San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	A08/AK3.05	
	Importance Rating	4.0	_____

1. Given the following conditions for Unit 3:
-plant trip from 100% power due to pipe rupture upstream of PSV-200, safety valve
-All safeguards equipment responded per design
-The crew has just completed all procedural steps up to the floating step FS-7 for "SI Throttle/Stop Actions" for Procedure EOI SO23-12-3, "Loss of Coolant Accident".

Of the steps required for SI Throttle/Stop criteria, what is the reason for verifying RCS sub-cooling with Core Exit Saturation Margin (REP CET)?

A. The QSPDS system is not physically wired to the HJTC's.

B. The REP CET's trend closer to T_{hot} RTD's (used in accident analysis by CE owner's group).

C. The range is too large in natural recirculation mode using RVUH RTD's.

D. The REP CET's are calculated in a manner that results in the lowest sub-cooling margin.

Proposed Answer: ___D___
Explanation (Optional):
The REP CET's are calculated by QSPDS using statistical analysis in order to provide a higher temperature and lower or more conservative sub-cooling margin. HJTC's and T_{hot} RTD's are not used because of sub-cooling differences between loops and the vessel head area.
Technical Reference(s): EOI SO-23-12-11 (FS-7), EOI SO23-12-3, and CE "Loss of Coolant Accident" Recovery Guideline (bases), rev 6, attachment 1, page 9.
Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X___
Question History: Last NRC Exam __N/A__
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X__
10 CFR Part 55 Content: 55.41 __7__
55.43 _____
Comments:
A08/AK3.05 & 4.0 - Pressurizer Vapor Space Accident/Knowledge of the reasons for the following responses as they apply to the Pressurizer Vapor Space Accident: ECCS termination or throttling criteria

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	Tier #	1	_____
	Group #	1	_____
	K/A #	E09/EA1.14	_____
	Importance Rating	3.4	_____

2. While performing a heat treat on Unit 3,
- A small break LOCA occurs and SIAS actuates
- All systems are responding as expected
- The condenser is in alarm for low vacuum as a result of the heat treat; main condenser backpressure is 5.8" Hg abs and steady

EOI SO23-12-11 Attachment 3, “Cooldown/Depressurization,” is being implemented. Under the current plant conditions, Attachment 3 directs the RCS cooldown to be accomplished by

A. allowing the ADVs to function in automatic mode

B. overriding and operating the ADVs manually

C. operating the SBCS manually

D. allowing the SBCS to function in automatic mode

Proposed Answer: C

Explanation (Optional): Attachment 3 directs use of SBCS for cooldown if condenser backpressure is less than the SBCS Interlock (which is 10" Hg).

Technical Reference(s): _____ (Attach if not previously provided)

_____

Proposed references to be provided to applicants during examination:

Learning Objective: _____ (As available)

Question Source:	Bank #	_____
	Modified Bank #	_____ (Note changes or attach parent)
	New	X
Question History:	Last NRC Exam	_____
Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	X
10 CFR Part 55 Content:	55.41	10
	55.43	_____

Comments:

E09/EA1.14 & 3.4 - Small Break LOCA/Ability to operate and monitor the following as they apply to a small break LOCA: Secondary Pressure Control.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	A15/17/AK1.05	_____
	Importance Rating	2.7	_____

3. Given the following conditions for Unit 2 with power at 100%:
- "LOCAL POWER DENSITY HI PRETRIP" Alarm activates in the control room (Window 56A13)
- RCP 1B flow indicates slightly less than the other three RCP's
- COLSS is in service

You have entered Procedure S023-2.30,"Determination of Adequate Core Cooling," as directed from the Alarm Response Procedure. In this procedure you will need to compare actual data points to Acceptance Criteria in order to determine if:

A. Localized DNB exists and power should be reduced below the acceptance criteria in S023-2.30,"Determination of Adequate Core Cooling."

B. Localized DNB exists and power should be reduced below the specified value in the Technical Specifications.

C. LPD margin from Tech Specs is zero and power should be reduced below the specified value in the Technical Specifications.

D. Azimuthal Tilt exceeds the limit specified in the Technical Specifications and should be reduced below the specified value in the Technical Specifications.

Proposed Answer: A

Explanation (Optional): For a core flow imbalance above the reactor trip setpoint this alarm is one of many that indicates a DNBR problem as specified in Procedure S023-2.30. The worksheet has the RO complete comparisons in order to determine if Localized DNB exists and if so then power should be reduced below the specified acceptance criteria. B is incorrect because it does not yet meet a TS requirement (pre-trips are below safety settings) while C is incorrect because the LPD is taken from COLSS when it is operating, not TS. D is incorrect because Azimuthal tilt acceptance criteria come from CPC, not TS.

Technical Reference(s): Procedure S023-2.30,"Determination of Adequate Core Cooling" page 6.
Alarm Response Instruction S023-15-56.A, page 31.

Proposed references to be provided to applicants during examination:

Learning Objective: _____ (As available)

Question Source:	Bank #	_____
	Modified Bank #	_____ (Note changes or attach parent)
	New	X
Question History:	Last NRC Exam	_____
Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	X
10 CFR Part 55 Content:	55.41	8, 10
	55.43	_____

Comments:

A15/17/AK1.05 & 2.7 - RCP Malfunctions/Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): Effects of unbalanced RCS flow on in-core average temperature, core imbalance, and quadrant power tilt.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	A22/AA2.01	_____
	Importance Rating	3.2	_____

4. Unit 2 is at 100% Power with all systems in their respective at-power configurations and all controllers in auto per station procedures. The following annunciators are actuated:

[57C43] RCS LEAKAGE ABNORMAL/RECIRC SYS VV MISALIGNED
[57C20] RCS LEAKAGE DETECTION ACTIVITY HI
[58A01] REGEN HX TSH 9267 LETDOWN TEMP HI
[58A31] REGEN HX TSH 0221 LETDOWN TEMP HI

Pressurizer (PZR) level is 51% and dropping slowly
Ion exchange bypass valve TV-0224B is in the "VCT" position
Charging flow meter FI-0212 indicates 43gpm in the control room
Letdown flow indicates 28gpm in the control room
RCP seal injection and CBO flows are all within their normal bands

The cause of the alarms is _____ .

A. A letdown line leak between the containment penetration and the letdown isolation valve TV-0221

B. A letdown line leak between the containment penetration and the containment isolation valve HV-9205

C. A charging line leak between the containment penetration and the Regen HX

D. A charging line leak between the containment penetration and FE-0212

Proposed Answer: __C____
Explanation (Optional): C is correct because only a charging leak would provide larger charging flow than letdown flow and because the leak is adding coolant to the containment sump (alarms in stem) it is C and not D. A and B are incorrect because it is not a letdown leak.
Technical Reference(s): System description S023-390, page 80, Alarm response Instruction S023-15-57C, page 47 and 93, S023-13-14, S023-15-57, S023-15-58A, page 6.
Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank #_____ (Note changes or attach parent)
New __X___
Question History: Last NRC Exam_____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X_
10 CFR Part 55 Content: 55.41 __3,7___
55.43 ___
Comments: A22/AA2.01 & 3.2 - Loss of reactor coolant make up/Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Pump Makeup: Whether a charging line break exists.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	_____
	Group #	1	_____
	K/A #	A25/2.4.11	_____
	Importance Rating	3.4	_____

5. Which of the following actions is the highest priority and thus performed FIRST in the Loss of Shutdown Cooling AOI?

A. Recover SDC Flow.

B. Recover RCS Inventory.

C. Ensure RCS dilutions are stopped.

D. Initiate Containment Closure and RCS Monitoring.

Proposed Answer: __D___
Explanation (Optional):

Technical Reference(s): __SO23-13-15_____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____55323_____ (As available)
Question Source: Bank # _N4197_
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 __10___
55.43 _____
Comments: A25/2.4.11 & 3.4 - Loss of RHR System/Knowledge of abnormal conditions procedures.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	A26/AA1.05	
	Importance Rating	3.1	

6. Component Cooling Water System (CCW) loop A is lined up to provide cooling water to the non-critical loop with the CCW loop B non-critical loop isolation valves (HV-6213 and HV-6219) closed. A leak develops that results in a low-low level alarm for the CCW loop A surge tank (T-003). The operator should also observe a loss of CCW to the:

A. A Control Room Emergency Cooler.

B. Letdown Heat Exchanger.

C. CEDM Coolers.

D. Shutdown Cooling Heat Exchanger.

Proposed Answer: C

Explanation (Optional): With the CCW system in the stated configuration, a low low level alarm would also indication a closure of the non-critical isolation valves HV-6212 and HV-6218. This would result in a loss of CCW to all non-critical heat loads. All the answers provided are critical heat loads with the exception of the CEDM Coolers making C the only correct answer.

Technical Reference(s): System Description SD-SO23-400, Revision 9, pages 4, 5, and 15.
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam NA
Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 (7)
55.43 _____
Comments: A26/AA1.05 & 3.1 - Loss of Component Cooling Water/Ability to operate and/or monitor the following as they apply to the Loss of Component Cooling Water: The CCWS surge tank, including level control and level alarms, and radiation alarms.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	A27/AK1.01	
	Importance Rating	3.1	

7. With the plant operating at 50 percent power, a pressurizer pressure control malfunction has resulted in pressurizer pressure increasing while pressurizer temperature has remained constant. As pressurizer pressure increases, pressurizer saturation temperature will:

A. remain the same.

B. increase.

C. decrease.

D. depend on pressurizer spray enthalpy.

Proposed Answer: B

Explanation (Optional): As pressure goes up in a saturated water environment, saturation temperature also goes up making B the only correct answer.

Technical Reference(s): Properties of Saturated and Superheated Steam

Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)

Question Source:
- Bank # _____
- Modified Bank # _____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam NA

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

10 CFR Part 55 Content:
- 55.41 (5)
- 55.43 _____

Comments:
A27/AK1.01 & 3.1 - Pressurizer Pressure Control System/Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions: Definition of saturation temperature.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	E29/EA2.07	
	Importance Rating	4.2	

8. The plant is operating at 100 percent power when the reactor operator receives several RPS annunciators. The operator also notices some of the RPS trip breakers have opened. If the plant is still at power, which of the following open trip breakers would indicate an ATWS is in progress?

A. Trip breakers 1, 2, 8, 9 indicate open.

B. Trip breakers 1, 2, 7, 8 indicate open.

C. Trip breakers 3, 4, 7, 8 indicate open.

D. Trip breakers 3, 4, 8, 9 indicate open

Proposed Answer: B

Explanation (Optional): A combination of trip breakers must be open for a scram to occur. Breakers 1 and 2 and breakers 7 and 8 must be open making B the correct answer.

Technical Reference(s): System Description SD-SO23-710, Revision 4

Proposed references to be provided to applicants during examination:

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

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

10 CFR Part 55 Content: 55.41 (5)
55.43 _____

Comments:
E29/EA2.07 & 4.2 - ATWS/Ability to determine or interpret the following as they apply to a ATWS: Reactor trip breaker indicating lights.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	A38/EK3.08	
	Importance Rating	4.1	

9. During a SG Tube Rupture (SGTR), when RCS pressure is reduced to less than _____, maintaining RCS pressure above the RCP NPSH trip criteria takes priority over reducing RCS pressure to within 50 psig of the ruptured SG. The reason for this change in priorities is that _____.

