting up after the third forced outage this calendar year. Current plant conditions are as follows:

- RPV water temperature is 120 °F and steady
- 11 control rods have been withdrawn to their withdraw limit

The RWM fails and is declared inoperable. The Reactor Engineer states that he recalls a similar RWM failure during the last startup at the exact same step in the control rod sequence and that the RWM was repaired after exceeding 10% power.

Which of the following is correct regarding the reactor startup?

A. The startup **CAN** continue as long as a second Licensed Operator verifies the Operator at the controls is following the control rod sequence.

B. The startup **CAN NOT** continue because a startup with the RWM failure with less than 12 control rods withdrawn has been performed this year.

C. The startup **CAN NOT** continue until a temporary change to procedure 409, Operation of the Rod Worth Minimizer, is processed by the SM or US.

D. The startup **CAN** continue as long as a second Licensed Operator **AND** A Reactor Engineer verifies the Operator at the controls is following the control rod sequence.

Question # **Answer**	**56 B**	**Question Developer Initials/Date: NTP 12/8/07**

Knowledge and Ability Reference Information		**RO**	**SRO**
201006 2.1.32 (RWM) Ability to explain and apply system limits and precautions.	**Importance Rating**	**3.4**	**3.8**

Level	**RO**	**Tier #**	**2**	**Group #**	**2**

References	409	TS 3.2	

Explanation:	The plant is starting up with 11 control rods withdrawn when the RWM is declared inoperable. A similar RWM failure occurred this year in which the startup continued with the RWM inoperable with < 12 control rods withdrawn. Because that startup took place this year, a second startup with an inoperable RWM and < 12 control rods withdrawn is not allowed IAW procedure 409 (and IAW TS 3.2). Answer B is correct. If more than 12 control rods had been withdrawn when the RWM failed, then answer A states the correct compensatory action. Answer A is incorrect. If the RWM failed with < 12 control rods withdrawn for the first time this year, then answer D states the correct compensatory action. Answer B Is incorrect. Because the procedural precaution reflects a TS requirement, it cannot be changed with a procedural temporary change. Answer C is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0041 217-10447 Given the normal operating procedures and documents for the system, describe or interpret the procedural steps.

Question Source	**Bank**		**Modified Bank**	**X**	**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X 1:P**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**10**	**55.43**			
Time to Complete: 1-2 minutes						

Question 57

The plant is at 80% power with Reactor Recirculation Pump B in local manual control. Which of the following states the impact if the Operator moves the scoop tube operating lever in the **RAISE** direction that scoops **LESS** oil.

A. The MG Set generator output current, voltage, and power will rise.

B. The MG Set generator output current, voltage, and power will lower.

C. The MG Set AC drive motor input current, voltage, and power will rise.

D. The MG Set AC drive motor input current, voltage, and power will lower.

Question # Answer	57 A	Question Developer Initials/Date: 12/9/07

Knowledge and Ability Reference Information		RO	SRO
202002 A1.03 Ability to predict and/or monitor changes in parameters associated with operating the RECIRCULATION FLOW CONTROL SYSTEM controls including: MG set generator current, power, voltage	Importance Rating	2.5	2.4

Level	RO	Tier #	2	Group #	2

References	Simulator		

Explanation:	The plant is at power with a recirculation pump in local manual control, when the operator moves the scoop tube operating lever in the direction that scoops less oil. This will enhance the coupling between the input AC drive motor and the generator and will result in generator speed, current, voltage and power rising, and the recirculation pump will pump more water. (Recall that power = voltage x current) Answer A is correct. If the candidate thinks that scooping less oil will result in the recirculation pump pumping less water, then answer B would be correct. If recirculation pump flow is increased, the MG input AC motor will have an increase in current and power, but voltage will remain constant. If recirculation pump flow is decreased, the MG input AC motor will have a decrease in current and power, but voltage will remain constant. Answers C and D are incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0040 00158 Describe the following components associated with the recirculation flow control system, including location, purpose, construction, operation and power supply: fluid coupler.

Question Source	**Bank**		**Modified Bank**	**X**	**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X 2:DR**		
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**			
Time to Complete: 1-2 minutes						

Question 58

Which of the following aids in providing cooling to the Containment Spray Pump motors when operating in the Torus Cooling Mode?

A. A recirculation fan is designed to always be running in the Containment Spray Pump corner rooms.

B. A recirculation fan will auto start in the Containment Spray Pump corner rooms when a Containment Spray Pump starts.

C. Containment Spray Pump corner room inlet and outlet dampers auto open on pump start to increase air flow into/out of the corner rooms.

D. A recirculation fan is automatically started in the Containment Spray Pump corner rooms whenever room temperature reaches the auto start temperature setpoint.

Question # **Answer**	58 B	**Question Developer Initials/Date: NTP 12/9/07**

<table>
<tr><td colspan="5">Knowledge and Ability Reference Information</td><td>RO</td><td>SRO</td></tr>
<tr><td colspan="5">219000 K4.06
Knowledge of RHR/LPCI: TORUS/SUPPRESSION POOL COOLING MODE design feature(s) and/or interlocks which provide for the following: Pump motor cooling</td><td>Importance Rating</td><td>2.7</td><td>2.7</td></tr>
<tr><td>Level</td><td>RO</td><td>Tier #</td><td>2</td><td>Group #</td><td colspan="3">2</td></tr>
<tr><td colspan="2">References</td><td colspan="2">310</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>Explanation:</td><td colspan="7">When a containment spray pump is started, as would be for initiating torus cooling, a recirculation fan (RF-1-10 or RF-1-11; one fan for each pump set) is set up to auto start. Answer B is correct. Other answers are plausible but incorrect.</td></tr>
<tr><td colspan="2">References to be provided during exam:</td><td colspan="3">None</td><td colspan="3"></td></tr>
<tr><td>Learning Objective</td><td colspan="7">2621-828-0-0009 226-10444
Describe the interlock signals and setpoints for the affected system components and expected system response including power loss or failed components.</td></tr>
</table>

Question Source	**Bank**		**Modified Bank**		**New**	X
Question Cognitive Level:	**Memory or Fundamental Knowledge**	X 1:F	**Comprehension or Analysis**			
10 CFR Part 55 Content:	55.41	7	55.43			
Time to Complete: 1-2 minutes						

Question 59

The plant is at rated power with the following conditions:

- Drywell average temperature is 120 °F
- Drywell Recirculation fans are in the **NORMAL** configuration IAW Procedure 312.9, Primary Containment Control

A fault on Bus 1B23 then occurred. Which of the following states the status of the Drywell Recirculation Fans?

A. Drywell Recirculation Fans 1-1, 1-2, and 1-3 have tripped.

Drywell Recirculation Fans 1-4 and 1-5 remain running.

B. Drywell Recirculation Fans 1-1 and 1-2 have tripped, and Drywell Recirculation Fan 1-3 is unavailable.

Drywell Recirculation Fans 1-4 and 1-5 remain running.

C. Drywell Recirculation Fans 1-4, and 1-5 have tripped.

Drywell Recirculation Fans 1-1,1-2, and 1-3 remain running.

D. Drywell Recirculation Fans 1-4 and 1-5 have tripped.

Drywell Recirculation Fans 1-1 and 1-2 remain running and Drywell Recirculation Fan 1-3 is available.

Question # Answer	59 D	Question Developer Initials/Date: NTP 12/9/07

Knowledge and Ability Reference Information		RO	SRO
223001 K2.09 Knowledge of electrical power supplies to the following: Drywell cooling fans	Importance Rating	2.7	2.9

Level	RO	Tier #	2	Group #	2

References	312.9		

Explanation:	At rated power, average drywell temperature is around 120 °F with the normal recirculation fan lineup of fans 1, 2, 4, and 5. The plant is at power when bus 1B23 is lost. Normally, fans 1, 2, 4, and 5 are operating, with fan 3 in standby. Fans 1, 2, and 3 are powered from Bus 1A23; fans 4 and 5 are powered from Bus 1B23. Therefore, when Bus 1B23 is lost, fans 4 and 5 trip. Fans 1 and 2 remain running and fan 3 is available (but not energized). Answer D is correct.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0032 00432 Given a set of plant conditions, interpret control room and/or local primary containment system indications and evaluate then in terms of limits and trends using available data.

Question Source	Bank		Modified Bank		New	X

Question Cognitive Level:	Memory or Fundamental Knowledge		Comprehension or Analysis	X 3:SPK

10 CFR Part 55 Content:	55.41	7	55.43		

Time to Complete: 1-2 minutes

Question 60

The plant was at rated power when a LOCA occurred. Drywell Sprays have been initiated. IAW the EOP Users Guide, which of the following states the basis for the Conditional Statement below?

> **IF** Drywell sprays have been initiated,
>
> **AND** Torus or Drywell pressure drops below 1 psig,
>
> **THEN** confirm termination of Drywell Sprays.

It provides operating margin to.....

A. the Torus suction header vortex limit.

B. operation of the Drywell-to-Torus vacuum breakers.

C. the Containment Spray Pump trip on low Drywell pressure.

D. operation of the Reactor Building-to-Torus vacuum breakers.

Question # Answer	60 D	Question Developer Initials/Date: NTP 12/9/07

Knowledge and Ability Reference Information		RO	SRO
226001 K5.06 Knowledge of the operational implications of the following concepts as they apply to RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE: Vacuum breaker operation	Importance Rating	2.6	2.8

Level	RO	Tier #	2	Group #	2

References	EOP Users Guide	TS 5.2	

Explanation:	The plant was at rated power when a LOCA occurred and drywell sprays have been manually initiated. There are 2 reasons IAW the users guide: 1) it provides margin to operation of the RB-Torus vacuum breakers which could add oxygen; 2) it maintains a positive margin to the design negative pressures of the drywell and Torus (from TS 5.2.A, these valves are: Drywell: -2 psid; and Torus: -1 psig). Answer D is correct. Answer A is plausible but is more related to low Torus water level instead of Torus pressure. Answer B is incorrect since it refers to the wrong vacuum breaker. It is true that a running containment spray pump will trip at low drywell pressures (0.6 psig), and this is to also prevent going negative in the drywell. But it is not the basis for the conditional statement. Answer C is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.845.0.0042 3000 Using procedure EMG-3200.02, evaluate the technical basis for each step in the procedure and apply this evaluation to determine correct courses of action under emergency conditions.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X 1:B**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**			
Time to Complete: 1-2 minutes						

Question 61

The plant is shutdown and fuel shuffling is taking place. The following annunciator is then received in the Control Room:

- ROD CNTRL – ROD BLOCK

Which of the following states the cause of this alarm?

A. The Main Fuel Hoist was just loaded with a fuel bundle over the core.

B. The Monorail Auxiliary Hoist was just loaded with a control rod blade over the core.

C. The Main Fuel Hoist positioned on a fuel bundle when the grapple ENGAGED light went **ON**.

D. The Main Fuel Hoist was loaded with fuel in the Spent Fuel Pool when a control rod was withdrawn to position 02.

Question # Answer	61 A	Question Developer Initials/Date: NTP 12/9/07

Knowledge and Ability Reference Information		RO	SRO
234000 A3.02 Ability to monitor automatic operations of the FUEL HANDLING EQUIPMENT including: †Interlock operation	Importance Rating	3.1	3.7

Level	RO	Tier #		Group #	

References	USAR Table 7.7-1	656.4.001	360

Explanation:	The plant is shutdown and fuel shuffling is underway. When the hoist loaded light comes on, this means that the hoist is loaded with fuel (as sensed by the load cell). When the hoist is loaded with fuel over the core, a control rod block is installed. Answer A is correct. Even with the bridge over the core, a loaded Monorail Auxiliary Hoist does not install a control rod block. Answer B is incorrect. In answer C, there is not yet any load on the fuel hoist, even though it is positioned over the core. The grapple engaged light verifies that the grapple is closed. It does not input into the rodblock circuit. Answer C is incorrect. A loaded hoist in the SFP does not create a control rod block nor does a single control rod withdrawn to position 2. Answer D is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.812.0.0003 02391 Demonstrate understanding of the interlocks and rod blocks associated with the following refueling platform components, including their purpose and applicable technical specifications: bridge and trolley, main hoist, aux. hoist.

Question Source	**Bank**		**Modified Bank**	**X**	**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:I**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 62

The plant was at rated power when a leak in the steam pressure sensing line to the EPR has developed, causing sensed pressure to **slowly decay**.

Which of the following states the impact on the Turbine Generator System?

A. Generator load (MWe) will rise.

B. Generator load (MWe) will lower.

C. Reactor Pressure Vessel pressure will lower.

D. Generator terminal voltage will require manual adjustment.

Question # Answer	62 B	Question Developer Initials/Date: NTP 12/10/07

Knowledge and Ability Reference Information		RO	SRO
241000 K1.24 Knowledge of the physical connections and/or cause/effect relationships between REACTOR/TURBINE PRESSURE REGULATING SYSTEM and the following: Main generator	Importance Rating	2.7	2.8

Level	RO	Tier #	2	Group #	2

References	Lesson Plan 2621.828.0.0051		

Explanation:	The plant is at power when the pressure sensing line to the electronic pressure regulator (EPR) develops a leak and sensed pressure starts to slowly decay. The EPR is designed to maintain the pressure setpoint. Normally, when reactor power is reduced, RPV pressure lowers and the EPR will close down on the turbine control valves (TCVs) to maintain pressure. This will result in a lower generator output (load). The same response on the generator is expected when the sensing line results in a lower sensed pressure to the EPR – it will act to close down on the TCVs to try to maintain the pressure. Thus, generator load will lower. Answer B is correct. Answer A is incorrect since generator load goes down – not up. Because a change in reactor power is not the cause for the sensed pressure reduction, and with the turbine control valves closing down, RPV pressure will start to rise. Answer C is incorrect. Because generator terminal voltage is automatically controlled, there will be no requirement to manually manipulate the generator terminal voltage (even if it does change). Answer D is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0051 249-10445 Given a set of system indications or date, evaluate and interpret them to determine limits, trends and status.