A. the SI Throttling Criteria; RCS inventory is assured.

B. the shutoff head of the SI pumps; pressurizer level can be recovered.

C. 1000 psia; the main steam safeties won't lift.

D. 1250 psia; the leak rate is within the capacity of the charging pumps.

Proposed Answer: C
Explanation (Optional): The EOI bases document states maintaining RCS pressure above the NPSH trip criteria is more important than maintaining SG pressure within 50 psid of RCS pressure when RCS pressure reaches 1000 psia. This is because SG main steam safety valves will not lift. This makes answer C the only correct answer.
Technical Reference(s): SO23-14-4, Revision 5, Attachment 1
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam NA
Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 (5)
55.43 _____
Comments: Knowledge of the reasons for the following responses as they apply to SGTR: Criteria for securing RCP

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	A40/2.3.2	
	Importance Rating	2.5	

10. A SG steam line rupture has occurred outside containment. The area around the steam line rupture is highly contaminated and has elevated dose rates. Consideration is being given to sending an individual into the area to close an important valve. Based on HP best estimates, the individual will receive the following doses:

- ✓ Deep Dose Equivalent (DDE) = 750 mRem
- ✓ Total Organ Dose Equivalent (TODE) = 400 mRem
- ✓ Committed Effective Dose Equivalent (CEDE) = 250 mRem
- ✓ Committed Dose Equivalent (CDE) = 200 mRem

Based on these estimates, the Total Effective Dose Equivalent (TEDE) for this job is:

A. 1600 mRem

B. 1000 mRem

C. 950 mRem

D. 850 mRem

Proposed Answer: B
Explanation (Optional): TEDE = DDE + CEDE = 750 + 250 = 1000 mRem
Technical Reference(s): 10CFR20
Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X
10 CFR Part 55 Content: 55.41 _____
55.43 _____
Comments: A40/2.3.2 - Steam Line Rupture - Excessive Heat Transfer /Knowledge of the facility ALARA program.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	A54/AK3.01	
	Importance Rating	4.1	

11. The Unit 2 reactor was automatically tripped as a result of loss of both feedwater pumps. Which of the following was the cause of the loss of feedwater pumps?

A. Failure in the Three-Element Feedwater Control System.

B. Channel "A" CIAS actuation signal.

C. Failure of a single Second Point Heater.

D. Air supply failure to the condensate pumps suction valves.

Proposed Answer: D

Explanation (Optional):
Loss of air supply to the condensate pumps suction valves will cause the suction valves to close resulting in a trip of the condensate pumps and a loss of NPSH to the Main Feedwater Pumps causing a loss of feed and a reactor trip.

Technical Reference(s): SO-23-240/250 (Attach if not previously provided)

Proposed references to be provided to applicants during examination:

Learning Objective: _____ (As available)

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

Question History:		
	Last NRC Exam	

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

10 CFR Part 55 Content:		
	55.41	7
	55.43	

Comments: Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater: Reactor and/or turbine trip, manual and automatic.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	A55/EA2.03	
	Importance Rating	3.9	

12. The Station has experienced a station blackout. Which of the following is the preferred EOI method of powering the Unit 2 ESF 4160VAC buses?

A. A04 and A06 powered through breakers A0419 and A0616

B. A04 and A06 powered through breakers 2A0417 and 2A0619

C. A04 and A06 powered through breakers A0413 and A0613

D. A04 and A06 energized through breakers 3A0416 and 3A0603

Proposed Answer: ___C___

Explanation (Optional): If 220VAC offsite power source is lost, the DGs are the preferred power and lastly cross-tying to the opposite units DGs.
Technical Reference(s): SO23-12-11 Att 24; Att 6;SO23-12-8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X___
10 CFR Part 55 Content: 55.41 __10___
55.43 _____
Comments: Actions necessary to restore power.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	A57/AA1.01	
	Importance Rating	3.7	

13. On a loss of vital AC, vital 120VAC power to panels Q062 and Q063 can be restored through which one of the following methods?

A. By transferring loads from the inverter to the line alternate source with switches YVS1, and YVS2.

B. By ensuring the unbalance between the sources is greater than 20 volts before operating the manual transfer switches.

C. By ensuring the sync monitor light is fully lit before operating the manual transfer switch.

D. By ensuring the solenoid in the manual transfer switch is de-energized.

Proposed Answer: A
Explanation (Optional):

Technical Reference(s): SD-SO23-130 (Attach if not previously provided)

Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X
10 CFR Part 55 Content: 55.41 7
55.43 _____
Comments: Ability to operate and/or monitor the following as they apply to the loss of vital AC bus: Manual inverter swapping

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	A58/AK3.01	
	Importance Rating	3.4	

14. A loss of 125VDC power (panel L160) has occurred for EDG 2G002. Which of the following best describes the operating condition of the emergency diesel?

A. The emergency diesel can be started locally.

B. The emergency diesel can be started but shutdown will be manual local action.

C. The emergency diesel can be started but will only have local governor control.

D. The emergency diesel should not be started and placed in maintenance lockout.

Proposed Answer: D
Explanation (Optional):

Technical Reference(s): ___ SO23-750/ SO23-5-2.35.1 (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X___
10 CFR Part 55 Content: 55.41 __7___
55.43 _____
Comments: Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Use of dc control power by D/Gs

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	A62/2.1.27	
	Importance Rating	2.8	

15. The Nuclear Service Water System serves which of the following functions?

A. Provides water to containment spray system during a Phase "B" actuation.

B. Provides demineralized water for normal fill of the CCW surge tanks.

C. Provides emergency makeup to the containment sumps and pumps.

D. Provides fire protection water source in case of fire in containment.

Proposed Answer: B
Explanation (Optional):

Technical Reference(s): _____ (Attach if not previously provided)
_____

Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X
10 CFR Part 55 Content: 55.41 7
55.43 _____
Comments: Knowledge of system purpose and or function.

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	Tier #	1	
	Group #	1	
	K/A #	A65/AA2.08	
	Importance Rating	2.9	

16. Which of the following is a correct valve alignment for failure position upon a loss of air to the pneumatic valve operator?

A. Letdown flow control valve fails in the as-is position.

B. Letdown back pressure control valves fail open.

C. Spray valves PV-100A and PV-100B fail closed.

D. VCT inlet valve LV-0277A fails so flow goes to Radwaste.

Proposed Answer: C
Explanation (Optional):

Technical Reference(s): ____ SD SO23-390 _____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X___
10 CFR Part 55 Content: 55.41 __7___
55.43 _____
Comments: Ability to determine and interpret the following as they apply to the Loss of Instrument Air: Failure modes of air-operated equipment

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	011-EK1.01	
	Importance Rating	4.1	

17. The plant has experienced a large break LOCA and all RCPs are currently tripped. Core cooling is currently being facilitated by natural circulation. According to EOI Loss of Coolant Accident, in order to establish shutdown cooling, T hot must be less than _____ degrees.

A. 260

B. 340

C. 350

D. 375

Proposed Answer: D
Explanation (Optional):

Technical Reference(s): Loss of Coolant Accident, SO23-12-3, Revision 18, Step 20.
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam NA
Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 _____
55.43 (5)
Comments: Knowledge of the operational implications of the following concepts as they apply to the Large Break LOCA: Natural Circulation and cooling, including reflux boiling.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	007-EK2.2	
	Importance Rating	3.5	

18. According to the Standard Post Trip Actions emergency operating instruction, all reactor coolant pumps must be stopped if:

A. pressurizer pressure is less than 1430 psia.

B. containment pressure is greater than 3.4 psig.

C. loop differential temperature is less than 10 degrees.

D. both S/G levels are less than 21%.

Proposed Answer: B

Explanation (Optional): The referenced procedure requires ensuring all RCPs are stopped if containment pressure is greater than 3.4 psig.

Technical Reference(s): SO23-12-1, Standard Post Trip Actions, Rev 19, step 8.a.3)

Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam NA

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

10 CFR Part 55 Content: 55.41 (5)
55.43 _____

Comments: Knowledge of the interrelations between the Reactor Trip Recovery and the following: Facility heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	051-A2.02	
	Importance Rating	3.9	

19. The main turbine trip setpoint associated with degraded condenser vacuum varies as a function of low pressure (LP) turbine load. With 100 percent LP load, the turbine would have to be tripped immediately if condenser vacuum degrades to:

A. 9.1 inches HgA

B. 8.1 inches HgA

C. 6.0 inches HgA

D. 3.5 inches HgA

Proposed Answer: A
Explanation (Optional): The operational limit for the turbine at 100 percent load is 9.1 inches HgA.

Technical Reference(s): Operating Instruction SO23-13-10, Loss of Vacuum, Revision 8, Attachment 3
Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 (7)
55.43 _____

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

San Onofre Generating Station SRO Written Examination Key
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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	028-G2.2.23	
	Importance Rating	2.6	

20. A malfunction has developed in the pressurizer level control system and level is currently slowly increasing. What is the maximum pressurizer level for the pressurizer to be considered operable according to the technical specifications?

A. 48%

B. 57%

C. 61%

D. 65%

Proposed Answer: B
Explanation (Optional): The technical specifications state the maximum level is 57%.

Technical Reference(s): TS 3.4.9.a (Attach if not previously provided)

Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 _____
55.43 (5)
Comments: Pressurizer Level Malfunction: Ability to track limiting conditions for operation.

San Onofre Generating Station SRO Written Examination Key
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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	032-AK2.01	
	Importance Rating	2.7	

21. Startup Channel 1 will be lost if which of the following power supplies fail?

A. Q039

B. Y01

C. Q041

D. Y02

Proposed Answer: A
Explanation (Optional): The power supply for Startup Rate Channel 1 is Q039.

Technical Reference(s): System Description SD-S023-470, Revision 6.

Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam NA
Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 (7)
55.43 _____
Comments:
032-AK2.01 Knowledge of the interrelations between the Loss of SRNI and the following: power supplies, including proper switch positions

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	037-AK1.01	
	Importance Rating	2.9	

22. A steam generator (SG) tube rupture has occurred and both SGs are being used to lower RCS temperature and pressure. All the RCPs have been stopped due to a saturation margin of 0 degrees. Step 12 (Lowering Pzr Pressure) of EOI SO23-12-4, Steam Generator Tube Rupture, is being implemented. If ruptured SG pressure is currently 600 psig, then an acceptable initial target temperature for RCS T hot would be:

A. 530 degrees.

B. 490 degrees.

C. 475 degrees.

D. 450 degrees.

Proposed Answer: B

Explanation (Optional): The initial target is to reduce RCS pressure to within 50 psig of the ruptured SG. This means RCS pressure must be reduced so that it is between 600 and 650 psig. With T hot at saturation, it must be reduced to a saturation temperature for 600 to 650 psig. Using the provided steam tables, this corresponds to a saturation temperature of 486 to 495 degrees.

Technical Reference(s): Emergency Operating Instruction SO23-12-4, Steam Generator Tube Rupture, Revision 19, Step12, Note 1

Proposed references to be provided to applicants during examination: Properties of Saturated and Superheated Steam (Steam Tables)

Learning Objective: _____ (As available)

Question Source:	Bank #	
	Modified Bank #	(Note changes or attach parent)
	New	X
Question History:	Last NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	X
10 CFR Part 55 Content:	55.41	(5)
	55.43	

Comments:

037-AK1.01 Knowledge of the operational implications of the following concepts as they apply to SGTL: use of steam tables

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	061-AA2.01	
	Importance Rating	3.5	

23. When the "Nor-AD" pushbutton of the Condenser Air Ejector Radiation Monitor control module RE7818 is latched down:

A. The associated alarms are defeated.

B. The power to the control module can be turned off without any actuation of equipment.

C. The meter needle on the control module will move to the red triangle on the meter scale.

D. The artificial background will not function for this channel.

Proposed Answer: A
Explanation (Optional):

Technical Reference(s): (N3922) , Lesson Plan 2XRL07, Condenser Air Removal Radmonitor

Proposed references to be provided to applicants during examination:

Learning Objective:	52730 (As available)	
Question Source:	Bank #	N3922
	Modified Bank #	(Note changes or attach parent)
	New	
Question History:	Last NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	X
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	11
	55.43	

Comments:
061-AA2.01 Ability to determine and interpret the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: ARM panel displays

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	068-AK2.07	
	Importance Rating	3.3	

24. Which of the following is taken to local control during the performance of SO23-13-2, Shutdown from Outside the Control Room?

A. P053, Condensate Pump

B. HV9209, VCT Vent Valve

C. P096, D/G Fuel Oil Transfer Pump

D. HV9200, Regenerative Heat Exchanger Inlet Valve

Proposed Answer: C
Explanation (Optional):
SO23-13-2 directs taking all D/G controls to LOCAL (so A is correct); it also directs operation of several letdown valves, which makes them good distractors;
Technical Reference(s): SO23-13-2 _____ (Attach if not previously provided)
(N40974) 13-2 local D/G fuel oil pump action
Proposed references to be provided to applicants during examination:

Learning Objective: 56663 (As available)
Question Source: Bank # N40974
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 10
55.43 _____
Comments:
068-AK2.07 Knowledge of the interrelations between the Control Room Evacuation and the following: ED/G

San Onofre Generating Station SRO Written Examination Key
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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	069-AA2.02	
	Importance Rating	3.9	

25. During core alterations with the personnel airlock door interlocks disabled, containment closure requirements are met if:

A. one of the personnel airlock doors remains operable and a designated individual is continuously available to close it if needed; this individual is free to move about inside the RCA.

B. one of the personnel airlock doors remains operable and a designated individual is continuously available to close it if needed; this individual must be stationed at the outer door.

C. neither of the personnel airlock doors remain operable, but a designated individual is continuously available to clear away hoses or cables that block them in order to close one if needed; this individual is free to move about inside the RCA.

D. neither of the personnel airlock doors remain operable, but a designated individual is continuously available to clear away hoses or cables that block them in order to close one if needed; this individual must be stationed at the outer door.

Proposed Answer: B

Explanation (Optional): core alterations require "containment closure" which is satisfied by B; A and C are incorrect because the designated individual must be stationed at the outer door; D is incorrect because at least one of the doors must remain either closed or operable (not blocked by hoses/cables).

Technical Reference(s): TSB 3.9.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination:

Learning Objective:		(As available)
Question Source:	Bank #	
	Modified Bank #	(Note changes or attach parent)
	New	X
Question History:	Last NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	X
10 CFR Part 55 Content:	55.41	10
	55.43	

Comments:

069-AA2.02 Ability to determine and interpret the following as they apply to the Loss of Containment Integrity: verification of automatic and manual means of restoring integrity

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	074-EK1.07	
	Importance Rating	2.8	

26. Given the following plant conditions:

-A small break loss of coolant accident has occurred.
-Both Safety Injection and Containment High Pressure have initiated.
-HPSI Pump P-66A has failed to start.
-Actual Pressurizer pressure is 1060 psia and slowly lowering.
-Average of the Qualified CETs is 560 deg F and slowly lowering.
-There are no Reactor Coolant Pumps running.
-The accident initiated 30 minutes ago.

In implementing the applicable Floating Steps at this point, the procedure directs the operators to "ENSURE maximum available CEDM cooling – operating" in order to:

A. increase air turbulence to reduce the possibility of localized buildup of hydrogen to a level that could cause combustion.

B. enhance overall containment cooling and mitigate the challenge to containment integrity.

C. assist in eliminating voids by removing the upper reactor vessel heat.

D. minimize the thermal stresses on the CEDM shroud area.

Proposed Answer: C

Explanation (Optional): S023-14-11 FS-10 indicates the reason for the action is C; normally, the CEDM cooling subsystem provides cooling to the CEDM shroud area for proper CEDM operation; hydrogen buildup is a concern in an earlier revision of the Containment Combustible Gas Functional Recovery Procedure.

Technical Reference(s): S023-14-11 (Attach if not previously provided)

Proposed references to be provided to applicants during examination:

Learning Objective: (As available)

Question Source:
- Bank #
- Modified Bank # (Note changes or attach parent)
- New X

Question History: Last NRC Exam

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

10 CFR Part 55 Content:
- 55.41 7,8,10
- 55.43

Comments:

074-EK1.07 Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling: definition of saturated steam

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	076-AK3.06	
	Importance Rating	3.2	

27. A shutdown is required due to Dose Equivalent I-131 level of five microcuries/gram for the last 50 hours. In this circumstance, why is Tcold required to be reduced to less than 500°F following the reactor shutdown?

A. Minimizes the magnitude of the iodine spiking phenomena caused by the unit shutdown.

B. Minimizes the release of noble gas to the reactor coolant, reducing the source term of the activity.

C. Minimizes the temperature related degradation of the CVCS demineralizers while RCS clean-up is in progress.

D. Minimizes the chances of a direct release of activity should a steam generator tube rupture occur.

Proposed Answer: D

Explanation (Optional): Reducing Tcold to <500F ensures that, in the event of a SGTR, the S/G pressure will not exceed the lift pressure settings of the atmospheric dump valves and main steam safety valves – thus minimizing the likelihood of a radioactive release to the environment.

Technical Reference(s): TSB 3.4.16 (Attach if not previously provided)

Proposed references to be provided to applicants during examination:

Learning Objective: _____ (As available)

Question Source:		
	Bank #	N56506
	Modified Bank #	_____ (Note changes or attach parent)
	New	_____

Question History:	Last NRC Exam	2000

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

10 CFR Part 55 Content:		
	55.41	10
	55.43	

Comments:

076-AK3.06 Knowledge of the reasons for the following responses as they apply to the High Reactor Coolant Activity: actions contained in EOP for high reactor coolant activity

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____003-K2.01____	
	Importance Rating	_3.1__	_____

28. Given the following:

- A Loss of Coolant Accident has occurred at Unit 2
- SO23-12-3 is being implemented
- The ACO has been directed to STOP all Reactor Coolant Pumps (RCPs)
- RCP 2P001 fails to stop when the STOP pushbutton is depressed

Which of the following is the appropriate action for stopping 2P001?

A. Dispatch an operator to open the breaker to 2P001 locally, at the bus.

B. Dispatch an operator to verify locally that DC power is aligned to 2P001 breaker.

C. Deenergize 2A01 by opening the supply breaker from the Reserve Auxiliary Transformer.

D. Deenergize Reserve Auxiliary Transformer 2XR3 by opening the breakers from the switchyard.

Proposed Answer: ___C___
Explanation (Optional):

Technical Reference(s): ____ SO23-0-46, SO23-6-1_ (Attach if not previously provided)
_____

Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _ N56831_
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam ___1999_____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X__
10 CFR Part 55 Content: 55.41 _____
55.43 _____

Comments:
003/K2.01 & 3.1 - Reactor Coolant Pump/Knowledge of bus power supply to the following: RCPs.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____003-A2.02____	
	Importance Rating	_3.7_	_____

29. The plant has just tripped from 100% power operation, the SPTAs are being carried out and plant conditions are as follows:

- All CEAs are fully inserted.
- PZR level is 2%.
- RCS Subcooling is 90°F.
- RCS pressure is 1300 psia, SIAS has actuated.
- RCS cold leg temperature is 490°F, MSIS has actuated.
- CNTMT pressure is 3.5 psig, CIAS has actuated.

Concerning Reactor Coolant Pumps, which of the following is the required action in the SPTAs and why?

A. Stop one RCP in each loop to limit RCS inventory loss

B. Stop all four RCPs to protect RCP seals and bearings due to isolation of CCW

C. Maintain all four RCPs running to maximize heat removal capability with forced circulation

D. Maintain all RCPs whose associated P002 Upward Thrust Bearing Temperature < 240^{o}F running to ensure maximum heat removal capability while protecting the RCP bearings

Proposed Answer: __B___
Explanation (Optional): Step 3.d of SO23-12-1 requires tripping all four RCPs if letdown has isolated (SIAS) and CIAS is actuated (loss of CCW) in order to protect the RCP seals and bearings (basis). 'A' would have been required by step 5.a if the conditions for tripping all four on step 3.d had not been met. Neither C nor D are appropriate for this condition.

Technical Reference(s): ___ Step 3.d of SO23-12-1___ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: ____56252_____ (As available)

Question Source:	Bank #	__N3932*__
	Modified Bank #	_____ (Note changes or attach parent)
	New	_____
Question History:	Last NRC Exam	_____
Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	__X___
10 CFR Part 55 Content:	55.41 __7,8,10___	
	55.43 _____	

Comments: Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Conditions which exist for an abnormal shutdown of an RCP in comparison with a normal shutdown. *Minor changes were made, but not sufficient to qualify for "modified" status.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	___004-K1.01_____	
	Importance Rating	__3.6_	_____

30. Which one of the following actions occur when the in-service Thot instrument fails low? (Assume 100% power and all systems are operating normally)

	L/D FLOW	B/U HEATERS	B/U CHARGING PUMPS
A.	Increases	Energize	OFF
B.	Increases	Deenergize	ON
C.	Decreases	Deenergize	ON
D.	Decreases	Energize	OFF

Proposed Answer: ___A___
Explanation (Optional):

Technical Reference(s): ___ SO23-3.1.10_____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____55219_____ (As available)
Question Source: Bank # _N5743_
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X___
10 CFR Part 55 Content: 55.41 __7___
55.43 _____
Comments: 004/K1.01 & 3.6 - Chemical and Volume Control/Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: PZR LCS

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____004-A3.10____	
	Importance Rating	_3.9_	_____

31. Unit 2 is operating at 100% power. Pressurizer Pressure and Level Control is aligned as follows:

- Pressurizer Pressure Control is selected to Channel X.
- Pressurizer Level Control is selected to Channel Y.
- All three (3) Charging Pumps are in Auto and Letdown flow is matched with Charging flow.

What would cause the backup Charging Pumps to start and Letdown flow to go to minimum?

A. Channel Y LT-110-2 failed low.

B. Channel X PT-0100X failed low.

C. Channel Y LT-110-2 failed high.

D. Channel X PT-0100X failed high.

Proposed Answer: __C___
Explanation (Optional):

Technical Reference(s): SO23-3-1.10, SO23-15-50.A1, 50A23 (Attach if not previously provided)

_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____55219_____ (As available)

Question Source:	Bank #	__ N5519__
	Modified Bank #	_____ (Note changes or attach parent)
	New	_____
Question History:	Last NRC Exam	__2000 Audit Exam__
Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	__X___
10 CFR Part 55 Content:	55.41 __7__	
	55.43 _____	

Comments:
004/A3.10 & 3.9 – Ability to monitor automatic operation of the CVCS, including: PZR Lev. & press

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____005-G2.1.32__	
	Importance Rating	_3.4_	_____

32. SO23-3-2.6, Shutdown Cooling System (SDCS), cautions the operator to maintain the SDCS and interconnecting piping within the following limit:

A. ≤ 340°F (normal operations)

B. ≤ 340°F (post-accident)

C. ≤ 350°F (normal operations)

D. ≤ 350°F (post-accident)

Proposed Answer: __C___
Explanation (Optional): SO23-3-2.6 L&S 1.1 indicates that 350°F is the normal operations limit for the SDCS and interconnecting piping; Thot must be < 340°F to place SDC in service for normal operations and < 375°F for post-accident operations.

Technical Reference(s): __ SO23-3-2.6 L&S 1.1 _____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:

Learning Objective:	__55073_____ (As available)	
Question Source:	Bank #	__ N3191*_
	Modified Bank #	_____ (Note changes or attach parent)
	New	_____
Question History:	Last NRC Exam	_____
Question Cognitive Level:	Memory or Fundamental Knowledge	__X__
	Comprehension or Analysis	_____
10 CFR Part 55 Content:	55.41 __3,7,10___	
	55.43 _____	

Comments:
005/2.1.32 & 3.4 - Residual Heat Removal/Ability to explain and apply all system limits and precautions.
*Changes were made, but not sufficiently to make this a “modified” question.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____006-K5.02____	
	Importance Rating	__2.8_	_____

33. During sampling, a purge of 165 gallons is taken from the SIT volume SO23-3-2.7.1 "Safety Injection Tank Operation". Prior to the purge, the level and pressure of the SIT was 82.0% (NR) and 630 psia respectively. With no other operator action to modify SIT level and pressure, the post-sampling level and pressure would be:

A. 71.0% (NR) and 570 psia respectively.

B. 71.0% (NR) and 624 psia respectively.

C. 80.9% (NR) and 570 psia respectively.

D. 80.9% (NR) and 624 psia respectively.

Proposed Answer: __D___
Explanation (Optional): SO23-3-2.7.1 indicates that the 165 gallon sample purge will result in 1.1% level drop and 6 psia pressure drop in the SIT.