Question Source	**Bank**		**Modified Bank**	**X**	**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X 3:PEO**		
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**			
Time to Complete: 1-2 minutes						

Question 63

Which of the following conditions would result in a **HIGHER GROUND-LEVEL** radioactivite release rate during the DBA refuel accident?

A. Reactor Building Differential Pressure LOWEST INDICATED changes from –0.10 to +0.15 inches of water.

B. The Reactor Building outer Railroad Airlock door is found to be stuck in the open position and it cannot be closed and sealed.

C. The electric heating coil in the running Standby Gas Treatment System loop is de-energized and the air stream humidity rises to 100%.

D. The Standby Gas Treatment System 1 Fan trips immediately upon startup, with the STANDBY GAS SELECT switch in the SYS 1 position.

Question # Answer	63 A	Question Developer Initials/Date: NTP 12/10/07

Knowledge and Ability Reference Information		RO	SRO
290001 K3.01 Knowledge of the effect that a loss or malfunction of the SECONDARY CONTAINMENT will have on following: Offsite radioactive release rate	Importance Rating	4.0	4.4

Level	RO	Tier #	2	Group #	2

References	TS 3.5 basis	USAR 6.5.1	Lesson Plan 2621.828.0.0042

Explanation:	With a positive pressure in the reactor building during the DBA refuel accident, the leakage from the RB to the outside is greater than when a negative pressure is maintained, as is the norm. Answer A is correct. Even though the RB outer Railroad Airlock door is open, the RB is still closed as long as the inner door is closed. Nothing in the question implies that these other doors are inoperable. Answer B is incorrect. If the heating coil in the running SGT loop failed, the efficiency of the charcoal filters is reduced and this will result in a greater elevated release – not ground level. Answer C is incorrect. When SGT auto starts, both loops initiate. If the selected fan does not provide adequate flow, the non-preferred fan will remain running. This fan trip will not affect either the elevated or ground release rates. Answer D is incorrect.

References to be provided during exam:	None	

Learning Objective	261-10435 2621.828.0.0042 Given plant operating conditions, describe or explain the purpose/function of the system and its components.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X** **2:DR**
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 64

The plant was at rated power when an event occurred. It has been determined that the Standby Liquid Control System injection line has completely sheared just inside the Drywell penetration. Which of the following states the Control Room indicator that is unreliable because of this pipe break?

A. Core ΔP

B. REACTOR LEVEL FUEL ZONE A **ONLY**

C. STANDBY LIQUID CONTROL PUMP DISCH PRESS

D. REACTOR LEVEL NARROW RANGE GEMAC A **ONLY**

Question # Answer	64 A	Question Developer Initials/Date: NTP 12/11/07

Knowledge and Ability Reference Information		RO	SRO
290002 K6.05 Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR VESSEL INTERNALS: SBLC	Importance Rating	3.3	3.4

Level	RO	Tier #	2	Group #	2

References	USAR 7.6.1.1.6	USAR 9.3.5.2	148F712

Explanation:	Differential pressure across the core plate utilizes nozzle N12 which has a pipe within a pipe. The outer pipe detects pressure above the core plate (low pressure leg) and the inner pipe, which is also the liquid poison line, detects pressure below the core plate (high pressure leg). When the SLC line shears, it will also break the inner pipe (core plate high pressure tap). In either event, the core Dp instrument is affected and no longer reliable. Answer A is correct. This same pipe break will also affect fuel zone water level transmitters since the high pressure below core plate line is also the variable leg to the fuel zone A and C water level transmitters. The low pressure above core plate is also the variable leg to fuel zone transmitters B and D. Therefore, level transmitters A and C are impacted, and answer B is incorrect. The RPV water level transmitter, GEMAC A, is unaffected by the SLC pipe break. Answer D is incorrect. The SLC pump discharge pressure instrument is located in the vicinity of the SLC pumps and is not affected, although SLC flow/pressure is affected. The SLC pressure indication will show the correct pump pressure when running, it will just be much lower than normal. Answer C is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0046 211-10453 Explain or describe how this system is interrelated with other systems.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:I**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**7**	**55.43**			
Time to Complete: 1-2 minutes						

Question 65

The plant was at rated power when the following annunciator alarmed:

- CIRC & SERVICE WATER – NRW CHLORINE LEAK

The Intake Operator reports an audible alarm and sees a greenish-yellow vapor cloud.

Which of the following states the required **status or mode** of operation of the Control Room Heating and Ventilation System for these conditions IAW ABN-33, Toxic or Flammable Gas Release?

	Status or Mode
A.	Purge
B.	Full Recirculation
C.	Partial Recirculation
D.	Manually tripped & isolated

Question # **Answer**	**65 B**	**Question Developer Initials/Date: NTP 12/11/07**

Knowledge and Ability Reference Information		**RO**	**SRO**
290003 A4.04 Ability to manually operate and/or monitor in the control room: Environmental conditions	**Importance Rating**	**2.8**	**3.0**

Level	**RO**	**Tier #**	**2**	**Group #**	**2**

References	RAP-K4e	ABN-33	331.1

Explanation:	The plant is at rated power when the control room receives indications of a chlorine gas leak to the environment outside of the control room. IAW the references, the control room HVAC shall be operated in the full recirculation mode. This mode of operation is provided to minimize the intrusion of toxic gases into the control room during a release using no outside air. Answer B is correct. All other answers are plausible vent system modes.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0054 02324 Explain the basis, with use of the procedure, for the four different modes of control room ventilation damper alignment and the effects of the damper alignment modes on control room habitability.

Question Source	**Bank**		**Modified Bank**	**X**	**New**	

Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:P**	**Comprehension or Analysis**	

10 CFR Part 55 Content:	**55.41**	**7**	**55.43**		

Time to Complete: 1-2 minutes

Question 66

The plant was at rated power when an event occurred which allowed the use of Transient Alarm Response. Which of the following states the expectation for alarm announcement by this response **AND** when Transient Alarm Response is exited?

	Transient Alarm Response Alarm Announcement	Transient Alarm Response Exited
A.	**ONLY** those alarms associated with EOP entry conditions should be announced	When announced by the Unit Supervisor
B.	**ONLY** those alarms associated with EOP entry conditions should be announced	When all EOPs have been exited
C.	**ONLY** critical alarms should be announced	When announced by the Unit Supervisor
D.	**ONLY** critical alarms should be announced	When all EOPs have been exited

Question # Answer	66 C	Question Developer Initials/Date: NTP 12/12/07

Knowledge and Ability Reference Information						RO	SRO
2.1.1 Knowledge of conduct of operations requirements					Importance Rating	3.7	3.8
Level	RO	Tier #	3	Group #			

References	OP-OC-101-111-1001		
Explanation:	IAW procedure OP-OC-101-111-1001, Strategies for Successful Transient Mitigation, when transient alarm response is allowed, only critical alarms and results should be announced to the US (Unit Supervisor). The US shall appraise the transient and as conditions permit, exit transient alarm response by announcing to the crew that transient alarm response is being exited. Answer C is correct. Other distractors are plausible in that some are related to normal alarm response or are mis-interpretations of the transient alarm response guideline in the procedure.		
References to be provided during exam:	None		
Learning Objective			

Question Source	Bank		Modified Bank		New	X

Question Cognitive Level:	Memory or Fundamental Knowledge	X 1:P	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	10	55.43	

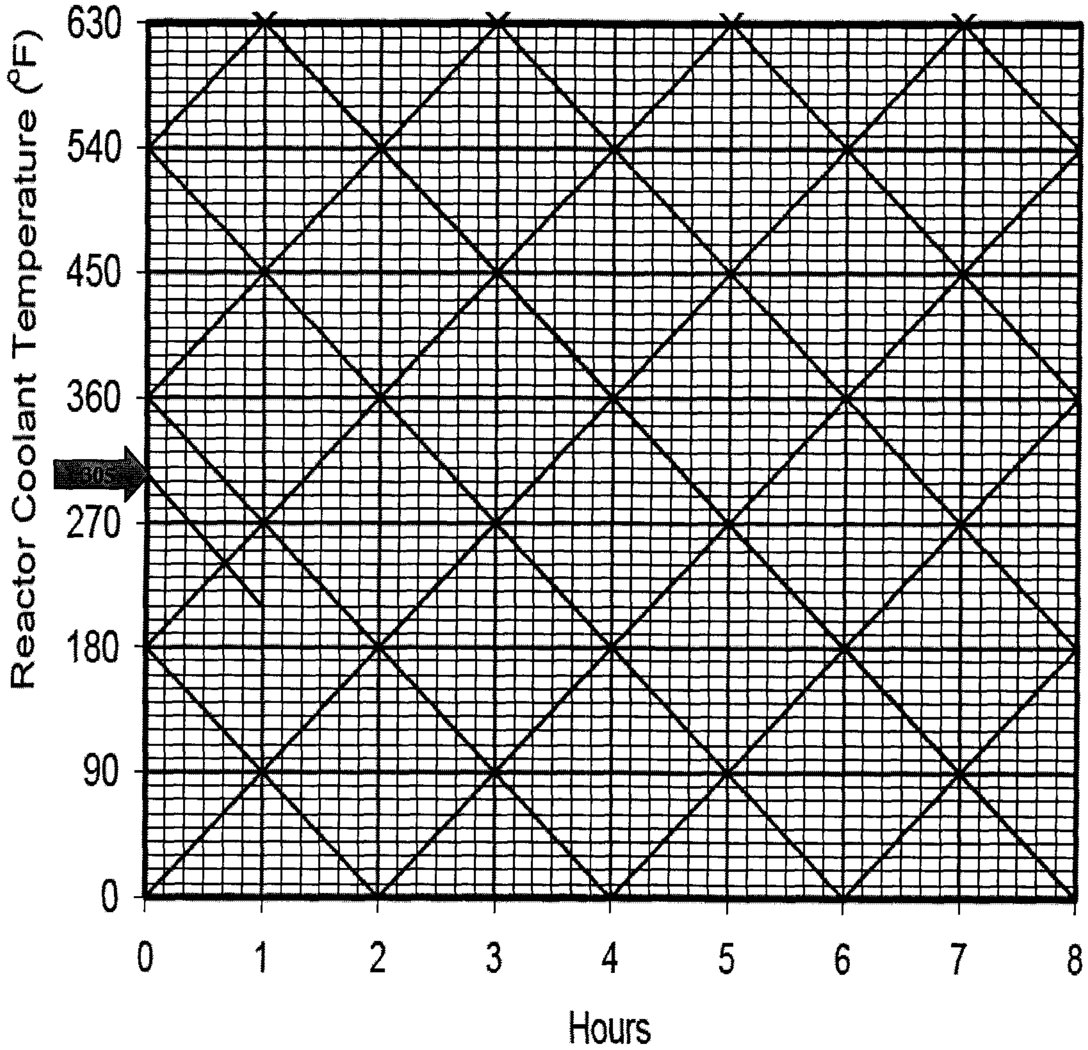
Time to Complete: 1-2 minutes

Question 67

The plant is shut down and is cooling down. The Shutdown Cooling System was placed into service with SDC Pumps A, B and C. The cooldown rate plot over the first hour from procedure 203, Plant Shutdown, is provided (see next page).

Which of the following correctly describes the cooldown rate and what action can be taken to change the cooldown rate? (The starting temperature is as shown on the plot.)

	Cooldown Rate	Action
A.	The cooldown rate should be reduced	Throttle closed RBCCW **INTO** the SDC Heat Exchangers
B.	The cooldown rate should be reduced	Throttle closed RBCCW **OUT OF** the SDC Heat Exchangers
C.	The cooldown rate should be raised	Throttle open RBCCW **INTO** the SDC Heat Exchangers
D.	The cooldown rate should be raised	Throttle open RBCCW **OUT OF** the SDC Heat Exchangers


Reactor Coolant Temperature (°F)
630
540
450
360
305
270
180
90
0
0
1
2
3
4
5
6
7
8
Hours

Question # Answer	67 B	Question Developer Initials/Date: NTP 12/12/07

Knowledge and Ability Reference Information		RO	SRO
2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics / reactor behavior / and instrument interpretation.	Importance Rating	3.7	4.4

Level	RO	Tier #	3	Group #	

References	BR 2006 sh. 1	305	203

Explanation:	The question stem describes a reactor cooldown with SDC, with the cooldown rate plot provided. It can be seen from the plot that the rate is approximately 95 °F/hr (305 – 210 in 1 hour). The procedurally allowed cooldown rate limit is 15 °F/10 minutes = 90 °F/hr. Therefore, the cooldown rate is greater than procedurally allowed and must be reduced. Cooldown rate is reduced by throttling closed V-5-106, SD CLG WTR OUTLET, which is the RBCCW out of the SDC heat exchangers. Answer B is correct and answer A is incorrect. Answers C and D state the incorrect cooldown rate relationship.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0045 205-10445 Given a set of system indications or data, evaluate and interpret then to determine limits, trends and system status.