Technical Reference(s): ___ SO23-3-2.7.1_____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:

Learning Objective: _____ (As available)

Question Source:	Bank #	_____
	Modified Bank #	_____ (Note changes or attach parent)
	New	___X____
Question History:	Last NRC Exam	_____
Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	__X___
10 CFR Part 55 Content:	55.41 __3,5,8___	
	55.43 _____	

Comments: 006/K5.02 & 2.8 - Emergency Core Cooling/Knowledge of the operational implications of the following concepts as they apply to ECCS: Relationship between accumulator volume and pressure.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____007-A4.10____	
	Importance Rating	_3.6_	_____

34. The following stable plant conditions exist while with the reactor shutdown:

-PCS level = 52%
-PCS pressure = 1000 psia
-Quench Tank level = 50%
-Quench Tank pressure = 10 psig

What tail pipe temperature would be expected for a leaking PZR code safety valve under these conditions?

A. 193 °F

B. 234 °F

C. 311 °F

D. 545 °F

Proposed Answer: __C___
Explanation (Optional): Isenthalpic process results in ~310 °F for 24.4 psia (must use absolute pressure on Mollier diagram vice gage pressure); 193, 234, and 545 are Tsat for 10 psia, 24.4 psia, and 1000 psia respectively.
Technical Reference(s): ___Steam Tables_____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination: **Steam Tables**
Learning Objective: _____ (As available)

Question Source:	Bank #	_____
	Modified Bank #	_____ (Note changes or attach parent)
	New	___X___
Question History:	Last NRC Exam	_____
Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	__X___
10 CFR Part 55 Content:	55.41	__5,14___
	55.43	_____

Comments: 007/A4.10 & 3.6 - Pressurizer Relief/Quench Tank/ Ability to manually operate and/or monitor in the control room: Recognition of a leaking PORV/safety.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____008-K4.02____	
	Importance Rating	_2.9_	_____

35. The in-service Train “A” CCW Surge Tank, T-003, has been over-filled, causing the normally dry reference legs for ALL level transmitters and switches to fill with water.

Which of the following will occur?
(Assume NCL aligned to Train "A")

A. Critical Loop isolation valves will close.

B. Non-Critical Loop isolation valves will close.

C. Automatic Makeup to the CCW System will terminate.

D. The CCW Pump on the Train "B" will automatically start.

Proposed Answer: __B___
Explanation (Optional):

Technical Reference(s): ___SD-SO23-400_____ (Attach if not previously provided)
___SO23-13-7_____
Proposed references to be provided to applicants during examination:

Learning Objective: _____55542_____ (As available)
Question Source: Bank # __N57589__
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam __1998_____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X__
10 CFR Part 55 Content: 55.41 __7__
55.43 _____
Comments: 008/K4.02 & 2.9 - Component Cooling Water/Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: Operation of the surge tank, including the associated valves and controls.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____010-K6.01____	
	Importance Rating	_2.7_	_____

36. What are the other TWO Reactor Trips that will be affected by the loss of a Narrow Range Pressurizer Pressure Instrument?

A. Local Power Density - High, and DNBR - Low.

B. Local Power Density - Low, and DNBR - High.

C. Pressurizer Pressure - Low (CCAS), and Pressurizer Pressure - Low (RPS).

D. Pressurizer Pressure - High (CIAS/CCAS), and Pressurizer Pressure - Low (RPS).

Proposed Answer: __A__
Explanation (Optional): .
Technical Reference(s): ___SO23-13-18 _____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____55180_____ (As available)

Question Source: Bank # _N3205_
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam ___2000_____

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

10 CFR Part 55 Content: 55.41 _____
55.43 _____

Comments: 010/K6.01 & 2.7 - Pressurizer Pressure Control/ Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: Pressure detection systems.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____010-K2.01_____	
	Importance Rating	_3.0_	_____

37. Which of the following Unit 2 Pressurizer heater groups are powered by 480V bus 2B04?

A. Backup heater group A (E128)

B. Backup heater group B (E129)

C. Proportional heater group A (E123)

D. Proportional heater group B (E124)

Proposed Answer: __A___
Explanation (Optional):

Technical Reference(s): _____ (Attach if not previously provided)
_____

Proposed references to be provided to applicants during examination:
Learning Objective: _____55417_____ (As available)
Question Source: Bank # _N11003_
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 __7__
55.43 _____

Comments:
010/K2.01 & 3.0 - Pressurizer Pressure Control/Knowledge of bus power supplies to the following: PZR Heaters

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____012-K4.09____	
	Importance Rating	_2.8_	_____

38. Plant conditions are as follows:

- Unit 2 at 100% power
- Pressurizer Pressure detector PT-0101-1 output fails high
- Pressurizer Pressure detector PT-0100X output has also fails high
- All actions of SO23-13-18, Reactor Protection System Failure, have been completed

What is the current high Pressurizer Pressure reactor trip coincidence logic status?

A. 1 out of 2.

B. 2 out of 3.

C. 2 out of 4.

D. The reactor is tripped on high Pressurizer Pressure.

Proposed Answer: __B__
Explanation (Optional): Only PT-0101-1 affects the RPS logic (PT-0100X is only used for control, not protection), and once it is bypassed per SO23-13-18, the coincidence shifts to 2 out of 3.

Technical Reference(s): ___SD-SO23-360_____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____56622_____ (As available)
Question Source: Bank # _____
Modified Bank # _N56867_ (Note changes or attach parent)
New _____
Question History: Last NRC Exam ____1999_____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X__
10 CFR Part 55 Content: 55.41 __6,7___
55.43 _____
Comments: 012/K4.09 & 2.8 - Reactor Protection/Knowledge of RPS design feature(s) and/or interlock(s)which provide for the following: Separation of control and protection circuits.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____012-K2.01____	
	Importance Rating	_3.3_	_____

39. Which of the following describes what will be a result from a loss of Vital Bus Inverter 2Y001 per SO23-13-18, RPS Failure/Loss of Vital Bus Inverter?

A. CEAC 2 failure

B. PPS Channel A Hi Log Power trip

C. Only Reactor Trip Breakers 2 and 4 open

D. RCP CBO to VCT isolation valve 2HV9218 fails closed

Proposed Answer: __B___
Explanation (Optional):

Technical Reference(s): ___SO23-13-18_____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:

Learning Objective: _____55180_____ (As available)
Question Source: Bank # _N11159_
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 __6,7,10___
55.43 _____
Comments: 012/K2.01 & 3.3 - Reactor Protection/Ability to manually operate and/or monitor in the control room: Bistable, trips, reset and test switches.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____013-A1.07____	
	Importance Rating	_3.6_	_____

40. A LOCA has occurred and the following plant conditions exist:

- S/G E088 pressure has lowered to 725 psia.
- S/G E089 pressure is at 1000 psia.
- PZR pressure has lowered to 1600 psia and slowly lowering.
- Containment pressure is 12 psig and slowly lowering.
- Containment Radiation monitors are reading 43 R/hr and slowly lowering.
- Containment Temperature is 198°F and slowly lowering.
- All systems are operating as expected.

The crew is implementing SO23-12-3 “Loss of Coolant Accident” and step 12 (ESTABLISH Optimal Containment Atmosphere Conditions) has prompted them to refer to FS-14 “TERMINATE Containment Spray Operation.” Under the above conditions, FS-14 directs the SM/OL to evaluate keeping the CSS operating in order to:

A. reduce containment pressure

B. maximize containment cooling

C. remove radioactive iodine from the containment atmosphere

D. circulate the Tri-Sodium Phosphate to minimize corrosion in containment

Proposed Answer: __C___

Explanation (Optional): FS-14 of SO23-12-11 directs the SM/OL evaluate whether CSS is required for containment iodine removal and decay heat removal post-RAS; since containment pressure is below 14 psig and lowering and all systems are operating as expected (meaning at least two Containment emergency Cooling Units are operating), A and B are not reasons to keep CSS operating; CSS does circulate TSP to minimize corrosion from the liquid being sprayed by the CSS, but it is not a reason to keep CSS running.

Technical Reference(s): ___ FS-14 of SO23-12-11 _____ (Attach if not previously provided)
_____

Proposed references to be provided to applicants during examination:

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X___

Question History: Last NRC Exam _____

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

10 CFR Part 55 Content: 55.41 __8,10___
55.43 _____

Comments: 013/A1.07 & 3.6 - Engineered Safety Features Actuation/Ability to predict and/or monitor changes in parameters (to Prevent exceeding design limits) associated with operating the ESFAS controls including: Containment radiation

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____022-A1.02____	
	Importance Rating	_3.6_	_____

41. What parameters will automatically initiate a Containment Cooling Actuation Signal (CCAS)?

A. Containment NR Pressure or PZR NR Pressure.

B. Containment NR Pressure or PZR WR Pressure.

C. Containment WR Pressure or PZR NR Pressure.

D. Containment WR Pressure or PZR WR Pressure.

Proposed Answer: ___B___
Explanation (Optional):
Technical Reference(s): ___T.S. Table 3.3.5-1_____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____56628_____ (As available)
Question Source: Bank # __N57476_
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 _8___
55.43 _____
Comments: 022/A1.02 & 3.6 - Containment Cooling/Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Containment pressure.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____022-A3.01____	
	Importance Rating	_4.1_	_____

42. Which of the following Engineered Safety Features Actuation Systems (ESFAS) signals are generated by an AUTOMATIC Safety Injection Actuation Signal (SIAS) but NOT by a MANUAL SIAS?

A. Toxic Gas Isolation Signal (TGIS).

B. Main Steam Isolation Signal (MSIS).

C. Containment Cooling Actuation Signal (CCAS).

D. Non-Critical Loop CCW Isolation Signal (CIAS).

Proposed Answer: __C___
Explanation (Optional):
Technical Reference(s): ___ SD-SO23-720 P. 8_____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____56628_____ (As available)
Question Source: Bank # _N4019_
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 __8__
55.43 _____
Comments: 022/A3.01 & 4.1 - Containment Cooling/Ability to monitor automatic operation of the CCS, including Initiation of safeguards mode of operation.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____026-K1.02____	
	Importance Rating	_4.1_	_____

43. Failure of HV-6501 "Shutdown Cooling Train A Heat Exchanger ME-004 CCW Return Isolation Valve" to open on a valid CSAS after a valid SIAS will result in:

A. "Shutdown HX Train A CCW Flow Lo" alarm

B. "Containment Spray Pump P012 CCW Flow Lo" alarm

C. Failure to meet the 100% Containment heat removal capacity

D. Inability of the Shutdown Cooling System to meet 100% of normal shutdown cooling requirements after the post-LOCA cooldown

Proposed Answer: ___C___
Explanation (Optional): SD-SO23-740 (page 38-40) describes that both SDCHX's are required to meet 100% Containment heat removal capacity during CSS operation; only one SDCHX is required to meet 100% of normal shutdown cooling requirements in SDC mode (so D is wrong); cooling flow is not affected to the CS pump seals, so B is wrong; the "Shutdown HX Train A CCW Flow Lo" alarm would normally actuate for no-flow through the HX, but the alarm does not actuate if HV-6501 is shut (so A is wrong)(see SO23-15-64.A section 64A37).
Technical Reference(s): __ SD-SO23-740 _____ (Attach if not previously provided)
__ SO23-15-64.A section 64A37__
Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X__
10 CFR Part 55 Content: 55.41 __7,8,10___
55.43 _____
Comments: 026/K1.02 & 4.1 - Containment Spray/Knowledge of the physical connections and/or cause-effect relationships between the CSS and the following systems: Cooling water

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____039-K1.01____	
	Importance Rating	_3.1_	_____

44. The plant was initially operating at 100% power. A complete Loss of Offsite Power occurred 5 minutes ago. NO operator actions have been taken and all systems functioned as designed.

How are the S/Gs maintaining RCS heat removal?