Question Source	Bank		Modified Bank		New	X

Question Cognitive Level:	Memory or Fundamental Knowledge		Comprehension or Analysis	X 3:SPR

10 CFR Part 55 Content:	55.41	5	55.43		

Time to Complete: 1-2 minutes

Question 68

The plant was at 60% power. A malfunction occurred in the master recirculation controller which caused recirculation flow and reactor power to lower. The Reactor Operator has taken all recirculation speed controllers to MANUAL and the flow/power reduction has ceased. The following conditions exist:

- Reactor power is 45% and steady
- Reactor recirculation flow is 6.5×10^4 GPM

Which of the following actions are required?

A. Manually scram the reactor.

B. Raise reactor power to 60% with control rods.

C. Lower reactor power to 30% with control rods.

D. Raise reactor recirculation flow to 7.0×10^4 GPM.

Question # Answer	68 D	Question Developer Initials/Date: NTP 12/12/07

Knowledge and Ability Reference Information		RO	SRO
2.1.25 Ability to obtain and interpret station reference materials such as graphs / monographs / and tables which contain performance data.	Importance Rating	2.8	3.1

Level	RO	Tier #	3	Group #	

References	202.1	301.2	

Explanation:	The question describes an event in which power and recirculation flow place the plant in the Exclusion Zone on the Power Operations Curve. IAW procedure 202.1, Power Operation, the operator is to exit the zone using rods or flow. The recirculation flow in answer D places the plant outside of the zone. Answer D is correct. Scramming the reactor would place the plant outside of the zone but this is not the intent of the procedural step. Answer A is incorrect. Raising reactor power to 60% would move the plant out of the zone, but it would also pass the scram setpoint. Answer B is incorrect. Lowering reactor power to 30% would not place the plant outside of the zone. Answer C is incorrect.

References to be provided during exam:	Attachment 202.1-2	

Learning Objective	2621.828.0.0040 00224 Identify and interpret normal operating procedures for the recirculation flow control system.

Question Source	Bank		Modified Bank	X	New	

Question Cognitive Level:	Memory or Fundamental Knowledge		Comprehension or Analysis	X 3:SPR

10 CFR Part 55 Content:	55.41	10	55.43		

Time to Complete: 1-2 minutes

Question 69

Which of the following would require the use of a grounding device for a clearance IAW Procedure OP-MA-109-101, Clearance and Tagging? The work will require replacing the motor in each case.

A. SDC Pump

B. ESW Pump

C. Core Spray Booster Pump

D. Containment Spray Pump

Question # Answer	69 B	Question Developer Initials/Date: NTP 12/12/07

Knowledge and Ability Reference Information		RO	SRO
2.2.13 Knowledge of tagging and clearance procedures.	Importance Rating	3.6	3.8

Level	RO	Tier #	3	Group #	

References	OP-MA-109-101		

Explanation:	IAW the reference, proper safety grounding shall be applied prior to working on high voltage equipment when contact with exposed conductors is planned or possible. The reference also defines high voltage as an energy source 600 volts or above. In the work activities listed in the question stem, all will require removal of the motor and the potential for exposed conductors exists. Of the equipment listed, only the ESW Pump is powered from a bus greater than 600 VAC (Bus 1C or 1D). Answer B is correct. SDC pumps are powered from 480 VAC USS 1A2/1B2. Answer A is incorrect. Core Spray Booster pumps are powered from 480 VAC USS 1A2/1B2. Answer C is incorrect. Containment Spray pumps are powered from 480 VAC USS 1A2/1B2. Answer D is incorrect.

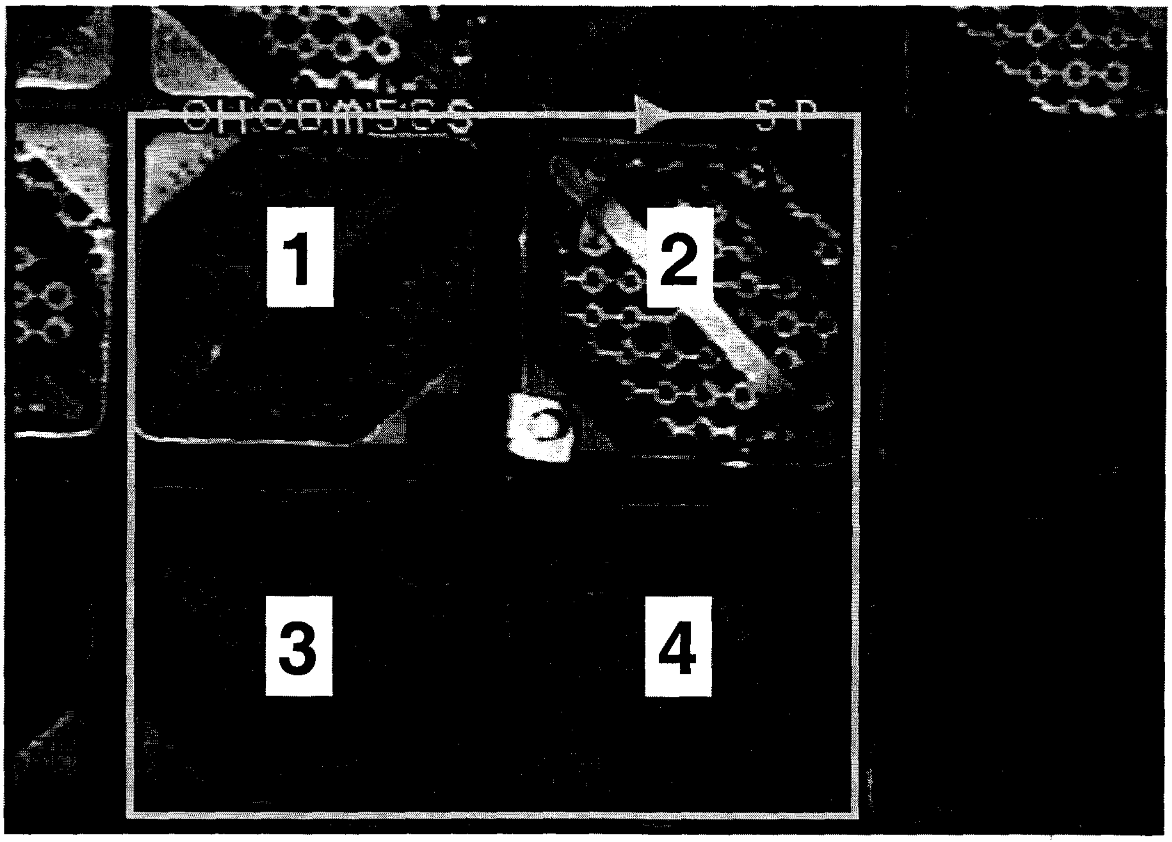
References to be provided during exam:	None	

Learning Objective	

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**			**Comprehension or Analysis**		**X 3:SPK**
10 CFR Part 55 Content:	**55.41**	**10**	**55.43**			
Time to Complete: 1-2 minutes						

Question 70

The plant is shutdown for a refuel outage. Fuel shuffling is in-progress. The fuel cell shown below must be emptied for inspection. Which of the following steps, **IN ORDER**, are performed to allow the control rod to be withdrawn?



	1st Step	2nd Step	3rd Step
A.	Remove bundles 1 & 3	Insert blade guide	Remove bundles 2 & 4
B.	Remove bundles 2 & 3	Remove bundles 1 & 4	Insert blade guide
C.	Remove bundles 1 & 4	Insert blade guide	Remove bundles 2 & 3
D.	Remove bundles 2 & 4	Remove bundles 1 & 3	Insert blade guide

Question # Answer	70 C	Question Developer Initials/Date: NTP 12/14/07

Knowledge and Ability Reference Information		RO	SRO
2.2.27 Knowledge of the refueling process.	Importance Rating	2.6	3.5

Level	RO	Tier #	3	Group #	

References	205		

Explanation:	The fuel cell must have all fuel removed prior to withdrawing the control rod. Diagonal bundles are removed first, then a blade guide installed to support the control rod, then the other diagonal bundles are removed. Answer C is correct.

References to be provided during exam:	None	

Learning Objective	2621.812.0.0003 07442 Describe in general, refueling and fuel handling procedures to include precautions and limitations per procedure 205.

Question Source	Bank		Modified Bank		New	X

Question Cognitive Level:	Memory or Fundamental Knowledge	X 1:P	Comprehension or Analysis	

10 CFR Part 55 Content:	55.41	5	55.43		

Time to Complete: 1-2 minutes

Question 71

A reactor startup is in-progress with the REACTOR MODE SELECTOR switch in STARTUP. The Drywell is being inerted IAW 312.11, Nitrogen System and Containment Atmosphere Control.

Which of the following states the valves used to allow nitrogen to flow into the Drywell **AND** the discharge path for air leaving the Drywell IAW procedure 312.11?

	Nitrogen Flow In	Air Discharge Out
A.	Drywell Purge Valves V-23-13 and V-23-14	Air is exhausted to the Standby Gas Treatment System
B.	Drywell Purge Valves V-23-13 and V-23-14	Air is exhausted to the RB Ventilation System
C.	Torus Purge Valves V-23-15 and V-23-16	Air is exhausted to the Standby Gas Treatment System
D.	Torus Purge Valves V-23-15 and V-23-16	Air is exhausted to the RB Ventilation System

Question # **Answer**	71 B	**Question Developer Initials/Date: NTP 12/14/07**

Knowledge and Ability Reference Information						**RO**	**SRO**
2.3.9 Knowledge of the process for performing a containment purge.					**Importance Rating**	**2.5**	**3.4**
Level	**RO**	**Tier #**	**3**	**Group #**			
References	312.11		13432.19-1		BR 2011 sh. 2		
Explanation:	IAW procedure 312.11, the drywell purge valves (V-23-13 and V-23-14) are open to allow nitrogen gas to flow directly into the drywell. Air is exhausted through the Drywell vent valves (V-72-1 and V-27-2) to the RB ventilation System. Answer B is correct. Answer A is plausible since the Drywell atmosphere could be aligned to the Standby Gas Treatment System but it not during a notrmal inert process. Answers C and D, which admit nitrogen directly to the Torus, are plausible since nitrogen could be added to the Torus and the nitrogen can flow to the Drywell due to operation of the Drywell-Torus vacuum breakers. Some stations use this method to inert.						
References to be provided during exam:	None						
Learning Objective	2621.828.0.0032 00446 Identify and interpret normal, abnormal and Emergency Operating Procedures for the Primary Containment System.						

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X 1:P**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**	**5**	**55.43**			
Time to Complete: 1-2 minutes						

Question 72

The plant was at rated power when the following annunciator alarmed:

- RADIATION MONITORS PROCESS OFF GAS – OFF GAS HI

The Operator reports that the Offgas Radiation Monitors are at the alarm setpoint.

Under the given conditions, which of the following states the required action IAW ABN-26, High Main Steam/Offgas/Stack Effluent Activity?

A. Confirm isolation of the Off Gas System.

B. Reduce reactor power to clear the alarm.

C. Scram the reactor IAW ABN-1, Reactor Scram.

D. Commence a plant shutdown IAW 203, Plant Shutdown.

Question # Answer	72 B	Question Developer Initials/Date: NTP 12/15/07

Knowledge and Ability Reference Information						RO	SRO
2.3.11 Ability to control radiation releases.					Importance Rating	2.7	3.2
Level	RO	Tier #	3	Group #			
References		ABN-26		RAP-10F2c			
Explanation:	The plant is at power when the offgas system radiation monitor alarms. The alarm response refers to ABN-26. IAW ABN-26, the correct action is to reduce power in an attempt to clear the alarm. Answer B is correct. A second alarm occurs at a higher offgas radiation level (offgas radiation hi-hi). When this alarm occurs, the offgas system will isolate after a 15-minute time delay. Answer A is incorrect. Answer C is an appropriate action if the hi-hi alarm is in and cannot be cleared in 15 minutes. Answer C is incorrect. For hi-hi offgas radiation, it is appropriate to initiate a plant shutdown. Answer D is incorrect.						
References to be provided during exam:	None						
Learning Objective	2621.828.0.0004 00200 Interpret given Augmented Off Gas System alarms, and describe the required operator actions IAW the applicable alarm response procedure.						

Question Source	Bank		Modified Bank		New	X
Question Cognitive Level:	Memory or Fundamental Knowledge	X 1:P	Comprehension or Analysis			
10 CFR Part 55 Content:	55.41	5	55.43			
Time to Complete: 1-2 minutes						

Question 73

The plant was at rated power when a **TOTAL** loss of feedwater occurred. The Unit Supervisor has entered the **ONLY** required EOP: RPV Control – No ATWS. Current plant conditions are as follows:

- RPV coolant temperature is 436 °F
- Immediate Operator Actions IAW ABN-1, Reactor Scram, have been performed
- An RPV isolation has occurred

Which of the following states the additional plant response?