A. AFW supplying S/Gs; steaming using Main Steam Safety Valves.

B. MFW supplying S/Gs; steaming using Main Steam Safety Valves.

C. AFW supplying S/Gs; steaming using the Atmospheric Dump Valves.

D. MFW supplying S/Gs; steaming using the Atmospheric Dump Valves.

Proposed Answer: __A___
Explanation (Optional):

Technical Reference(s): ___SO23-12-1_____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____56252_____ (As available)
Question Source: Bank # _N56790*_
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam __1999____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X__
10 CFR Part 55 Content: 55.41 __4,5,7___
55.43 _____
Comments:
039/K1.01 & 3.1 - Main and Reheat Steam/Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: S/G. *Modified slightly, but not enough to count as “modified” instead of “bank.”

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__1__	_____
	K/A #	____059-K3.04____	
	Importance Rating	_3.6_	_____

45. Following a reactor trip, Standard Post Trip Actions have been completed. The CRS has diagnosed a loss of feedwater and entered SO23-12-6, Loss of Feedwater. The Loss of Feedwater EOI requires the operators to confirm the Loss of Feedwater diagnosis by verifying that Pressurizer Level is_____ before the operators_____.

A. Stable or Decreasing slowly; Trip all Reactor Coolant Pumps.

B. Stable or Increasing slowly; Trip all Reactor Coolant Pumps.

C. Stable or Decreasing slowly; Trip only one Reactor Coolant Pump in each loop.

D. Stable or Increasing slowly; Trip only one Reactor Coolant Pump in each loop.

Proposed Answer: __B___
Explanation (Optional): SO23-14-6 explains that PZR Level will be stable or slowly increasing and that all RCP's are tripped to minimize heat addition to the RCS.

Technical Reference(s): __ SO23-14-6 _____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)

Question Source:	Bank #	_____
	Modified Bank #	_____ (Note changes or attach parent)
	New	__X____
Question History:	Last NRC Exam	_____
Question Cognitive Level:	Memory or Fundamental Knowledge	__X__
	Comprehension or Analysis	_____
10 CFR Part 55 Content:	55.41 __5,10__	
	55.43 _____	

Comments:
059/K3.04 & 3.6 - Main Feedwater/Knowledge of the effect that a loss or malfunction of the MFW will have on the following: RCS.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_2__	_____
	Group #	_1__	_____
	K/A #	_061/K4.14_____	
	Importance Rating	_3.5__	_____

46. Given the following plant parameters,

-A reactor trip has occurred.

-Steam Generator 1: Pressure 735 psig and lowering
Level 10%

-Steam Generator 2: Pressure 1040 psig steady
Level 18%

Which of the following describes the feedwater flow to the steam generators:

A. P-140, P-141, and P-504 are running supplying feed to both steam generators.

B. P-141, and P-504 are running supplying feed to both steam generators.

C. P-140, and P-504 are running supplying feed to steam generator 2.

D. P-140, P-141, and P-504 are running supplying feed to steam generator 2.

Proposed Answer: __C___

Explanation (Optional):

Technical Reference(s): _SD-SO23-780 section 2.1.3, SSO23-720,_
Proposed references to be provided to applicants during examination: none

Learning Objective: _____ (As available)

Question Source:	Bank #	_____
	Modified Bank #	_____ (Note changes or attach parent)
	New	__X___
Question History:	Last NRC Exam	_____
Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	__X__
10 CFR Part 55 Content:	55.41 __4,7,8___	
	55.43 _____	

Comments:
061/K4.14 & 3.5 - Auxiliary/Emergency Feedwater/AFW automatic isolation

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_2__	_____
	Group #	_1__	_____
	K/A #	_062/2.2.22	_____
	Importance Rating	_3.4_	_____

47. Minimum allowable starting air pressure for the Emergency Diesel Generator operability is:

A. 120 psig

B. 175 psig

C. 185 psig

D. 210 psig

Proposed Answer: __B__
Explanation (Optional):

Technical Reference(s): SD-SO23-750 and tech spec 3.8___
Proposed references to be provided to applicants during examination: none

Question Source:	Bank #	_____
	Modified Bank #	_____ (Note changes or attach parent)
	New	__X____
Question History:	Last NRC Exam	_____
Question Cognitive Level:	Memory or Fundamental Knowledge	_X__
	Comprehension or Analysis	_____
10 CFR Part 55 Content:	55.41 __7,8___	
	55.43 _____	

Comments:
062/2.2.22 & 3.4 - AC Electrical Distribution / Knowledge of limiting conditions for operations and safety limits

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	063/K3.01	
	Importance Rating	3.7	

48. EDG 2G002 is being operated in parallel with normal power when an operator error results in the control power fuses being removed for the generator's output breaker. In this configuration, the generator output breaker:

A. will immediately trip open.

B. can be opened from the control room.

C. will trip open on a loss of generator excitation.

D. can only be opened manually at the breaker cubical.

Proposed Answer: D

Explanation (Optional): On a loss of breaker control power the breaker cannot be operated remotely. It will not open on most generator trip signals. It will remain closed unless manually tripped from the breaker cubicle.

Technical Reference(s): _____ (Attach if not previously provided)

_____

Proposed references to be provided to applicants during examination:

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # _____ (Note changes or attach parent)

New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis ____

10 CFR Part 55 Content: 55.41 (7)

55.43 _____

Comments:

063/K3.01 & 3.7 - DC Electrical Distribution/Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the following: ED/G

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_2__	_____
	Group #	_1__	_____
	K/A #	_064/K6.07	_____
	Importance Rating	_2.7_	_____

49. A leak on one air receiver for EDG 2G002 requires one bank of air receivers be isolated for repairs. With the discharge isolation valve closed for one bank of air receivers, a start signal for EDG 2G002 will result in:

A. all the air start valves will open and starting air will be provided to all the air start motors.

B. one-half the air start valves will open and air will be provided to one-half of the air start motors.

C. all the air start valves will open and starting air will be provided to one-half of the air start motors.

D. One-half the air start valves will open and air will be provided to all the air start motors.

Proposed Answer: ___C___
Explanation (Optional): On a start signal, all the air start valves will open. With only one bank of starting air in service, only one-half the air start motors will receive starting air making C the correct answer.
Technical Reference(s): _System Description SD-SO230750, Revision 11, Figure V-1
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New __X____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X___
10 CFR Part 55 Content: 55.41 _(7)__
55.43 _____
Comments: 064/K6.07 & 2.7 - Emergency Diesel Generator/Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: Air receivers

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	064/A1.01	
	Importance Rating	3.0	

50. The EDG automatic trip on low low lube oil pressure is always;

A. active.

B. active at all times except for the first 50 seconds of an engine startup.

C. active at all times unless there is a SIAS signal present.

D. active except for the first 50 seconds of an engine startup or if there is a SIAS signal present.

Proposed Answer: B
Explanation (Optional): The low low oil pressure is bypassed for the first 50 seconds of an engine start. Otherwise it is always active. This makes B correct.

Technical Reference(s): System Description SD-SO23-750, Revision 11, page 60.
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 (7)
55.43 _____
Comments: 064/A1.01 & 3.0 - Emergency Diesel Generators/Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ED/G system controls including: ED/G lube oil temperature and pressure

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_2__	_____
	Group #	_1__	_____
	K/A #	__073/2.3.9	_____
	Importance Rating	_2.5_	_____

51. During a board walk-down, you notice the following lineup for the containment purge system:

Mini Purge supply isolation valve HV-9821 closed
Mini Purge supply isolation valve HV-9823 open
Mini Purge exhaust isolation valve HV-9824 open
Mini Purge exhaust isolation valve HV-9825 closed
Normal Purge inlet isolation valve HV-9948 closed
Normal Purge inlet isolation valve HV-9949 open
Normal Purge outlet isolation valve HV-9951 closed
Normal Purge outlet isolation valve HV-9950 open

Which of the following automatic isolation signals could have caused this lineup?

A. Containment Purge Isolation Signal

B. High radiation detected by RE-7828 (purge stack radiation monitor)

C. Containment Purge Isolation Signal or High radiation detected by RE-7828 (purge stack radiation monitor)

D. Containment Isolation Actuation Signal

Proposed Answer: __B___
Technical Reference(s): __SD-SO23-770 Section 2.0
Proposed references to be provided to applicants during examination: none
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New __X___
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis __X___
10 CFR Part 55 Content: 55.41 __7,11___
55.43 _____
Comments: 073/2.3.9 & 2.5 - Process Radiation Monitoring/Knowledge of the process for performing a containment purge.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_2__	_____
	Group #	_1___	_____
	K/A #	__076/K3.05	_____
	Importance Rating	_3.0_	_____

52. Given the following plant conditions:

-Plant shutdown and cooldown from 100% power has just been completed.
-Shutdown Cooling has been established on Train A.
-The running component cooling water pump trips, and the standby pump fails to start.

Which of the following describes the shutdown Cooling System response?

A. All SDC flow is lost; the LPSI pumps will trip on low CCW flow.

B. No effect; CCW is not required by the Shutdown Cooling System.

C. SDC heat removal is lost and the Shutdown HX Train A CCW Flow Hi Lo alarm will actuate.

D. SDC flow will be degraded and the Shutdown HX Train A CCW Flow Hi Lo alarm will actuate.

Proposed Answer: __C__
Explanation (Optional):
Technical Reference(s): _____ (Attach if not previously provided)
_____
Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X___
10 CFR Part 55 Content: 55.41 __7___
55.43 _____
Comments: 076/K3.05 & 3.0 - Service Water/ Knowledge of the effect that a loss or malfunction of the SWS will have on the following: RHR components, controls, sensors, indicators, and alarms, including rad monitors

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_2___	_____
	Group #	_1__	_____
	K/A #	__078/A3.01	_____
	Importance Rating	_3.1_	_____

53. Unit 2 is operating at 100% power with the Instrument Air system lined up for normal operations when the Instrument Air Header Pressure Low alarm is received. Instrument Air header pressure is at 87 psig. The current status of the Instrument air system is:

A. Three air compressors are running fully loaded, the Nitrogen backup supply system is maintaining the instrument air header via a pressure-regulating valve.

B. Two air compressors are running fully loaded and one air compressor is running half loaded maintaining the instrument air header.

C. Two air compressors are running fully loaded and one air compressor is running half loaded, and the service air system is maintaining the instrument air header via a self-regulating pilot operated pressure control valve.

D. Three air compressors are running fully loaded, the service air system is maintaining the instrument air header via a self-regulating pilot operated pressure control valve.

Proposed Answer: __C___
Explanation (Optional):
Technical Reference(s): __SD SO23-570__section 2.2.10 and section 3.2___
Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New __X_____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis __X___
10 CFR Part 55 Content: 55.41 __4,7___
55.43 _____
Comments: 078/A3.01 & 3.1 - Ability to monitor automatic operation of the IAS, including: Air pressure

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_2___	_____
	Group #	_1__	_____
	K/A #	____103/A2.05_____	
	Importance Rating	_2.9_	_____

54. Which of the following conditions prevents containment Entry?

A. Containment Pressure is 3.4 psig.

B. Containment Humidity is 100%.

C. Only two egress paths exist from containment

D. Containment atmosphere Oxygen level is unacceptable.

Proposed Answer: __A__
Explanation (Optional): The requirements are for pressure <3 psig and a minimum of 2 egress paths.
Technical Reference(s): _SO23-3-2.34___
Proposed references to be provided to applicants during examination: None
Question Source: Bank # _N101330_
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 __9,10___
55.43 _____

Comments: 103/A2.05 & 2.9 - Containment/Ability to (a) predict the impacts of the following malfunctions or operations on the containment system-and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operation: Emergency containment entry

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	103/A4.06	
	Importance Rating	2.7	

55. Given the following:

-Unit 2 is in a refueling outage.
-Fuel is being moved inside containment.

WHICH ONE (1) of the following is the MINIMUM required condition for the Personnel Air Lock (PAL) and Emergency Air Lock (EAL) doors and Equipment hatch?

A. The Equipment hatch must be closed and held in place by 4 bolts, both doors in the EAL must be closed, and one door of the PAL must be closed

B. The Equipment hatch must be closed with all bolts installed; both doors in the PAL and EAL must be closed.

C. The Equipment hatch must be closed and held in place by 4 bolts, one door in the EAL must be closed, and one door in the PAL must be closed.

D. Both doors of the PAL and both doors of the EAL must be closed.

Proposed Answer: C
Explanation (Optional):
Technical Reference(s): Tech Spec 3.9.3
Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X
10 CFR Part 55 Content: 55.41 9,12
55.43 _____
Comments: 103/A4.06 & 2.7 - Containment/Ability to manually operate and/or monitor in the control room: Operation of the containment personnel airlock door

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__2__	_____
	K/A #	___015-A1.04	_____
	Importance Rating	_3.5_	_____

56. Reactor power is 80 percent and COLSS (Core Operating Limits Supervisory System) is out of service. Axial Shape Index (ASI) is being computed by the CPCs.

CEAs were driven in due to a transient and the following core power conditions exist:

Upper Half power is 45%.
Lower Half power is 55%.

With these conditions, the Axial Shape Index is equal to:

A. + 0.1, and outside the applicable technical specification limit.

B. - 0.1, and outside the applicable technical specification limit.

C. + 0.1, and within the applicable technical specification limit.

D. - 0.1, and within the applicable technical specification limit.

Proposed Answer: __C____
Explanation (Optional): The ASI is 55 – 45/55 + 45 = +0.1 making B and D incorrect. The limit with COLSS out of service is ± 0.2. This makes C the only correct answer.
Technical Reference(s): _TS 3.2.5 & LCS 3.2.102_____ (Attach if not previously provided)
_____

Proposed references to be provided to applicants during examination:
Learning Objective: ___54674_____ (As available)
Question Source: Bank # _75630_
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam _2000__
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis _X___
10 CFR Part 55 Content: 55.41 __(5)_
55.43 _____
Comments: 015/A1.04 & 3.5 - Nuclear Instrumentation/Ability to predict and/or monitor changes in parameters to prevent exceeding design limits associated with operating the NIS controls including: Quadrant power tilt ratio

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April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__2__	_____
	K/A #	___028-k3.01	_____
	Importance Rating	_3.3_	_____

57. The power regulators in both hydrogen recombiners were replaced during the last outage with parts that contained a manufacturing defect that effectively reduced the heater output in both hydrogen recombiners. Several hours after placing both units in service, an operator notes the indicated heater temperature for the hydrogen recombiners is approximately 925 degrees rather than the expected 1150-1400 degrees.

With the post-LOCA hydrogen concentration at 2 percent and slowly rising, the operator should expect the hydrogen concentration in containment to:

A. increase as though the hydrogen recombiners were not in service.

B. increase at a slower rate than if the recombiners were not in service.

C. remain stable at approximately 2 percent.

D. decrease at a slower rate than expected.

Proposed Answer: ___A___
Explanation (Optional): For the hydrogen combiners to remove hydrogen from the containment atmosphere, heater temperature must be at least 1150 degrees (the reaction temperature for hydrogen recombination). With the heater temperature at 925 degree there will be no hydrogen recombination and the containment hydrogen concentration will increase as though the recombiners were not in service. Therefore the correct answer is A.
Technical Reference(s): _System Description SD-SO23-770, Revision 6, page 40_
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X___
Question History: Last NRC Exam __NA___
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 __(7)_
55.43 __ _____
Comments: 028/K3.01 & 3.3 - Hydrogen Recombiner and Purge Control/Knowledge of the effect that a loss or malfunction of the HRPS will have on the following: Hydrogen concentration in containment

San Onofre Generating Station SRO Written Examination Key
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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__2__	_____
	K/A #	___029-K1.03	_____
	Importance Rating	_3.6_	_____

58. Both CIAS and CPIS will close the following valves:

A. Containment mini-purge supply valves (HV-9821 & HV-9823) AND Containment mini-purge exhaust valves (HV-9824 & HV-9825)

B. Containment mini-purge supply valves (HV-9821 & HV-9823) AND Containment purge supply valves (HV-9948 & HV-9949)

C. Containment purge exhaust valves (HV-9950 & HV-9951) AND Containment mini-purge exhaust valves (HV-9824 & HV-9825)

D. Containment purge supply valves (HV-9948 & HV-9949) AND Containment purge exhaust valves (HV-9950 & HV-9951)

Proposed Answer: __A___
Explanation (Optional): CIAS only closes the mini-purge supply and exhaust valves, while CPIS closes purge and mini-purge supply and exhaust valves.

Technical Reference(s): _____System Description SD-SO23-270, Rev 6, page 71 and 80_
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X___
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge __X_
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 _7,8,9___
55.43 _____
Comments: 029/K1.03 & 3.6 - Knowledge of the physical connections and/or cause-effect relationships between the Containment Purge System and Engineered Safeguards

San Onofre Generating Station SRO Written Examination Key
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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__2__	_____
	K/A #	___035-A2.06	_____
	Importance Rating	_4.5_	_____

59. The plant is operating at full power when a crack develops in a Steam Generator (SG) tube that results in a 30 GPM RCS leak rate. Pressurizer and VCT levels are stable.

This situation will require the operators to:

A. immediately trip the reactor and isolate the affected SG.

B. perform a rapid shutdown and isolate the affected SG.

C. immediately trip the reactor and cooldown the RCS to less than 200 degrees.

D. perform a rapid shutdown and then cooldown the RCS to less than 200 degrees.

Proposed Answer: __D___
Explanation (Optional):

Technical Reference(s): _Abnormal Operating Instruction SO23-13-14, Revision 9, step 4c and Technical Specification 3.4.13.
Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X___
Question History: Last NRC Exam _NA____
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X__
10 CFR Part 55 Content: 55.41 _(10)
55.43 _____
Comments: 035/A2.06 & 4.5 - Steam Generator/Ability to (a) predict the impacts of the following mal-functions or operations on the GS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Small break LOCA

San Onofre Generating Station SRO Written Examination Key
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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__2__	_____
	K/A #	___002-K5.08	_____
	Importance Rating	_3.4_	_____

60. If actual pressurizer water level is above the program level then:

A. a SIAS may occur on a rapid load change transient.

B. the pressurizer may empty following a reactor trip.

C. the pressurizer could go solid on a load reject event.

D. the energy release during a LOCA could exceed the containment design.

Proposed Answer: __C___
Explanation (Optional):
Technical Reference(s): _System Description DS-SO23-360, Revision 11, page 64._
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X___
Question History: Last NRC Exam _None__
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 _(5)_
55.43 _____
Comments: 002/K5.08 & 3.4 - Knowledge of the operational implications of the following concepts as they apply to the RCS: Why Pzr level should be kept within the programmed band.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__2__	_____
	K/A #	___045-K4.13	_____
	Importance Rating	_2.6_	_____

61. Unit 2 is at 45 percent power after coming out of an outage. A grid disturbance has resulted in grid frequency and turbine speed increasing. With turbine speed now at 1950 RPM, the response of the turbine and generator control systems should be to:

A. throttle the governor valves in the closed direction.

B. close the turbine stop and governor valves.

C. trip the generator output breaker on a high volts to hertz signal.

D. throttle open the steam bypass control valves.

Proposed Answer: __B__
Explanation (Optional): When turbine speed reaches 1950 RPM the overspeed setpoint has been exceeded and the turbine stop and governor valves should trip closed. The generator volts/hertz ratio should not be approached in this scenario so the generator breaker should remain closed until the turbine trips.
Technical Reference(s): __System Description SD-SO23-180, Revision 9, page 71._
Proposed references to be provided to applicants during examination:
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X___
Question History: Last NRC Exam _NA_ ___
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X__
10 CFR Part 55 Content: 55.41 _(7)__
55.43 _____
Comments: 045/K4.13 & 2.6 - Knowledge of MT/G system design feature(s) and/or inter-lock(s) which provide for the following: Overspeed protection

San Onofre Generating Station SRO Written Examination Key
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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	011/A3.03	
	Importance Rating	3.2	

62. The reactor is at rated thermal power with all systems operable and in their normal configuration. While performing a board walkdown, the reactor operator notes pressurizer level is slowly lowering. If the downward trend continues with no operator action, when pressurizer level deviates from program level by a negative:

A. 0.75%, the letdown flow control valve will have reached its' minimum flow position.

B. 2%, the 1st backup charging pump will automatically start.

C. 3%, the 2nd backup charging pump will automatically start.

D. 6%, an alarm signal will provide a backup start signal to both charging pumps.

Proposed Answer: D

Explanation (Optional): As level lowers, the percent of deviation from program increases. When deviation reaches –1.1 %, the flow control valve reaches minimum making a. incorrect. When level reaches –2.5%, the 1st backup charging pump starts making b. incorrect. When level reaches –3.9%, the 2nd backup charging pump starts making c. incorrect. When level reaches –6%, an alarm signal will provide a backup start signal to both charging pumps making d. correct.

Technical Reference(s): System Description SD-SO23-390, Revision 10, page 46.

Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam NA

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

10 CFR Part 55 Content: 55.41 (7)
55.43 _____

Comments: 011/A3.03 & 3.2 – Pressurizer Level Control System/Ability to monitor the automatic operation of the PZR LCS, including charging and letdown.

San Onofre Generating Station SRO Written Examination Key
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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	071-A4.30	
	Importance Rating	2.9	

63. If actual pressurizer water level is above the program level then:

A. a SIAS may occur on a rapid load change transient.

B. the pressurizer may empty following a reactor trip.

C. the pressurizer could go solid on a load reject event.

D. the energy release during a LOCA could exceed the containment design.

Proposed Answer: C
Explanation (Optional):

Technical Reference(s): System Description DS-SO23-360, Revision 11, page 64.
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X
Question History: Last NRC Exam None
Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 (5)
55.43 _____
Comments: 071/A4.30 & 2.9 - Waste Gas Disposal/Ability to manually operate and/or monitor in the control room: Water drainage from the WGOS decay tanks [Deleted]

002/K5.08 & 3.4 - Knowledge of the operational implications of the following concepts as they apply to the RCS: Why Pzr level should be kept within the programmed band.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__2__	_____
	K/A #	_ _072-K3.01	_____
	Importance Rating	_3.2_	_____

64. A malfunction of which Radiation Monitors could initiate a Containment Purge Isolation Signal (CPIS)?

A. RE-7807, Containment Airborne Radiation Monitor.

B. RE-7828C, Containment Purge Stack Radiation monitor.

C. RE-7820, In-Containment High Range Radiation Monitor.

D. RE-7822, Fuel Handling Building Ventilation Airborne Radiation Monitor.

Proposed Answer: __A__
Explanation (Optional):

Technical Reference(s): ___System Description SD-SO23-690, Revision 9, page 127-132.
Proposed references to be provided to applicants during examination: None.

Learning Objective: ____52758_____ (As available)
Question Source: Bank # _N4330_
Modified Bank # _____ (Note changes or attach parent)
New _____
Question History: Last NRC Exam ____
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 __11_
55.43 _____
Comments: 072/K3.01 & 3.2: Knowledge of the effect that a loss or malfunction of the ARM system will have on the following: Containment ventilation isolation.