A. The ADS timers are timing-down.

B. Core Spray has automatically started and is injecting.

C. Core Spray has automatically started and the EDGs have idle started.

D. Core Spray has automatically started and the EDGs have fast started.

Question # Answer	73 C	Question Developer Initials/Date: NTP 12/15/07

Knowledge and Ability Reference Information		RO	SRO
2.4.2 Knowledge of system set points / interlocks and automatic actions associated with EOP entry conditions.	Importance Rating	4.3	4.6

Level	RO	Tier #	3	Group #	

References	EMG-SP1	341	203 ABN-1

Explanation:	The plant was at rated power when a loss of feedwater occurred. This will result in a loss of RPV water level. An RPV isolation has occurred which can occur at RPV water level lo-lo (86"). This water level would also require entry into RPV Control – No AtWS. High DW pressure is not the RPV Control EOP entry since it does not say that Primary Containment Control EOP has been entered. On the lo-lo setpoint, core spray will auto start and the EDGs will idle start. Core spray is not injecting since RPV pressure is too high (500 °F is less than a 100 °F under normal P/T; therefore RPV pressure is higher than what it would have been for a 100 °F cooldown, which would be a pressure of about 400 psig, which is above the setpoint to open the core spray parallel isolation valves. Thus actual RPV pressure is above this value.). Answer C is correct. There are no indications that drywell pressure is high. Therefore, ADS will not be timing-out (requires RPV water level lo-lo-lo plus high drywell pressure). Answer A is incorrect. Since core spray is not injecting, answer B is incorrect. Since the emergency busses (C and D) still have power, the EDGS do not fast start, but will idle start due to RPV water level. Answer D is incorrect.

References to be provided during exam:	Attachment 203-2 (provided in another question)	

Learning Objective	2621.828.0.0010 209-10444 Describe the interlock signals and setpoints for the affected system components and expected system response including power loss or

	failed components. 2621.828.0.0013 264-10444 Describe the interlock signals and setpoints for the affected system components and expected system response including power loss or failed components.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X** **3:SPK**
10 CFR Part 55 Content:	**55.41**	**10**	**55.43**			
Time to Complete: 1-2 minutes						

Question 74

The plant was at rated power when a break in the Service Water 30" discharge header occurred during excavation at the intake area. The Intake Operator reports a large visible Service Water geyser. The Control Room Operator reports that SERVICE WATER HEADER PRESS indicates 58 psig and steady.

Which of the following actions is required IAW ABN-18, Service Water Failure Response?

A. Reduce Reactor Recirculation flow to 8.5×10^4 gpm.

B. Scram the reactor and trip all reactor recirculation pumps.

C. Swap RBCCW Heat Exchanger cooling to ESW System I.

D. Stop all Service Water Pumps and initiate a reactor shutdown.

Question # Answer	74 C	Question Developer Initials/Date: NTP 12/15/07

Knowledge and Ability Reference Information						RO	SRO
2.4.24 Knowledge of loss of cooling water procedures.					Importance Rating	3.3	3.7
Level	RO	Tier #	3	Group #			

References	ABN-18		

Explanation:	The plant is at power when a major leak occurred in the common SW discharge line and cannot be isolated. This event occurred at Oyster Creek during the current operating cycle and required entry into ABN-18. Answer D, stopping service water pumps, was required by the then-current ABN-18 revision. With a non-isolable leak that effects both SW pumps, the required actions are to enter ABN-19, RBCCW Failure Response and swap RBCCW HX cooling to ESW I. Answer A is incorrect since a reactor scram is only required for a total loss or imminent total loss of SW. With SW discharge pressure steady at 58 psig, the loss is not imminent (normal pressure is approximately 70 psig). Answer A is incorrect. Answer B and D are also actions for an actual or imminent loss and are incorrect.
References to be provided during exam:	None
Learning Objective	2621.828.0.0044 00888 Using the procedure, identify and interpret normal and abnormal operations of the service water system.

Question Source	**Bank**		**Modified Bank**	**X**	**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**X 1:P**	**Comprehension or Analysis**		
10 CFR Part 55 Content:	**55.41**	**10**	**55.43**			
Time to Complete: 1-2 minutes						

Question 75

The plant was at rated power, when the Shift Manager has declared an Unusual Event.

A Reactor Operator can fill which of the following Emergency Plan positions, which notifies the New Jersey State Police Office of Emergency Management of the **INITIAL** event from the Control Room?

A. Incident Assessor

B. Shift Communicator

C. ENS Communicator

D. Operations Communicator – Control Room

Question # Answer	75 B	Question Developer Initials/Date: NTP 12/17/07

Knowledge and Ability Reference Information		RO	SRO
2.4.39 Knowledge of the RO's responsibilities in emergency plan implementation.	Importance Rating	3.3	3.1

Level	RO	Tier #	3	Group #	

References	EP-AA-1010	EP-AA-112-100-F-03	
Explanation:	The Control Room Operators become qualified as the Shift Communicator. Answer B is correct. All other answers are emergency positions but are incorrect.		
References to be provided during exam:	None		
Learning Objective			

Question Source	Bank		Modified Bank		New	X

Question Cognitive Level:	Memory or Fundamental Knowledge	X 1:P	Comprehension or Analysis	

10 CFR Part 55 Content:	55.41	5	55.43		
Time to Complete: 1-2 minutes					

U.S. Nuclear Regulatory Commission

Site-Specific SRO Written Examination

Applicant Information

Name:	
Date:	Facility / Unit: Oyster Creek
Region: I ☒ II ☐ III ☐ IV ☐	Reactor Type: W ☐ CE ☐ BW ☐ GE ☒
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination you must achieve a final grade of at least 80.00 percent overall, with a 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.

Applicant Certification

All work on this examination is my own. I have neither given nor received aid.

____
Applicant's Signature

Results

RO/SRO-Only/Total Examination Values	____ / ____ / ____	Points
Applicant's Scores	____ / ____ / ____	Points
Applicant's Grade	____ / ____ / ____	Percent

OC ILT 07-1 NRC Exam Required References – SRO Written Exam

Question	Reference To Be Provided
1	TS 3.3 (No Basis)
2	10CFR50.72. EP-AA-1010 Hot Matrix in COLOR
4	EP-AA-1010 Cold Matrix in COLOR
5	EMG-SP38 EMG-3200.02 (PCC EOP)
6	EMG-3200.01B (RPVC – with ATWS EOP) **DELETE SP-21 actions in Power Leg**
7	EMG-3200.01A (RPVC – No ATWS EOP)
8	TS 3.2 (No Basis)
10	EMG-3200.11 (SCC EOP) **NOTE: DELETE the major override that refers to SP-49 & -50.**
11	TS 3.5 (No Basis)
12	EMG-3200.01A (RPVC – No ATWS EOP)
13	TS Figures 3.2.1 and 3.2.2 (SLC graphs) TS Figure 4.5.1 TS 3.5
15	EMG-3200.01B (RPVC – with ATWS EOP) **DELETE SP-21 actions in Power Leg**
16	TS 5.3 (No Basis)
17	EMG-3200.01A (RPVC – No ATWS EOP)
18	10CFR50.72
20	TS 3.3.E (No Basis) TS 3.6
24	Calculator

ILT 07-1 NRC Exam - SRO

1. A B C D
2. A B C D
3. A B C D
4. A B C D
5. A B C D
6. A B C D
7. A B C D
8. A B C D
9. A B C D
10. A B C D
11. A B C D
12. A B C D
13. A B C D
14. A B C D
15. A B C D
16. A B C D
17. A B C D
18. A B C D
19. A B C D
20. A B C D
21. A B C D
22. A B C D
23. A B C D
24. A B C D
25. A B C D

KEY

Originated by N. Patron

Verified by S. Sowell

Name: Key Date: ________

Question 1

A plant startup was in-progress. The following conditions currently exist:

- All IRM Range switches are on Range 10
- The REACTOR MODE SELECTOR switch is in STARTUP

An event occurred which resulted in reduced recirculation pump flow, and **NO** operator actions have occurred. Total core flow is 30.2 x 10^6 lb/hr.

Which of the following states the Technical Specification requirements due to this plant condition, **AND** the basis for this requirement?

	Tech Spec Requirement	Basis for TS Requirement
A.	The plant shall be placed in COLD SHUTDOWN within 30 hours.	To prevent transition boiling during a transient.
B.	The plant shall be placed in COLD SHUTDOWN within 24 hours.	To prevent fuel cladding temperature exceeding 1500 °F during a LOCA.
C.	The plant shall be placed in the SHUTDOWN CONDITION within 30 hours.	To prevent exceeding 1% plastic strain on the cladding during a transient.
D.	The plant shall be placed in the SHUTDOWN CONDITION within 24 hours.	To prevent fuel cladding failure during a LOCA.

Question # Answer	1 A	Question Developer Initials/Date: NTP 10/19/07

Knowledge and Ability Reference Information						RO	SRO
295001 2.2.22 (Partial/Complete loss of forced core flow) Knowledge of limiting conditions for operations and safety limits.					Importance Rating	3.4	4.1
Level	SRO	Tier #	1	Group #	1		

References	TS 3.3.H	TS 3.0	

Explanation:	TS 3.3.H says that a minimum flow of 39.65×10^6 lb/hr is required while in Range 10 of the IRMs and the Reactor Mode switch in STARTUP. This is done to ensure the transient MCPR limits are not violated. Maintaining within the MCPR limits will prevent/reduce the amount of transition boiling during a transient. Because this TS does not provide any actions if exceeded, then TS 3.0.A applies, which requires the plant be placed in Cold Shutdown within 30 hours. Answer A lists the correct TS requirement and the correct basis. All other answers are related to other thermal limits and/or provide an incorrect thermal limit basis.

References to be provided during exam:	TS 3.3	

Learning Objective	2621.828.0.0040 00221 Given plant conditions and applicable sections of Technical Specifications, describe which specification applies and what action is required.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X 3:SPR**
10 CFR Part 55 Content:	**55.41**		**55.43**	**2**		
Time to Complete: 1-2 minutes						

Question 2

The plant is at rated power.

Which of the following would require an **IMMEDIATE (1 Hour)** notification to the NRC IAW 10CFR50.72?

A. RPV water level lowered to 76" during a transient.

B. 34.5 KV Bank 5 and Bank 6 were de-energized for 30 minutes.

C. Both EDGs were declared inoperable due to diesel fuel contamination.

D. A vehicle fire located in the main parking lot that was extinguished in 20 minutes.

Question # Answer	**2 B**	**Question Developer Initials/Date: NTP 10/23/07**

Knowledge and Ability Reference Information						**RO**	**SRO**
295003 2.4.30 (Partial/Complete loss of AC power) Knowledge of which events related to system operations/status should be reported to outside agencies.					**Importance Rating**	**2.2**	**3.6**
Level	**SRO**	**Tier #**	**1**	**Group #**	**1**		

References	LS-AA-1400	EP-AA-1010 Hot Matrix	10CFR50.72
Explanation:	IAW EP-AA-1010, the loss of startup transformers SA and SB for > 15 minutes would constitute an unusual event emergency classification (this is represented by Bank 5 and Bank 6). IAW 10CFR50.72, this would require an immediate NRC notification. Answer B is correct. A 4-hour report to the NRC due to RPS actuation or ECCS discharge into the reactor coolant system. Answer A is incorrect. A tech. spec. required shutdown would be required if both EDGs were declared inoperable. A 4-hour report would then be required from the initiation of this shutdown. Answer C is incorrect. A fire, not extinguished within 15 minutes could result in an emergency classification, depending on the location. A vehicle fire in the main parking lot does not have the potential to damage safety systems in any Table H2 areas (from EP-AA-1010, UE classification for fire/explosion, HU6). Thus, no immediate NRC notification is required. Answer D is incorrect.		
References to be provided during exam:	10CFR50.72	EP-AA-1010 Hot Matrix in COLOR	
Learning Objective			

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X 3:SPR**
10 CFR Part 55 Content:	**55.41**		**55.43**	**5**		
Time to Complete: 1-2 minutes						

Question 3

A plant startup was in-progress. The following conditions currently exist:

- RPV pressure is 990 psig
- 5 Turbine Bypass Valves are open
- The REACTOR MODE SELECTOR switch is in RUN
- Preparations are being made to place the generator on line

Which of the following states an expected reactor scram signal and the Technical Specifications basis for the scram signal, if **ALL** Turbine Bypass Valves **SIMULTANEOUSLY** failed opened? (Assume **NO** operator action)

	Scram Signal	TS Basis
A.	Turbine Stop Valve closure	Anticipatory scram for pressure and flux transients
B.	MSIV closure	Anticipatory scram for pressure and flux transients
C.	Turbine Stop Valve closure	To maintain margin to the reactor coolant system pressure safety limit
D.	MSIV closure	To maintain margin to the reactor coolant system pressure safety limit

Question # Answer	3 B	Question Developer Initials/Date: NTP 10/23/07

Knowledge and Ability Reference Information		RO	SRO
295006 AA2.06 Ability to determine and/or interpret the following as they apply to SCRAM: Cause of reactor SCRAM	Importance Rating	3.5	3.8

Level	RO	Tier #	1	Group #	1

References	TS 2.3 Basis		

Explanation:	The question stems describes a plant startup, in preparation for placing the main generator on-line. In this condition the reactor Mode Selector switch is in RUN. Steam to the turbine at this point is minimal, with the majority going through the 5 open turbine bypass valves. When the other 4 turbine bypass valves fail open, reactor pressure will drop below 825 psig and the MSIVs will auto close (the reactor mode switch is still in RUN). MSIV closure scram is to anticipate flux and pressure transients from MSIV closure events and is the correct answer (B). The reactor scram signal from turbine stop valve closure is indeed to anticipate flux and pressure transients. But at this point in the startup, this scram is bypassed due to low turbine load. Answer A and C are incorrect. Answer D lists the incorrect basis (but related to reactor pressure as is the question) and is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.850.0.0090 01658 State the reactor coolant and fuel clad integrity safety limits and briefly describe the bases.