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__2__	_____
	Group #	__2__	_____
	K/A #	___079-K1.01	_____
	Importance Rating	_3.2_	_____

65. A weld failure on the instrument air (IA) header has resulted in instrument air header pressure slowly decreasing. Assuming the system is functioning as designed and no operator action, the correct sequence of events as pressure continues to decrease is the:

A. Service Air (SA) to IA cross connect valve opens and then the nitrogen backup supply comes into service.

B. backup nitrogen supply comes into service and then the SA to IA cross-connect valve closes.

C. backup nitrogen supply comes into service and then the SA to IA cross-connect valve opens.

D. SA to IA cross connect valve closes and then the nitrogen backup supply comes into service.

Proposed Answer: ___C_
Explanation (Optional): As IA pressure lowers, the N2 backup will begin to supply nitrogen. If pressure continues to lower, then the SA cross connect will begin to open to supply the IA with SA. Therefore the correct answer is C.
Technical Reference(s): _System Description SD-SO23-570, Revision 7, page 32.
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X___
Question History: Last NRC Exam __NA___
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X___
10 CFR Part 55 Content: 55.41 _(7)_
55.43 _____
Comments: 079/K1.01 & 3.0 - Station Air/Knowledge of the physical connections and/or cause-effect relationships between the SAS and the following systems: IAS

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__3__	_____
	Group #	_____	_____
	K/A #	_____G2.1.1_____	
	Importance Rating	_3.7_	_____

66. A maintenance supervisor arrives in the control room and asks permission to block open a non-security fire door to facilitate communications between two electricians. The supervisor also informs you both electricians will have a direct view of the door, the door can be quickly closed, and there will not be anything strung through the door.

According to the Conduct of Operations, what is the maximum amount of time the door be left open continuously without implementing a Barrier Impairment?

A. 30 minutes

B. 45 minutes

C. 1 hour

D. 2 hours

Proposed Answer: ___B__
Explanation (Optional): According to the Conduct of Operations procedure the fire door can be left open for no longer than 45 minutes without implementing a Barrier Impairment. Therefore, the correct answer is B.
Technical Reference(s): _Conduct of Operations, SO123-0-A1, Revision 1, step 6.4.9.1
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New __X____
Question History: Last NRC Exam _____
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 _(10)_
55.43 _____
Comments: 2.1.1 & 3.7 - Knowledge of the Conduct of Operations

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__3__	_____
	Group #	_____	_____
	K/A #	___G2.1.22_____	
	Importance Rating	_2.8_	_____

67. The plant is shutdown and shutdown cooling (SDC) is in operation. Current plant conditions are as follows:

- ✓ All CEAs are fully inserted
- ✓ Chemistry reported RCS boron is at the required concentration for shutdown
- ✓ Tave is 210 degrees with a 25 degree per hour cooldown rate
- ✓ LPSI Pump A is in service for SDC
- ✓ All vessel head closure bolts are fully tensioned

According to the Technical Specifications, the plant is currently in Mode:

A. 3.

B. 4.

C. 5.

D. 6.

Proposed Answer: __B____
Explanation (Optional): Mode 4 is defined as Keff<0.99 and Tave between 350 and 200 degrees. Mode 3 is Tave>350 degrees and Modes 5 and 6 require Tave to be either less than 200 degrees or at least one vessel head closure bolt not fully tensioned. Therefore, the only correct answer is B.
Technical Reference(s): _Technical Specifications Table 1.1-1
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X___
Question History: Last NRC Exam __NA_____
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 __(5)
55.43 _____
Comments: 2.1.22 & 2.8 - Ability to determine the mode of operation.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__3__	_____
	Group #	_____	_____
	K/A #	___G2.1.31_____	
	Importance Rating	_4.2_	_____

68. The plant is operating at 100 percent power with all systems operable and in their normal configuration with the exception of the Steam Bypass Control System (SBCS). The SBCS main calculator has failed high.

In this situation, for the SBCS to be in automatic operation (direct acting) an operator doing a board walkdown in the control room should observe the SBCS:

A. Master Control Station remote/local switch in the local position.

B. Master Control Station remote/local switch in the remote position.

C. Valve Control Station remote/local switch in the local position.

D. Valve Control Station remote/local switch in the remote position.

Proposed Answer: __A___
Explanation (Optional): If the SBCS has failed, the Master Control Station (MCS) no longer receives a signal to open the pressure control valves if in remote. The MCS must be put in the local position and the setpoint adjusted for continued automatic operation. The SBCS Valve Control Station does not have a remote/local switch in the control room. Therefore the only correct answer is A.
Technical Reference(s): _System Description SD-SO23-175, Revision 5, page 18._
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New __X____
Question History: Last NRC Exam __NA___
Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis __X__
10 CFR Part 55 Content: 55.41 _(7)__
55.43 _____
Comments: 2.1.31/4.2 - Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__3__	_____
	Group #	_____	_____
	K/A #	___G2.2.11_____	
	Importance Rating	_2.5_	_____

69. The process for controlling a procedure containing a Single Use TCN includes:

A. printing the procedure from NDMS, putting the unique number on it, and stamping it FOR SINGLE USE ONLY

B. printing the procedure from NDMS, ensuring it has an expiration date of less than 30 days, and stamping it FOR SINGLE USE ONLY.

C. getting the procedure from the cognizant personnel and ensuring it is stamped CONTROLLED COPY.

D. getting the procedure from the cognizant personnel, ensuring it is uniquely numbered, and stamped FOR INFORMATION ONLY .

Proposed Answer: __D____
Explanation (Optional): A procedure designated for single use only may not be printed from NDMS but must be obtained from the cognizant personnel. It must be uniquely numbered and stamped FOR INFORMATION ONLY. Therefore the only correct answer is D.
Technical Reference(s): _Administrative Procedure SO123-VI-1.0.1, Revision 15, step 6.1.9.
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X___
Question History: Last NRC Exam __NA___
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 _(10)_
55.43 _____
Comments: 2.2.11 & 2.5 - Knowledge of the process for controlling temporary changes.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__3__	_____
	Group #	_____	_____
	K/A #	___G2.2.13_____	
	Importance Rating	_3.6_	_____

70. The proper location for placing tags associated with PULLED fuses on 4 KV buses (bus pot fuses) is on the:

A. threaded hole in the fuse drawer faceplate.

B. fuses with the fuses taped together and placed in the fuse drawer.

C. fuse clip inside the fuse drawer with the drawer remaining open.

D. breaker cubicle door handle.

Proposed Answer: __A____
Explanation (Optional):
Technical Reference(s):___ SO123-XX-5_____
Proposed references to be provided to applicants during examination: None
Learning Objective: ___55439_____ (As available)
Question Source: Bank # N57303
Modified Bank # _____(Note changes or attach parent)
New _____
Question History: Last NRC Exam Unknown
Question Cognitive Level: Memory or Fundamental Knowledge __X__
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 _(10)_
55.43 _____
Comments: 2.2.13 & 3.6 - Knowledge of the tagging and clearance procedures

San Onofre Generating Station SRO Written Examination Key
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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	G2.2.22	
	Importance Rating	3.4	

71. The plant is about to enter Mode 1 during a startup when a review of the as-left data contained in a surveillance for Pressurizer Pressure - High RPS trip setpoints was performed. The results of the review are tabulated below.

RPS Channel	Setpoint
A	2398 PSIA
B	2355 PSIA
C	2393 PSIA
D	2362 PSIA

According to Technical Specification 3.3.1, RPS Instrumentation – Operating (Attached), if no operator action is taken the plant may:

A. enter Mode 1, but must be in Mode 3 within 1 hour if repairs are not made.

B. enter Mode 1, but must be in Mode 3 within 7 hours if repairs are not made.

C. not enter Mode 1 and must be in Mode 3 within 1 hour if repairs are not made.

D. not enter Mode 1 and must be in Mode 3 within 7 hours if repairs are not made.

Proposed Answer: B

Explanation (Optional): According to Table 3.3.1-1 operability for this function is required in Modes 1 and 2. The action statement says 3.0.4 in not applicable so the startup may continue into Mode 1. Action statement 3.3.1.B is entered giving the operator 1 hour to complete the actions (or repairs) with an additional 6 (Action statement G) hours to get to Mode 3. This makes answer B the only correct answer.

Technical Reference(s): Technical Specification 3.3.1

Proposed references to be provided to applicants during examination: Technical Specification 3.3.1 including Table 3.3.1-1.

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam NA

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

10 CFR Part 55 Content: 55.41 (5)
55.43 _____

Comments: 2.2.22 & 3.4 - Knowledge of limiting conditions for operations and safety limits.

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__3__	_____
	Group #	_____	_____
	K/A #	___G2.3.4_____	
	Importance Rating	_2.5_	_____

72. While reviewing an RWP, an operator on tour of the plant notes one accessible area that may be entered has a dose rate of 1073 mrem/hour and contamination levels of 31,162 dpm/100 cm2 beta/gamma. This area should be posted as a:

A. contamination area and radiation area.

B. high contamination area and radiation area.

C. contamination and high radiation area.

D. high contamination and high radiation area.

Proposed Answer: __C___
Explanation (Optional): Dose rates greater than 1000 mrem/hour is a high radiation area, contamination levels in excess of 1000 dpm is a contamination area, and contamination levels in excess of 100,000 dpm is a high contamination area. Therefore this area should be posted as a contamination and high radiation area.
Technical Reference(s): _Health Physics Procedure SO123-VII-20.11.1, Revision 7.
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New __X____
Question History: Last NRC Exam __NA___
Question Cognitive Level: Memory or Fundamental Knowledge __X___
Comprehension or Analysis _____
10 CFR Part 55 Content: 55.41 _(12)_
55.43 _____
Comments: 2.3.4 & 2.5 - Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__3__	_____
	Group #	_____	_____
	K/A #	___G2.3.10_____	
	Importance Rating	_2.9_	_____

73. Consideration is being given to a high dose job that needs to be performed by Operations. The general dose rate in the area is 500 mrem/hour but can be reduced to 200 mrem/hour if lead shielding is installed. It will take 2 individuals an hour and a half to install the shielding if desired.

In order to minimize the total dose to get the high dose work done;

A. install the lead and send one operator in to do the work.

B. install the lead and send two operators in to do the work.

C. do not install the lead and use one operator to do the work.

D. do not install the lead and use two operators to do the work.

Proposed Answer: __D____

Explanation (Optional): It will take 1500 mrem to install the shielding and with two operators working it will cost another 600 mrem for a total of 2100 mrem. Without the shielding it will cost 1500 mrem for the same two operators to get the work done and 2000 mrem if one operator does the work. Therefore the lowest total dose will be 1500 mrem making answer D the only correct answer.

Technical Reference(s): _Health Physics Procedure SO123-VII-20.4_

Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # _____ (Note changes or attach parent)

New ___X___

Question History: Last NRC Exam _NA_____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis __X__

10 CFR Part 55 Content: 55.41 _(12)_

55.43 _____

Comments: 2.3.10 & 2.9 - Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	__3__	_____
	Group #	_____	_____
	K/A #	___G2.4.20_____	
	Importance Rating	_3.3_	_____

74. According to 10CFR20, Standards for Protection Against Radiation Protection, one of the requirements for a Planned Special Exposure (PSE) is that the dose from all PSEs and all doses in excess of the limits may not exceed _____ times the annual dose limits during an individual's lifetime.

A. 5

B. 10

C. 20

D. 25

Proposed Answer: __A____
Explanation (Optional): 10CFR20.1206 (e)(1) states the individual may not exceed 5 times the lifetime annual dose limits. This makes A the only correct answer.

Technical Reference(s): 10CFR20.1206 (e)(1)
Proposed references to be provided to applicants during examination: None
Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New ___X___

Question History: Last NRC Exam __NA___

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

10 CFR Part 55 Content: 55.41 __12_
55.43 _____

Comments: 2.4.20 & 3.3 - Knowledge of 10 CFR 20 and related facility radiation control requirements.

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	G2.4.24	
	Importance Rating	3.3	

75. One of the steps in the process of performing a radioactive gaseous release is to verify the Plant Vent Stack (PVS) airborne radiation monitor (3RE-7865-1) is operable.

The PVS airborne radiation monitor would be inoperable if the:

A. red SUPV MODE LED is illuminated.

B. red KYBD LOCKOUT LED is extinguished.

C. key has been removed from the NORM/SUPV keyswitch.

D. green EFF level OPERATE LED is illuminated.

Proposed Answer: A

Explanation (Optional): According to the reference procedure, the PVS monitor is operable if (among other things) the red SUPV MODE and KYBD LOCKOUT LEDs are extinguished, the key has been removed from the NORM/SUPV keyswitch, and the green EFF level OPERATE LED is illuminated. This makes A the only correct answer.