Question Source	**Bank**		**Modified Bank**		**New**	**X**

Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **3:SPK**

10 CFR Part 55 Content:	**55.41**		**55.43**	**2**	

Time to Complete: 1-2 minutes

Question 4

The plant was in a refueling outage with refueling in-progress, when an event occurred.

Which of the following would require an emergency classification and entry into the Site Emergency Plan? (Emergency classifications from "Emergency Director Judgment" are **NOT** to be considered.)

A. RPV water level suddenly dropped by 10".

B. RPV water level indication is lost for 20 minutes.

C. RB ARM C-1 verified to be reading at the MAX SAFE level.

D. Stack RAGEMS indicates 7.93 E3 cps LRM for 30 minutes.

Question # Answer	4 C	Question Developer Initials/Date: NTP 10/23/07

Knowledge and Ability Reference Information		RO	SRO
295023 AA2.05 Ability to determine and/or interpret the following as they apply to REFUELING ACCIDENTS: Entry conditions of emergency plan	Importance Rating	3.2	4.6

Level	SRO	Tier #	1	Group #	1

References	EP-AA-1010	EMG-3200.11 (SCC EOP)	

Explanation:	Answer C states that a RB ARM (Area Radiation Monitor) indicates at the MAX SAFE value, which is 1000 mr/hr (the upscale reading). A UE for Abnormal Rad Levels (RU2) is appropriate if an ARM indicates a valid upscale reading. Answer C is correct. A UE classification would be appropriate if there is an uncontrolled drop in SFP water level or reactor cavity and a valid rise in the refuel floor radiation monitors. Since there are no indications provided that show an increase in these radiation monitors, the UE does not apply (see RU2 for abnormal rad levels). Answer A is incorrect. A UE classification would be appropriate if all RCS temperature and RPV water level indications are lost for > 15 minutes (MU5 for Decay Heat), but since only water level indication is lost, this classification does not apply. Answer B is not correct. A UE classification would be appropriate if stack RAGEMS rose above 7.92 E3 cps for $\geq$ 60 minutes (RU1 for radiological effluent). But since the given rad levels are above this setpoint for only 30 minutes, the classification does not apply. Answer D is incorrect.

References to be provided during exam:	EP-AA-1010 Cold Matrix in COLOR	

Learning Objective	

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X 3:SPR**
10 CFR Part 55 Content:	**55.41**		**55.43**	**5**		
Time to Complete: 1-2 minutes						

Question 5

The plant was at rated power when a LOCA occurred. The following conditions currently exist:

- The RPV has been emergency depressurized
- Primary Containment hydrogen indicates 0.5%
- Containment High Range Radiation Monitors indicate 22,000 R/hr
- Torus pressure is 32 psig
- (Torus – Drywell) ΔP has been calculated as 8 psid
- Wide range Torus level recorder indicates upscale

Which of the following is the correct Primary Containment vent strategy?

	Vent From	Vent Through
A.	Torus	Torus Vent Valves V-23-21 and V-23-22
B.	Drywell	Drywell Purge Valves V-27-3 and V-27-4
C.	Torus	Torus Vent Valves V-28-18 and V-28-47
D.	Drywell	N2 Purge Valves V-23-13 and V-23-14

Question # **Answer**	5 **B**	**Question Developer Initials/Date: NTP 10/23/07**

Knowledge and Ability Reference Information						**RO**	**SRO**
295024 EA2.01 Ability to determine and/or interpret the following as they apply to HIGH DRYWELL PRESSURE: Drywell pressure					**Importance Rating**	4.2	**4.4**
Level	**SRO**	**Tier #**	**1**	**Group #**	**1**		

References	EMG-3200.02, PCC EOP	Support Procedure 38	
Explanation:	The given conditions put the Candidate deep in the pressure leg of the Primary Containment Control EOP. The vent path depends on the Primary Containment Water Level (Torus water level). Information is provided, along with the handout to look on a graph and determine this value (which is 550"). Given this value and the other information, the only correct path is to vent the Drywell through the Drywell Purge Valves, V-27-3 and V-27-4. Answer B is correct. All other options are possible vent paths (in the pressure leg and the combustible gas leg), but are incorrect with the given conditions.		
References to be provided during exam:	EMG-SP38 Primary Containment Control EOP	EMG-3200.02, PCC EOP	
Learning Objective	2621.845.0.0008 03000 Using procedure EMG-3200.02, evaluate the technical basis for each step in the procedure and apply this evaluation to determine correct courses of action under emergency conditions.		

Question Source	**Bank**	**X**	**Modified Bank**		**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X 3:SPR**
10 CFR Part 55 Content:	**55.41**		**55.43**	**5**		
Time to Complete: 2-3 minutes						

Question 6

The plant was at rated power when a feedwater level control event occurred. The following conditions currently exist **1 minute after** the Operator placed the REACTOR MODE SELECTOR switch in SHUTDOWN:

- RPV water level is 184"
- Isolation Condensers have automatically initiated
- EMRV NR108A is cycling
- Control rod position indication has been lost
- Some LPRM downscale lights are **cycling** ON and OFF
- Annunciators FLOW HI/MN STM LINE AREA TEMP HI-HI I **AND** II have alarmed

Which of the following states the **INITIAL** RPV pressure control strategy?

A. Open EMRVs to maintain RPV pressure 920 psig to below 1045 psig.

B. Depressurize the RPV with EMRVs to maintain the cooldown rate below 100 °F/hr.

C. Manually open the Turbine Bypass Valves to maintain RPV pressure below 1045 psig.

D. Continue to use Isolation Condensers to maintain RPV pressure 920 psig to below 1045 psig.

Question # **Answer**	6 A	**Question Developer Initials/Date: NTP 10/23/07**

Knowledge and Ability Reference Information						**RO**	**SRO**
295025 2.4.6 (High reactor Pressure) Knowledge symptom based EOP mitigation strategies.					**Importance Rating**	**3.1**	**4.0**
Level	**SRO**	**Tier #**	**1**	**Group #**	**1**		

References	EMG-3200.01B		

Explanation:	The question stem describes a failure to scram event (EMRV cycling and LPRM downscale lights cycling on/off), and therefore entry into RPV Control – With ATWS is required. Establishing a normal cooldown is not appropriate, and thus answer B is incorrect. Manually controlling the EMRV to reduce RPV pressure to 920 psig and then maintain < 1040 is correct. Answer A is correct. Using the turbine bypass valve to control pressure is not appropriate since there are indications that the MSIVs have automatically gone closed. Answer C is incorrect. The use of isolation condensers is not allowed in the ATWS EOP when RPV water level reaches 180", and the isolation condenser DC valves should be closed. Answer D is incorrect.

References to be provided during exam:	EMG-3200.01B (RPVC – W/ATWS)	

Learning Objective	2621.845.0.0004 03080 Given a copy of EMG-3200.01B, explain the actions to be taken to control level, pressure, and power, and the consequences of failing to control these parameters.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X** **3:SPR**
10 CFR Part 55 Content:	55.41		55.43	5		
Time to Complete: 1-2 minutes						

Question 7

The reactor was at rated power when an event occurred. Current plant conditions are as follows:

- All control rods indicate full-in
- RPV water level lowered to 130" and has recovered to 182"
- RPV pressure is 900 psig
- Drywell temperature is 225 °F and steady
- Drywell pressure is 2 psig and steady
- Torus water level is 120" and steady
- Torus water temperature is 158 °F and rising slowly

Which of the following actions is required?

A. Line-up and spray the Drywell.

B. Emergency Depressurize the RPV.

C. Lower RPV pressure with EMRVs.

D. Lower RPV pressure with Isolation Condensers.

Question # Answer	7 C	Question Developer Initials/Date: NTP 10/23/07

Knowledge and Ability Reference Information		RO	SRO
295030 EA2.03 Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL: Reactor pressure	Importance Rating	3.7	3.9

Level	SRO	Tier #	1	Group #	1

References	EMG-3200.01A (RPVC-NA)	EMG-3200.02 (PCC)	EOP Users Guide

Explanation:	A loss of Drywell cooling, with controlled Drywell venting can result in the Drywell conditions listed. A Torus leak combined with EMRV leakage, with no Torus cooling can result in the Torus indications listed. From the conditions in the question stem, it is given that the reactor has scrammed. The plant has entered RPV Control – No ATWS EOP (RPVC-NA EOP) on low RPV water level, and Primary Containment Control EOP (PCC EOP) due to low Torus water level and high DW temperature. There are no parameters that require an emergency depressurization. Currently, the Heat Capacity Temperature Limit Curve is not violated but will be violated if RPV pressure is maintained constant and Torus temperature continues to rise. If Torus temperature and RPV water level cannot be maintained below HCTL, ED will be required. IAW the RPV Control – No ATWS EOP, if Torus temperature cannot be maintained below HCTL, then maintain RPV pressure below HCTL. This action will prevent the need to ED. Because RPV water level is > 180", the Isolation Condensers cannot be used to reduce RPV pressure. The EMRVS can be used to lower RPV pressure. Answer C is correct. Spraying the Drywell is not appropriate since Drywell is < 12 psig, and since Drywell parameters are on the bad side of the Containment Spray Initiation Limit Curve. Answer A is incorrect. Because HCTL is not currently violated and lowering RPV pressure can prevent the need to ED, answer B is incorrect. Answer D is incorrect since RPV water level precludes the use of the

	Isolation Condensers.						
References to be provided during exam:	RPVC – No ATWS EOP						
Learning Objective	2621.845.0.0042 3000 Using EMG-3200.02, evaluate the technical basis for each step in the procedure and apply this evaluation to determine correct courses of action under emergency conditions.						
Question Source	**Bank**		**Modified Bank**	**X**	**New**		
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **3:SPR**			
10 CFR Part 55 Content:	**55.41**		**55.43**	**5**			
Time to Complete: 1-2 minutes							

Question 8

The plant was starting up after a refuel outage. Current plant conditions are as follows:

- Control rod withdrawals have begun.
- The point of adding heat has **NOT** yet been reached.
- The neutron flux is increasing with a stable, positive period without additional control rod movement.
- The last control rod movement was **AFTER** the –1% dk sequence step in the ECP.
- The shutdown margin has **NOT** yet been demonstrated.

Which of the following states the required Technical Specifications action and the associated TS Basis?

	Required TS Action	TS Basis
A.	Immediately fully insert the control rods in the reverse order until the reactor is subcritical.	A 1% reactivity limit is considered unsafe since an insertion of this reactivity into the core would lead to transients exceeding design conditions.
B.	Fully insert all insertable control rods within 1 hour and verify operability of the Standby Liquid Control System.	A control rod drop accident combined with a failure to meet SDM can lead to fuel damage and a loss of equipment important to safety.
C.	Meet the SDM requirement within 6 hours or be in the SHUTDOWN CONDITION within the following 12 hours.	If the SDM cannot be restored, shutdown is required to minimize the potential of a malfunction of equipment important to safety.
D.	Meet the SDM requirement within 6 hours or be in the SHUTDOWN CONDITION within the following 12 hours.	A 1% reactivity limit is considered safe since an insertion of this reactivity into the core would not lead to transients exceeding design conditions.

Question # Answer	8 C	Question Developer Initials/Date: NTP 10/24/07

Knowledge and Ability Reference Information		RO	SRO
295014 AA2.01 Ability to determine and/or interpret the following as they apply to INADVERTENT REACTIVITY ADDITION: Reactor power	Importance Rating	4.1	4.2

Level	SRO	Tier #	1	Group #	2

References	TS 3.2	201	

Explanation:	The question stem describes a reactor startup, with the indications that the reactor is critical. The 1% reactivity anomaly has been demonstrated but the reactor is critical before being able to ensure the shutdown margin has been met. IAW TS 3.2.A.3, when in the startup or run modes, the SDM must be met within 6 hours or be in the shutdown condition within the following 12 hours. Answer C is correct. The other answers list other TS requirements (loss of SDM in the shutdown condition or reactivity anomalies, or actions required by the Startup Procedure, 201) and/or the basis is incorrect.

References to be provided during exam:	TS 3.2	

Learning Objective	2621.828.0.0011 10451 Given Technical Specifications, identify and explain associated actions for each section of the Tech Specs relating to this system including personnel allocation and equipment operation.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X** **3:SPR**
10 CFR Part 55 Content:	**55.41**		**55.43**	**2**		
Time to Complete: 2-3 minutes						

Question 9

Which of the following states **(1)** a condition requiring entry into an EOP, **AND (2)** the associated Technical Specification basis for the limit of the associated EOP entry condition?

	(1)	(2)
A.	RPV water level 11' 5" above TAF	Provides margin to the fuel integrity safety limit
B.	Drywell pressure 3.6 psig	Provides margin to the Primary Containment integrity safety limit
C.	Torus water level 83,000 ft^3	Ensures operability of ECCS equipment in the corner rooms
D.	Torus water temperature of 96 °F	Prevents Torus over-loading during an RPV blowdown at high pressures

Question # Answer	9 A	Question Developer Initials/Date: NTP 10/24/07

Knowledge and Ability Reference Information						RO	SRO
295009 2.4.4 (Low reactor water level) Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.					Importance Rating	4.0	4.3
Level	SRO	Tier #	1	Group #	2		
References	TS 2.3 Bases						
Explanation:	IAW TS 2.3 Bases, the LSSS for low RPV water level is set ≥ 11'5" to assure maintaining the fuel integrity safety limit. This water level equates to 137", which is an EOP entry. Answer A is correct. TS Table 3.1.1 requires a reactor scram at a Drywell pressure ≤ 3.5 psig, which would also require an EOP entry. There is no Drywell integrity safety limit. Answer B is incorrect. TS 3.5 requires a minimum Torus volume of 82,000 ft^3, and IAW the EOP Bases, this equates to a water level of 143". This would not require an EOP entry (< 143"), but the basis is correct. Answer C is incorrect. TS 3.5 also requires a maximum Torus water temperature of 95 °F, and is also an EOP entry condition (>95 °F), but the bases is incorrect. Answer D is incorrect.						
References to be provided during exam:	None						
Learning Objective	2621.845.0.0003 03053 Explain the basis for each of the EMG-3200.01 entry conditions.						
Question Source	Bank		Modified Bank		New	X	
Question Cognitive Level:	Memory or Fundamental Knowledge	X 1:B	Comprehension or Analysis				
10 CFR Part 55 Content:	55.41		55.43	2			
Time to Complete: 1-2 minutes							

Question 10

The plant was at rated power when the following annunciators alarmed:

- RWCU HELB I **AND** RWCU HELB II
- CU ROOM TEMP HI
- AREA MON HI

IAW the RAP, the Operator attempted to manually isolate the Cleanup System, but valve V-16-1, Cleanup System Isolation Valve, and valve V-16-14, Cleanup SYSTEM INLET Valve, both indicate red light ON and green light OFF.

The following conditions are also noted by the Operator:

- Area Radiation Monitor C-1 indicates 45 mr/hr and rising slowly
- Temperature indicator IB06-15 indicates 211 °F and rising slowly

Which of the following states the correct action?

A. Shutdown the reactor when area radiation monitor C-4 reaches 50 mr/hr.

B. Immediately scram the reactor and place the Mode Switch in SHUTDOWN.

C. Shutdown the reactor when the NW Corner Room water level reaches 16".

D. Emergency depressurize the reactor when temperature indicator IB06-17 reaches 212 °F.

Question # Answer	10 B	Question Developer Initials/Date: NTP 10/24/07

Knowledge and Ability Reference Information		RO	SRO
295032 EA2.03 Ability to determine and/or interpret the following as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE: Cause of high area temperature	**Importance Rating**	3.8	4.0

Level	SRO	Tier #	1	Group #	2

References	EMG-3200.12 (SCC EOP)		

Explanation:	The question stem presents indications of a cleanup system leak with the cleanup system failing to isolate. One temperature indicator is above the max safe value. IAW the Secondary Containment Control EOP, with a primary system discharging into the secondary containment, before any area temperature reaches the max safe value, a reactor scram and entry into the RPV Control – No ARWS EOP is required. Since this value is already exceeded, a manual reactor scram is required now. Answer B is correct. IAW the Secondary Containment Control EOP, with a primary system discharging into secondary containment, a scram is required before any area radiation level reaches the max safe value. A shutdown is required if area radiation levels in 2 or more areas are above the max safe. Answer A is incorrect. IAW the Secondary Containment Control EOP, a reactor shutdown is required when water levels in 2 areas are above the max safe. No water level is above this value. A scram is required, with a primary system discharge before any water level reaches the max safe value. The term "shutdown the reactor" and "scram the reactor" are 2 different actions. Answer D is incorrect. When a primary system is discharging, then ED is required when area temperatures exceed the max safe value in $\geq$ 2 areas. The temperature indicators, which are above max safe, are both in the same area. Answer D is incorrect.

References to be provided during exam:	EMG-3200.11 (SCC EOP)	

Learning Objective	2621.845.0.0011 03082 Using procedure 3200.11, evaluate the technical basis for each step and apply this evaluation to determine the correct courses of action under emergency conditions.

Question Source	**Bank**		**Modified Bank**		**New**	**X**

Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **3:SPR**

10 CFR Part 55 Content:	**55.41**		**55.43**	**5**	

Time to Complete: 1-2 minutes

Question 11

A plant shutdown was in progress in preparation for a refuel outage. Current plant conditions are as follows:

- Shutdown Cooling Pump A is in service
- Shutdown Cooling Pump B is in service
- Shutdown Cooling Pump C is in standby
- RPV coolant temperature is 325 °F and lowering

The following annunciator just alarmed:

- DC-1 PWR LOST

The Operator reports that position indication to V-17-1 and V-17-2 have been lost (SDC Loop A suction valve and SDC Loop B suction valve).

Which of the following states the impact on the Shutdown Cooling System and the action required related to the Shutdown Cooling System **ONLY**?

	Impact on Shutdown Cooling	SDC Required Action
A.	The Shutdown Cooling System shall be declared inoperable	Isolate the Shutdown Cooling System **WITHIN** 4 hours
B.	Shutdown Cooling Loops A and B **ONLY** shall be declared inoperable	Remove Shutdown Cooling Loops A and B from service **WITHIN** 4 hours
C.	Declare impacted Shutdown Cooling System Primary Containment Isolation Valves inoperable	Restore Shutdown Cooling Primary Containment Isolation Valves to operable **BY THE TIME** the REACTOR MODE SELECTOR switch is placed in RUN on plant startup
D.	Declare impacted Shutdown Cooling System Primary Containment Isolation Valves inoperable	Restore Shutdown Cooling Primary Containment Isolation Valves to operable **PRIOR TO** declaring the reactor critical on plant startup

Question # Answer	11 D	Question Developer Initials/Date: NTP 10/25/07

Knowledge and Ability Reference Information		RO	SRO
205000 A2.04 Ability to (a) predict the impacts of the following on the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: D.C. failure	**Importance Rating**	2.5	2.6

Level	SRO	Tier #	2	Group #	1

References	TS 3.5.A.3 TS 3.5.A.3.a.3	Procedure 305 RAP-9XF4d	USAR Table 6.2-12

Explanation:

The question stem shows that Shutdown Cooling (SDC) is in service with Loops A and B. IAW Procedure 305 and the USAR reference, the SDC Loop suction and discharge valves are considered primary containment isolation valves. All of these 6 valves (suction & discharge for each of 3 loops) are powered from 125 VDC MCC DC1. Therefore, 4 of the 6 inoperable valves are open with RPV coolant temperature above 212 °F. These valves shall be declared inoperable. TS 3.5.3.A.3.a.3 allows inoperable SDC containment isolation valves with RPV coolant temperature < 350 °F. The same Tech Spec requires that the inoperable valves be made operable prior to placing the reactor in the condition where Primary Containment is required (as when the plant is started-up).

From TS 3.5.A.3, primary containment shall be maintained when the reactor is critical or RPV temperature is above 212 °F. Therefore, there is no requirement to alter the current SDC configuration, although the valves are inoperable. But, the valves must be made operable prior to either declaring the reactor critical, or exceeding cold shutdown temperatures (ie, > 212 °F) [since either of these conditions require primary containment integrity] Answer D is correct. Answer A and B are incorrect since there is no requirement to remove SDC from service. Because the reactor is past initial criticality and RPV coolant temperature is in excess of 500 °F when the reactor mode switch is placed in RUN (ie, this is past the 2 conditions that require primary containment to be established), verifying containment

	isolation valve operability at this point would be too late. Answer C is incorrect.						
References to be provided during exam:	TS 3.5						
Learning Objective	2621.828.0.0045 205-10451 Given Technical Specifications, identify and explain associated actions for each section of the Technical Specifications relating to this system including personnel allocation and equipment operation.						
Question Source	**Bank**		**Modified Bank**		**New**	**X**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **3:SPR**			
10 CFR Part 55 Content:	**55.41**		**55.43**	**2**			
Time to Complete: 2-3 minutes							

Question 12

A plant startup was in-progress. Current conditions are as follows:

- RPV pressure is 700 psig and rising slowly
- RPV water level is in the normal band
- Control rods are being withdrawn
- Feedwater Pump A is in service

The following events then occurred:

- RPS MG SET 1 TRIP annunciator alarmed
- RPV water level swelled to 181"

Which of the following states the strategy to lower RPV pressure as directed by the SRO?

A. Use the EMRVs.

B. Adjust the MPR setpoint.

C. Use the Isolation Condensers Vents.

D. Use the BYPASS VALVE OPENING JACK.

Question # Answer	12 A	Question Developer Initials/Date: NTP 10/26/07

Knowledge and Ability Reference Information		RO	SRO
212000 A2.11 Ability to (a) predict the impacts 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: Main steamline isolation valve closure	**Importance Rating**	**4.1**	**4.1**

Level	SRO	Tier #	2	Group #	1

References	EMG-3200.01A (RPVC – No ATWS)	237E566, sheets 3, 7 EMG-SP15	RAP-G2c, RAP-J1d 408.12

Explanation:	Under the conditions in the stem, with RPV pressure less that 825 psig (TS value), a single RPS Bus loss will result in a full reactor scram and closure of the MSIVs. With the closure of the MSIVs, changing the MPR setpoint or the Bypass Valve Opening Jack will have no impact on RPV pressure. Answers B and D are incorrect. Also, the FW Pump tripped on high RPV water level (which occurs at 181"). At this RPV water level, the EOPs (RPV Control – No ATWS) direct that the isolation condensers DC steam IVs closed. EMG-SP15, Alternate Pressure Control Systems IC Tube Side Vents, requires that in order to use the IC vents, that the ICs are not required to be isolated. Since the EOP requires the DC steam valve closed, then use of the tube side vents is not allowed. Therefore answer C is incorrect. The EMRVs can be still used to control RPV pressure. Even though the use of EMRVs require Torus water level above 90", the event started at normal level of approximately 150" and can be assumed to the same. Therefore, answer A is correct.

References to be provided during exam:	EMG-3200.01A (RPVC – No ATWS)	

Learning Objective	2621.828.0.0037 212-10445 Given a set of system indications or date, evaluate and interpret them

	to determine limits, trends, and system status. 2621.845.0.0040 3054 Given a copy of RPV Control, describe in detail each step or conditional statement, including technical basis, and how to perform each step as required.

Question Source	**Bank**		**Modified Bank**	**X**	**New**	

Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **3:SPR**

10 CFR Part 55 Content:	**55.41**		**55.43**	**5**	

Time to Complete: 1-2 minutes

Question 13

The plant is at rated power. Which of the following events would require the SRO to make a notification IAW OP-AA-106-101, Significant Event Reporting?

A. The Trunion Room door was opened to allow entry of RP Technicians to perform surveys.

B. The SGTS Fan 2, whose motor failed yesterday, can not be repaired or replaced until 10 days from now.

C. Surveillance showed that at 2600 scfm, the pressure drop across the SGTS HEPA filter measured at 2.2 inches of water.

D. Analysis of the Standby Liquid Control System Poison Tank showed a tank volume of 1400 gallons, 18 weight percent of Sodium Pentaborate Solution, at a temperature of 95 °F.

Question # Answer	13 B	Question Developer Initials/Date: NTP 10/26/07

Knowledge and Ability Reference Information						**RO**	**SRO**
261000 2.1.14 (SGTS) Knowledge of system status criteria which require the notification of plant personnel.					**Importance Rating**	2.5	3.3
Level	**SRO**	**Tier #**	2	**Group #**	1		
References		TS 3.5.b.5 OP-OC-108-104-1001		OP-AA-106-101	TS Figure 4.5.1		

Explanation:	IAW OP-OC-108010401001, Guidance for Limiting and Administrative Conditions for Operations, if it is determined that condition cannot be rectified prior to expiration of the LCO clock, then consider the LCO clock expired and commence a controlled shutdown. IAW OP-AA-106-101, Significant Event Reporting, notification is required if an LCO action that will not be met within the allowable time requirement. TS 3.5.b.5, Secondary Containment, allows 1 SGT System to be inoperable for 7 days. A failed motor would render 1 SGTS fan inoperable. Tech Specs allows one SGTS train to be inoperable for 7 days. Knowledge that the SGTS motor will not be fixed until 10 days from now, it will exceed the TS allowed time of 7 days. Therefore, notification IAW OP-AA-106-101 is required. The SRO will notify the Duty Station Manager (DSM), who is a plant management employee. Answer B is correct. In the current plant condition, Secondary Containment integrity is required. But IAW TS definition 1.14.A, momentary opening of the Trunion Room door is allowed. Therefore, this is a non-event and no DSM notification is required. Answer A is incorrect. IAW TS 4.5.H.1.b.1, the pressure drop across the SGTS HEPA filter must be less than provided in Figure 4.5.1. The data provided places it less than the maximum allowed and no violation has occurred and no notifications are required. Answer C is incorrect. The indications of the Standby Liquid Control poison tank fall within the Tech Specs limits, and therefore no notification is required. Answer D is incorrect. The KA is directly matched in that the question requires the candidate

	to choose what events requires the notification of plant personnel.					
References to be provided during exam:	TS Figures 3.2.1 and 3.2.2 TS 3.5		TS Figure 4.5.1			
Learning Objective	2621.828.0.0042 261-10451 Given Technical Specifications, identify and explain associated actions for each section of the Technical Specifications relating to this system including personnel allocation and equipment operation.					
Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X** **3:SPK**
10 CFR Part 55 Content:	**55.41**		**55.43**	**5**		
Time to Complete: 2-3 minutes						

Question 14

Which of the following states the bases for Technical Specifications 3.7.D.1.a?

Tech Spec 3.7:

D. Station Batteries and Associated Battery Chargers

1. With one required station battery B or C charger inoperable:

   a. Restore associated station battery terminal voltage to greater than or equal to the minimum established float voltage within 2 hours,

This provides good assurance that ....

A. the affected battery will be restored to its fully charged state within 12 hours.

B. the affected battery will be restored to its fully charged state within 24 hours.

C. the design current-carrying capacity of the affected battery will be restored within 24 hours.

D. the battery charger current carrying capacity will not be exceeded when the charger is returned to service after 2 hours.

Question # Answer	14 A	Question Developer Initials/Date: NTP 10/26/07

Knowledge and Ability Reference Information		RO	SRO
263000 2.2.25 (DC Electrical Distribution) Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	**Importance Rating**	2.5	3.7

Level	**SRO**	**Tier #**	**2**	**Group #**	**1**

References	TS 3.7 Bases		
Explanation:	The TS Bases for 3.7.D.1.a states that “restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, within 12 hours, the associated battery will be restored to its fully charged condition (as verified by Action 3.7.D.1.b) from any discharge that might have occurred due to the charger inoperability.” Answer A is correct and all other answers are incorrect.		
References to be provided during exam:	None		
Learning Objective	2621.828.0.0012 263-10451 Given Technical Specifications, identify and explain associated actions for each section of the Technical Specifications relating to this system, including personnel allocation and equipment operation.		

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X 1:B**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**		**55.43**	**2**		
Time to Complete: 1-2 minutes						

Question 15

The plant was at rated power when the following annunciator alarmed:

- ROD CONTROL – CONTROL AIR PRESS LO

The TB Operator reports that the in-service drying tower has isolated and the standby drying tower cannot be placed into operation. The SRO ordered a manual reactor scram when INSTR AIR SUPPLY PRESS indicated < 60 psig and lowering. With the REACTOR MODE SELECTOR switch in SHUTDOWN, the current plant conditions are as follows:

- **ALL** of the LPRM amber lights on the full core display are LIT
- RPV water level is 120" and rising
- The MASTER RECIRC SPEED CONTROLLER indicates 35 hertz
- 8 control rods indicate position 22

Assuming that a drying tower **CANNOT** be restored and indicated air pressure has decayed to 0 psig, which of the following states the plant impact and the required action directed by the SRO?

	Plant Impact	Required Action
A.	Main steam flow to the turbine and/or condenser is isolated	Stabilize RPV pressure below 1045 psig with the Isolation Condensers
B.	The Recirculation MG fluid couplers have locked up	Place the Recirculation Pumps in local manual control and reduce to minimum
C.	The CRD DRIVE WATER Pressure Control valve has failed closed	Place the bypass Pressure Control valve in-service and manually insert control rods
D.	The Feedwater MFRVs have locked up	Terminate and prevent Feedwater by closing the Heater Bank Outlet valves

Question # Answer	15 A	Question Developer Initials/Date: NTP 10/26/07

Knowledge and Ability Reference Information						RO	SRO
300000 A2.01 Ability to (a) predict the impacts of the following on the INSTRUMENT AIR SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Air dryer and filter malfunctions					Importance Rating	2.9	2.8
Level	SRO	Tier #	2	Group #	1		
References		EMG-3200.01B (RPVC – With ATWS)	ABN-35		BR 2013, sheets 1, 3		
Explanation:	The question describes a loss of air event and a failure of the reactor to scram, with reactor power < 2% (since all LPRM amber lights are lit). With air pressure at 0 psig, the outside MSIVs have closed and thus steam flow to the turbine or condenser is isolated, and IAW the ATW EOP, pressure control should be stabilized < 1045 psig. Pressure control with the Isolation Condensers is allowed (as long as RPV water level is < 160", which it is). Answer A is correct. It is true that with a loss of instrument air, the Recirculation MG fluid couplers (scoop tubes) lock up in their current position. The question stem shows that the recirculation pumps are currently at 35 hertz, which is way above the minimum. IAW the ATWS EOP, flowing back recirculation flow to minimum is required when the main generator is on-line. The stem does not provide any indications that the turbine generator did not trip, and thus it is correct to assume that it has. Since the generator is not online, reducing recirculation flow is not required (although the step is the correct way to control recirculation flow during a loss of air event). Answer B is incorrect. It is true that the in-service CRD FCV fails closed on loss of air, but the CRD drive water PCV is motor operated, and is unaffected by the loss of air. Since the CRD FCV has failed closed, CRD water supply is not available downstream to manually insert control rods. Answer C is incorrect. The feedwater MFRV will lock up on loss of air (but may slowly drift open or closed). But since RPV water level is 120" and reactor power							

	< 2%, there is no need to terminate and prevent feedwater (although the listed method is one correct method to control feedwater flow during a loss of air event). Answer D is incorrect.						
References to be provided during exam:	EMG-3200.01B (RPVC – With ATWS)						
Learning Objective	2621.845.0.0041 3055 Given a copy of RPV Control, describe in detail each step or conditional statement, including technical basis, and how to perform each step as required 2621.828.0.0043						
Question Source	**Bank**		**Modified Bank**		**New**	X	
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	X 3:SPK			
10 CFR Part 55 Content:	**55.41**		**55.43**	**5**			
Time to Complete: 1-2 minutes							

Question 16

The plant was starting up after a refuel outage. Radwaste notified the Control Room of receipt of the following NRW annunciator:

- NV-37 FUEL POOL FILTER FLOW LOW

30 minutes later, the following annunciator then alarmed in the main Control Room:

- FUEL POOL – POOL LEVEL/TEMP HI

The Reactor Building Operator reports that Fuel Pool temperature is 116 °F and rising at 1°F/minute. If this condition **CANNOT** be corrected in the next 10 minutes, which of the following states the plant impact and the required Technical Specifications action?

	Impact	Required Action
A.	The margin to the amount of allowable positive reactivity in the Fuel Pool is reduced	The plant shall be placed in COLD SHUTDOWN in 24 hours
B.	The margin to the amount of allowable Fuel Pool corrosion is reduced	Alternate Fuel Pool cooling shall be established prior to exceeding 150 °F
C.	The margin to ensuring the structural integrity of the Fuel Pool is reduced	The plant shall be placed in COLD SHUTDOWN in 30 hours
D.	The margin to the assumptions used in the Reactor Building flooding analysis is reduced	The plant shall be placed in HOT SHUTDOWN in 30 hours

Question # Answer	16 C	Question Developer Initials/Date: NTP 10/27/07

Knowledge and Ability Reference Information		RO	SRO
233000 A2.07 Ability to (a) predict the impacts of the following on the FUEL POOL COOLING AND CLEAN-UP; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: High fuel pool temperature	Importance Rating	3.0	3.2

Level	SRO	Tier #	2	Group #	2

References	TS 5.3.1.D TS 3.0.A	RAP-G4a	

Explanation:	The question stem shows the loss of fuel pool cooling (low flow and high fuel pool temperature) during a reactor startup after a refuel outage. After 10 minutes, fuel pool temperature will reach 126 °F, while TS 5.3.1.D limit is 125 °F. Since there is no direct action statement, then TS 3.0.A applies which requires the plant to be in cold shutdown in 30 hours. The basis for the pool temperature limit is based on ensuring the structural integrity of the fuel pool. Answer C is correct.

References to be provided during exam:	TS 5.3	

Learning Objective	2621.828.0.0020 00488 With the aid of Tech Specs, explain each Tech Spec design basis applicable to Augmented & Fuel Pool Cooling System.

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X 1:B**	**Comprehension or Analysis**			**X 3:SPK**
10 CFR Part 55 Content:	**55.41**		**55.43**	**2**		
Time to Complete: 1-2 minutes						

Question 17

The reactor was at 28% power when the Reactor Operator reports the following indications:

- TOTAL STEAM FLOW indicates 2.0 Mlb/hr
- TOTAL FEEDWATER FLOW indicates 2.50 Mlb/hr and rising
- RPV Water Level indicates 173" and rising

The following annunciators alarmed moments later:

- RX LVL HI I **AND** RX LVL HI II
- ROPS ACTUATE A **AND** ROPS ACTUATE B

Which of the following predicts the expected plant impact and the required action directed by the Unit Supervisor?

	Plant Impact	Required Action
A.	Automatic reactor scram **AND** turbine trip on a high RPV water level signal	Stabilize RPV pressure below 1045 psig with the turbine bypass valves
B.	Automatic reactor scram **AND** turbine trip on a high RPV water level signal	Augment RPV pressure control with the Isolation Condensers
C.	Automatic turbine trip **AND** Feedwater Pump trip on a high RPV water level signal	Restore RPV water level 138-175" using Support Procedure 2, Feed & Condensate System Operation
D.	Automatic turbine trip **AND** Feedwater Pump trip on a high RPV water level signal	Restore RPV water level 138-175" using Support Procedure 8, Lineup for Condensate System Operation

Question # Answer	17 C	Question Developer Initials/Date: NTP 10/27/07

Knowledge and Ability Reference Information		RO	SRO
259001 A2.01 Ability to (a) predict the impacts of the following on the REACTOR FEEDWATER SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Pump trip	**Importance Rating**	3.7	3.7

Level	SRO	Tier #	2	Group #	2

References	EMG-3200.01A	RAP-H5d	RAP-H6f

Explanation:	The question describes the plant at 28% power with feed flow (rising) greater than steam flow and RPV water level above normal and continuing to rise. Moments later, the RPV Level HI alarms come in (175") and results in a turbine trip. Because turbine load is < 30% power, the reactor does not scram. RPV water level continues to rise until the ROPS alarms comes in (181"). With total feedwater flow $\geq$ 2.4E6 lb/hr and RPV water level $\geq$ 181", all feedwater pumps trip. With the reactor still at power and no feed flow, RPV water level will lower and the reactor will scram on low water level. Since the feed pumps have tripped, ROPS is now bypassed and feedwater pumps can be manually restarted IAW support procedure 2. Answer C is correct. Distractors A and B are incorrect since the reactor will not scram on high RPV water level signal. Pressure control is from the pressure leg in the No ATWS EOP. Distractor D is incorrect since support procedure 2 only operates condensate pumps, whose discharge head is much lower than a post-scram reactor (with no primary leaks).

References to be provided during exam:	RPV Control – No ATWS EOP	

Learning Objective	2621.845.0.0041 3055 Given a copy of RPV Control, describe in detail each step or conditional statement, including technical basis, and how to perform

	each step as required.					
Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**			**X 3:SPK**
10 CFR Part 55 Content:	**55.41**		**55.43**	**5**		
Time to Complete: 2-3 minutes						

Question 18

The plant is at rated power.

Which of the following events requires notification to an off-site agency, and what agency must be notified?

	Event	Offsite Agency
A.	The plant was manually scrammed due to the loss of both CRD Pumps	4-hour notification to the NRC
B.	Sighting or capture of a Snapping Turtle	24-hour notification to the NRC
C.	The declaration of an Unusual Event	15-minute notification to Lacey Township
D.	The discovery in March that the monthly Core Spray surveillance due in February was not performed as required	8-hour notification to the NRC

Question # Answer	18 A	Question Developer Initials/Date: NTP 10/29/07

Knowledge and Ability Reference Information					RO	SRO
201001 2.4.30 (CRD Hydraulics) Knowledge of which events related to system operations/status should be reported to outside agencies.				Importance Rating	2.2	3.6
Level	SRO	Tier #	2	Group #	2	

References	LS-AA-1020 EP-AA-1010	10CFR50.72	TS 4.2

Explanation:	A 4-hour report to the NRC is required for an RPS actuation. Answer A is correct (IAW 10CFR50.72.) This would also be a 4-hour report for the initiation of a plant shutdown required by Tech Specs. The sighting/capture of a sea turtle (not snapping) requires notification of NRC and National Marine Fisheries Service w/in 24 hours (LS-AA-1020, Exelon Reportability Manual). But, the question refers to a snapping turtle, which is a different species than a sea turtly. A description of a snapping turtle is provided in the procedure. Answer B is incorrect. A UE declaration does not require Lacey Township notification w/in 15 minutes (EP-AA-114-100-F-03). A UE requires that the NJ State Police Office of Emergency Management be notified within 15 minutes. Answer C is incorrect. A missed surveillance by itself, is not a tech spec violation. TS 4.2 allows time to complete the surveillance and NOT enter the applicable LCO (if tested sat) until after the test is completed. Answer D is incorrect.

References to be provided during exam:	10CFR50.72	

Learning Objective	

Question Source	**Bank**	X	**Modified Bank**		**New**	
Question Cognitive Level:	**Memory or Fundamental Knowledge**	X 1:F	**Comprehension or Analysis**			
10 CFR Part 55 Content:	55.41		55.43	5		
Time to Complete: 2-3 minutes						

Question 19

Procedure 301.2, Reactor Recirculation System, states the following Precaution and Limitation in regards to an **ISOLATED** recirculation loop with the plant at power:

- The recirculation loop shall NOT be returned to service prior to achieving cold shutdown conditions

Which of the following states the Technical Specification bases for the precaution?

A. The reactor coolant between the closed valves in the recirculation loop is not available during a LOCA event.

B. The restart of an isolated loop can raise concerns about the thermal stresses on the recirculation loop reactor nozzle.

C. The restart of an isolated loop can result in thermal shock to the CRD seals and result in non-conservative scram times.

D. The restart of an isolated loop will result in a cold water transient which will result in an increase in the critical power ratio.

Question # Answer	19 B	Question Developer Initials/Date: NTP 10/29/07

Knowledge and Ability Reference Information		RO	SRO
2.1.32 Ability to explain and apply system limits and precautions.	Importance Rating	3.4	3.8

Level	SRO	Tier #	3	Group #	

References	202.1, P&L 4.2.5	TS 3.3.F.2.a.1 and Bases	USAR 15.4.4

Explanation:	IAW Tech Specs Bases to TS 3.3.F.2.a.3, an isolated loop will experience a cooling of the loop temperatures greater than 50 °F and restart of an isolated loop could result in a cold water addition transient. The previous paragraph is related to an idle loop restart. The TS Bases states that an idle loop can be restarted since the restart of the loop will not result in a cold water addition transient causing a concern from either reactivity addition or reactor nozzle thermal stresses. Therefore, startup of an isolated loop, which can result in a cold water addition transient and raises concerns due to the reactivity addition and the thermal stresses on the reactor nozzle. Therefore, answer B is correct. IAW TS Bases to 3.3.F.2.a.1, the water trapped between the closed recirculation suction and discharge valves is not available during a LOCA. This is the basis as to why the MAPLHGR limit is reduced during an isolated loop event. Answer A is incorrect. Placing cold water past the CRD seals could thermally shock the seals and result in degradation. If the seals were bad enough, the scram times could be affected. But the correct answer is as provided above. Answer C is incorrect. As stated, the restart of an isolated recirculation loop can cause a cold water addition transient but as shown in the accident analysis (USAR chapter 15) the CPR actual goes down – not up. Answer D is incorrect.

References to be provided during exam:	None	

Learning Objective	2621.828.0.0038 202-10451 Given Technical Specifications, identify and explain associated actions for each section of the Technical Specifications relating to this system including personnel allocation and equipment operations.

Question Source	**Bank**		**Modified Bank**		**New**	**X**

Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:B**	**Comprehension or Analysis**	

10 CFR Part 55 Content:	**55.41**		**55.43**	**2**	

Time to Complete: 1-2 minutes

Question 20

The plant is starting up after an outage.

At 0800, Chemistry has provided the following reactor coolant and AOG analysis, which was completed at 0800 today:

- Analysis at 0800
  - Reactor coolant pH is 8.9
  - Reactor coolant conductivity is 1.9 μS/cm
  - Reactor coolant chlorides is 0.09 ppm
  - AOG hydrogen concentration downstream of the recombiner is 4.2% by volume
  - Reactor coolant activity of 0.1 μCi per gram dose equivalent I-131
  - Turbine steam flow is 50,000 lb/hr

At 1200, Chemistry has provided the following reactor coolant and AOG analysis, which was completed at 1200 today:

- Analysis at 1200
  - Reactor coolant pH is 9.1
  - Reactor coolant conductivity is 2.6 μS/cm
  - Reactor coolant chlorides is 0.21 ppm
  - AOG hydrogen concentration downstream of the recombiner is 2.3% by volume
  - Reactor coolant activity of 0.18 μCi per gram dose equivalent I-131
  - Turbine steam flow is 200,000 lb/hr

The current time is 1200. Which of the following is required IAW Technical Specifications (based upon the above data)?

A. No Technical Specifications are required.

B. Reduce AOG hydrogen within 48 hours.

C. An orderly shutdown shall be initiated within 4 hours.

D. Chlorides and conductivity shall be reduced within the next 72 hours.

Question # Answer	20 D	Question Developer Initials/Date: NTP 10/29/07

Knowledge and Ability Reference Information						RO	SRO
2.1.34 Ability to maintain primary and secondary plant chemistry within allowable limits.					Importance Rating	2.3	2.9
Level	SRO	Tier #	3	Group #			

References	TS 3.3.E	TS 3.6	

Explanation:	The question stem shows that reactor coolant chemistry is within the TS limits with steaming rates < 100,000 lb/hr at 8:00 am. At noon, the water chemistry does not violate TS 3.3.E.3 with steaming rates > 100,000 lb/hr. But TS 3.3.E.5 requires that if either conductivity or chlorides is exceeded in this paragraph (which is more limiting than the limits provided in 3.3.E.3), they may remain violated up to 72 hours. Answer D is correct. All other answers are plausible as they are TS actions or interpretations, but incorrect. Other data is provided that do not violate other TS requirements. Answer A is plausible since the data is within the chemistry limits in 3.3.E.4, but 3.3.E.5 also applies. Answer B is plausible since AOG was violated at 0800, but is no longer violated at 1200. Answer C is a requirement under coolant chemistry that does not apply under the given conditions.

References to be provided during exam:	TS 3.3.E TS 3.6	

Learning Objective	2621.828.0.0039 204-10451 Given Technical Specifications, identify and explain associated actions for each section of the Technical Specifications relating to this system including personnel allocation and equipment operations.

Question Source	Bank	X (INPO)	Modified Bank		New	
Question Cognitive Level:	Memory or Fundamental Knowledge		Comprehension or Analysis		X 3:SPR	
10 CFR Part 55 Content:	55.41		55.43	2		
Time to Complete: 1-2 minutes						

Question 21

Which of the following proposed changes would require NRC approval prior to implementation?

A. Changing the SRM upscale rodblock to $4x10^4$ cps.

B. Changing the Core Spray start signal to 84" RPV water level.

C. Changing the low condenser vacuum scram signal to 23" HG.

D. Changing the Primary Containment isolation signal to 3.1 psig.

Question # Answer	21 B	Question Developer Initials/Date: NTP 10/29/07

Knowledge and Ability Reference Information						RO	SRO
2.2.5 Knowledge of the process for making changes in the facility as described in the safety analysis report.					Importance Rating	1.6	2.7
Level	SRO	Tier #	3	Group #			

References	LS-AA-104-1000	TS 2.3	

Explanation:	IAW the reference, activities that require a change to Technical Specifications cannot be implemented until formal NRC approval is obtained. IAW TS 2.3.K, core spray starts at ≥ 7'2" TAF (86"). Assigning a water level below this value would first require NRC approval. All other setpoint are listed in TS, but do not violate the current TS setting. Answer B is correct.
References to be provided during exam:	None
Learning Objective	

Question Source	Bank		Modified Bank	X	New	
Question Cognitive Level:	Memory or Fundamental Knowledge	X 1:I	Comprehension or Analysis			
10 CFR Part 55 Content:	55.41		55.43	5		
Time to Complete: 1-2 minutes						

Question 22

An Operator on your Crew wishes to modify a step in procedure 315.1, Turbine Generator Startup. You have verified the technical accuracy of the change and it does not involve a change of intent.

Which of the following is correct to process this as a procedure Temporary Change?

1. The Temporary Change must be approved by ______(1)______.
2. The procedure must undergo a full review within ______(2)______ days.

	(1)	(2)
A.	Station Qualified Reviewer **AND** an SRO	14
B.	Station Qualified Reviewer **AND** the Site Functional Area Manager	90
C.	Site Functional Area Manager **AND** an SRO	14
D.	Site Functional Area Manager **ONLY**	90

Question # **Answer**	**22 A**	**Question Developer Initials/Date: NTP 10/30/07**

Knowledge and Ability Reference Information					**RO**	**SRO**
2.2.11 Knowledge of the process for controlling temporary changes.				**Importance Rating**	**2.5**	**3.4**
Level	**RO**	**Tier #**	**3**	**Group #**		

References	AD-AA-101		
Explanation:	IAW the reference, to allow use of *procedure* temporary change, it must be approved by a Station Qualified Reviewer and an SRO, and must undergo a full review within 14 days. Answer A is correct. A *T&RM* temporary change must be approved by the Site Functional Area Manager only and be fully reviewed within 14 days. Both types of temporary changes are valid for 90 days. All other answers are incorrect.		
References to be provided during exam:	None		
Learning Objective			

Question Source	**Bank**		**Modified Bank**		**New**	**X**
Question Cognitive Level:	**Memory or Fundamental Knowledge**	**X** **1:P**	**Comprehension or Analysis**			
10 CFR Part 55 Content:	**55.41**		**55.43**	**5**		
Time to Complete: 1-2 minutes						

Question 23

Radiation Protection surveys have shown that a room in the Reactor Building now shows radiation levels at 1100 mr/hr at 30 cm in the room.

IAW Technical Specification, which of the following states how unauthorized entry into this room shall be prevented (in addition to correct postings)?

A. The room shall be roped-off, with an alarm.

B. The room shall have a locked door with an alarm.

C. The room shall have a gate (locking **NOT** required).

D. The room shall have a locked door (alarming **NOT** required).

Question # Answer	23 D	Question Developer Initials/Date: NTP 10/30/07

Knowledge and Ability Reference Information		RO	SRO
2.3.1 Knowledge of 10 CFR: 20 and related facility radiation control requirements.	Importance Rating	2.6	3.0

Level	SRO	Tier #	3	Group #	

References	10CFR20.1003	TS 6.13	RP-AA-18

Explanation:	IAW TS 6.13.2, a high radiation area in excess of 1000 mrem/hr shall have a locked door, alarm is not required.

References to be provided during exam:	None	

Learning Objective	

Question Source	Bank		Modified Bank	X	New	

Question Cognitive Level:	Memory or Fundamental Knowledge	X 1:D	Comprehension or Analysis	

10 CFR Part 55 Content:	55.41		55.43	2	

Time to Complete: 1-2 minutes

Question 24

You are reviewing an Operations Department job with the ALARA Committee. There are several options on how to proceed with the job. The **OPTIONS** are listed below: (assume only one Operator will be required to perform the job)

Option 1: Perform the work **WITHOUT** respiratory protection and **WITHOUT** any additional shielding

- The dose rate in the work area is 50 mr/hr
- Expected work completion time: 2 hours
- Expected internal dose: 25 mrem CEDE

Option 2: Perform the work **WITH** respiratory protection and **WITHOUT** any additional shielding

- The dose rate in the work area is 50 mr/hr
- Expected work completion time: 2.5 hours
- Expected internal dose: 15 mrem CEDE

Option 3: Perform the work **WITHOUT** respiratory protection and **WITH** additional shielding

- The dose rate in the work area is 30 mr/hr
- Expected work completion time: 2 hours
- Expected internal dose: 25 mrem CEDE
- Additional dose to install shielding: 20 mrem

Option 4: Perform the work **WITH** respiratory protection and **WITH** additional shielding

- The dose rate in the work area is 30 mr/hr
- Expected work completion time: 2.5 hours
- Expected internal dose: 15 mrem CEDE
- Additional dose to install shielding: 20 mrem

Question 24

In keeping with the ALARA principles, which job option should be selected?

A. Option 1

B. Option 2

C. Option 3

D. Option 4

Question # **Answer**	**24 C**	**Question Developer Initials/Date: NTP 10/30/07**

Knowledge and Ability Reference Information						**RO**	**SRO**
2.3.2 Knowledge of facility ALARA program.					**Importance Rating**	**2.5**	**2.9**
Level	**SRO**	**Tier #**	**3**	**Group #**			
References	RP-AA-16						
Explanation:	ARARA principles dictate that the option with the lowest achievable dose be selected. The total dose for Option 1 is 125 mrem (50x2 + 25). The total dose for Option 2 is 140 mrem (50x2.5 + 15). The total dose for Option 3 is 105 mrem (30x2 + 25 + 20). The total dose for Option 4 is 110 mrem (30x2.5 + 15 + 20). Option 3, answer C, represents the lowest total dose to perform the job. Answer C is correct.						
References to be provided during exam:	Calculator						
Learning Objective							
Question Source	**Bank**		**Modified Bank**	**X**	**New**		
Question Cognitive Level:	**Memory or Fundamental Knowledge**		**Comprehension or Analysis**	**X** **3:SPK**			
10 CFR Part 55 Content:	**55.41**		**55.43**	**5**			
Time to Complete: 1-2 minutes							

Question 25

The plant was at rated power when an event occurred. The Shift Manager, acting as the Shift Emergency Director, has declared an Alert.

The Shift Manager has turned over the command and control responsibilities to the Station Emergency Director in the TSC. Which of the following roles and responsibilities does the Shift Manager have in these conditions?

A. Declare emergency event classifications.

B. Make offsite notifications (State/County).

C. Determine/issue Protective Action Recommendations.

D. Coordinate in-plant operations with the TSC Operations Manager.

Question # Answer	25 D	Question Developer Initials/Date: NTP 10/30/07

Knowledge and Ability Reference Information		RO	SRO
2.4.37 Knowledge of the lines of authority during an emergency.	Importance Rating	2.0	3.5

Level	SRO	Tier #	3	Group #	

References	EP-AA-112-100	EP-AA-112-200-F-01	

Explanation:	IAW the EP-AA-112-100, Control Room Operations, and EP-AA-112-200-F-01, Station Emergency Director Checklist, the Shift Manager assumes the role as the Shift Emergency Director and turns over to the Station Emergency Director in the TSC. Prior to the turnover, the SM has the responsibilities listed in answers A-C. Once these duties have been transferred, the SM will no longer declare emergency events, make offsite notifications to state/county, and determine PARs. The SM will coordinate in-plant actions with the TSC Operations Manager. Answer D is correct.

References to be provided during exam:	None	

Learning Objective	

Question Source	Bank		Modified Bank		New	X

Question Cognitive Level:	Memory or Fundamental Knowledge	X 1:F	Comprehension or Analysis	

10 CFR Part 55 Content:	55.41		55.43	5	

Time to Complete: 1-2 minutes