Technical Reference(s): Operating Instruction SO23-8-15, Revision 16, step 1.8

Proposed references to be provided to applicants during examination:

Learning Objective: _____ (As available)

Question Source:
- Bank # _____
- Modified Bank # _____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam NA

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

10 CFR Part 55 Content:
- 55.41 (7/10)
- 55.43 _____

Comments: 2.4.24 & 3.3 - Knowledge of the process for performing a planned gaseous radioactive release.

76. The Reactor has tripped and 4 Full-length CEAs are stuck out. After opening the Reactor Trip circuit breakers locally, 2 CEAs fall in.

What are the proper actions by the operating crew in response to this event?

A. Emergency borate the RCS, and immediately go to the Functional Recovery.

B. Emergency borate the RCS, and immediately go to the Reactor Trip Recovery.

C. Emergency borate the RCS, finish the Standard Post Trip Actions, and diagnose a Functional Recovery entry.

D. Emergency borate the RCS, finish the Standard Post Trip Actions, and diagnose a Reactor Trip Recovery event.

ANSWER: D
QUESTION TYPE: SRO
KA# & KA VALUE: EPE07/G.2.4.1 & 4.6 - Reactor Trip/Knowledge of EOP entry conditions and immediate action steps.
REFERENCE: SO23-12-1
SOURCE: Tier 1, Group 1, SONGS **BANK**#N3927
LEARNING OBJECTIVE: 56252
COGNITIVE RATING: H
ATTACHMENTS: None
JUSTIFICATION:
10CFR55 BASIS: 10CFR55.43 (5)
COMMENTS: Q 76

San Onofre Generating Station SRO Written Examination Key
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77. SONGS experienced an earthquake that annunciated the Operating Basis Earthquake Detected alarm. Since then, Unit 2 has been in a transient involving a loss of RCS inventory. Current plant status is:

- ✓Reactor coolant average temperature is 480 degrees and lowering
- ✓Pressurizer pressure is 2000 psig and lowering
- ✓Pressurizer level is 30% and lowering
- ✓VCT level is lowering
- ✓Charging flow to the reactor has been maximized
- ✓Containment Pressure is 0.8 psig and rising
- ✓SG levels are approximately 40% and rising

Based on the current conditions, this event should be classified as a(n):

A. Unusual Event

B. Alert

C. Site Area Emergency

D. General Emergency

ANSWER: C
QUESTION TYPE: SRO
KA# & KA VALUE: APE022/G2.4.29 & 4.0 - Loss of Reactor Coolant/Knowledge of the emergency plan.
REFERENCE: SO123-VIII-1, EPIP, Revision 22, page 22 of 75.
SOURCE: **New** Question - Tier 1, Group 1
LEARNING OBJECTIVE:
COGNITIVE RATING: H
ATTACHMENTS: **Emergency Plan Classification Chart**
JUSTIFICATION: In Mode 3, with the RCS leak rate greater than the capacity of the charging pumps, this is EAL B3.1. This is a Site Area Emergency.
10CFR55 BASIS: 10CFR55.43 (5)
COMMENTS: Q 77

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

78. The plant is shutdown with one train of shutdown cooling (SDC) in service. The Control Room Supervisor observes:

- T hot is 180 degrees and is beginning to trend up
- The reactor coolant pumps were shutdown an hour ago in preparation for an outage project
- Pressurizer and VCT levels are trending down
- Charging flow is greater than letdown flow
- SDC pump amps are fluctuating approximately ± 20 amps
- Containment sump inlet flow (as indicated on CFMS) is increasing
- The SDC pump just tripped

Of the following, the Control Room Supervisor should diagnose these symptoms as a loss of:

A. RCS inventory and enter EOI SO23-12-3, Loss of Coolant Accident.

B. Pressurizer level control and enter AOI SO23-13-27, Pressurizer Pressure and Level Malfunction.

C. SDC and enter AOI SO23-13-15, Loss of Shutdown Cooling.

D. RCS inventory and enter AOI SO23-13-14, Reactor Coolant Leak.

ANSWER:	C
QUESTION TYPE:	SRO
KA# & KA VALUE:	APE025/AA2.03 & 3.8 - Loss of RHR/Ability to determine and interpret the following as they apply to the Loss of RHR System: Increasing reactor sump level.
REFERENCE:	AOI SO23-13-15, Loss of Shutdown Cooling, Revision 15
SOURCE:	**New** Question - Tier 1, Group 1
LEARNING OBJECTIVE:	
COGNITIVE RATING:	H
ATTACHMENTS:	None
JUSTIFICATION:	Answers A and D are incorrect because the entry conditions include SDC not initially in service. Answer B is incorrect because there is no indication of a problem with the pressurizer level control system. Answer C is correct because the stated conditions meet the entry conditions for the referenced procedure (loss of RCS inventory/loss of SDCS flow).
10CFR55 BASIS:	10CFR55.43 (5)
COMMENTS:	Q78

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

79. With Unit 2 at rated thermal power, an 8 gpm leak develops in the RCP 1A seal cooler and CCW surge tank level is rising rapidly. The reactor operator mis-diagnosed the transient and he has just tripped the running CCW pumps resulting in a complete loss of CCW.

At this point the SRO should immediately enter procedure:

A. SO23-13-6, Reactor Coolant Pump Seal Failure, to shutdown the failed RCP.

B. SO23-13-7, Loss of CCW/SWC, to establish the system lineup necessary to restore CCW.

C. SO23-12-1, Standard Post Trip Actions, after tripping the reactor due to the loss of CCW.

D. SO23-13-14, Reactor Coolant Leak, to isolate the RCS seal cooler leak.

ANSWER:	B
QUESTION TYPE:	SRO
KA# & KA VALUE:	APE026/AA2.03 & 2.9 - Loss of Component Cooling Water/The valve lineups necessary to restart the CCWS while bypassing the portion of the system causing the abnormal condition.
REFERENCE:	
SOURCE:	**New** Question - Tier 1, Group 1
LEARNING OBJECTIVE:	
COGNITIVE RATING:	H
ATTACHMENTS:	None
JUSTIFICATION:	
10CFR55 BASIS:	10CFR55.43 (5)
COMMENTS:	Q 79

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

80. Given the following plant conditions:

- Channel "A" RCS hot leg temperature TT-0122-1 has failed and the affected functional units have been bypassed
- Channel "C" RCS hot leg temperature TT-0122-3 has also failed and the affected functional units have been placed in trip
- A loss of vital bus inverter 2Y004 occurs and the Reactor does NOT trip
- All other plant conditions are normal

Which of the following action is required?

A. Initiate a Rapid Downpower per SO23-5-1.7, Power Operations.

B. Initiate a normal plant shutdown per SO23-5-1.7, Power Operations.

C. Manually trip the reactor and enter SO23-12-1, Standard Post Trip Actions.

D. Vital bus 2Y04 must be placed on its alternate source within 24 hours per SO23-13-18, Reactor Protection System Failure / Loss of Vital Bus Inverter.

ANSWER:	A
QUESTION TYPE:	SRO
KA# & KA VALUE:	APE057/AA2.03 & 3.9 - Ability to determine and interpret the following as they apply to the Loss of a Vital Inst. Bust: RPS panel alarm annunciators and trip indicators.
REFERENCE:	SO23-13-18
SOURCE:	Tier 1, Group 1; SONGS BANK#N56791
LEARNING OBJECTIVE:	55183
COGNITIVE RATING:	H
ATTACHMENTS:	None
JUSTIFICATION:	
10CFR55 BASIS:	10CFR55.43 (5)
COMMENTS:	Q 80

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

81. Technical Specification 3.4.4 requires two RCS loops be operable and in operation when in Mode 1. If an RCP malfunction resulted in degraded flow in one RCS loop, the following technical specification limit could be exceeded during some transients:

A. Azimuthal Power Tilt (Tq)

B. Departure from Nucleate Boiling (DNB)

C. Axial Shape Index (ASI)

D. Linear Heat Rate (LHR)

ANSWER:	B
QUESTION TYPE:	SRO
KA# & KA VALUE:	000015/17/G2.2.25 & 3.7 - RCP Malfunctions/Knowledge of basis in technical specifications for limiting conditions of operation and safety limits.
REFERENCE:	Technical Specification Bases B 3.4.4.
SOURCE:	**New** Question - Tier 1, Group 1
LEARNING OBJECTIVE:	
COGNITIVE RATING:	F
ATTACHMENTS:	None
JUSTIFICATION:	The TS reference states “The pump flow rate has been sized to provide core heat removal with appropriate margin to departure from nucleate boiling (DNB) during power operation.” This makes B the only correct answer.
10CFR55 BASIS:	10CFR55.43 (3)
COMMENTS:	Q 81

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

82. The San Onofre technical specifications and plant operating procedures limit the cooldown rate imposed on the reactor coolant system. Specifically, with the plant in Mode 2, the technical specifications limit pressurizer cooldown rate to _____ per hour and, if exceeded, require pressurizer temperature be restored to within limits within _____.

A. 100 degrees; 30 minutes

B. 100 degrees; 60 minutes

C. 200 degrees; 30 minutes

D. 200 degrees; 60 minutes

ANSWER:	C
QUESTION TYPE:	SRO
KA# & KA VALUE:	CE/A11/AA2.2 & 3.4 - Ability to determine and interpret the following as they apply to the RCS overcooling: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.
REFERENCE:	**NEW**, Technical Specification 3.4.3.1
SOURCE:	Tier 1, Group 2
LEARNING OBJECTIVE:	
COGNITIVE RATING:	F
ATTACHMENTS:	None
JUSTIFICATION:	The referenced technical specification limits pressurizer cooldown to 200 degrees in any one hour and require restoration within 30 minutes if exceeded. This makes answer C the only correct answer.
10CFR55 BASIS:	10CFR55.43 (2)
COMMENTS:	Q 82

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

83. After shift turnover, the on-coming crew discovers a trippable Group 5 CEA is stuck and is misaligned from the other Group 5 rods by 10 inches. The stuck CEA is at 90 inches and the remainder of the Group is at 100 inches. The misalignment has existed for 60 minutes with the reactor at 80% power.

According to Technical Specification 3.1.5, Control Element Assembly (CEA) Alignment (attached), the crew:

A. may remain at 80% power.

B. must reduce power to 78% power.

C. must reduce power to 75% power.

D. must reduce power to 70% power.

ANSWER:	B
QUESTION TYPE:	SRO
KA# & KA VALUE:	000005/G2.1.10 & 3.9 - Inoperable/Stuck Control Rod: Knowledge of conditions and limitations in the facility license
REFERENCE:	Technical Specification 3.1.5 and LCS 3.1.105.
SOURCE:	**New** Question - Tier 1, Group 2
LEARNING OBJECTIVE:	
COGNITIVE RATING:	H
ATTACHMENTS:	**Technical Specification 3.1.5 and LCS 3.1.105 (including Power Reduction Graphs)**
JUSTIFICATION:	According to the referenced TS, power must be reduced to the limits in the COLR within 15 minutes. LCS 3.1.105.D is in effect and directs power be reduced according to Figure 3.1.105-4. According to this graph, after 60 minutes power must be reduced by 2% (or to 78%). Answer A is for a non-group 6 rod that is $\geq$112.5 inches, Answer C and D are for a Group 6 rod. This makes answer B the only correct answer.
10CFR55 BASIS:	10CFR55.43 (1)
COMMENTS:	Q 83

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

84. At 0200 this morning, a partial loss of grid caused a plant transient and a power reduction from 100% to 70% rated thermal power. Generator voltage and frequency have been restored to normal.

Following the transient the operating crew noted an increase in RCS identified leakage and at 0400 an 18 gpm RCS leak was confirmed. The leak rate now appears to have stabilized. In discussions with the dispatcher concerning the technical specification (attached) required shutdown, she indicated that due to current grid conditions, the loss of the SONGS generator would result in a loss of a large part of the grid (including power for SONGS, many hospitals, and 3 major airports). It is now 0900.

In this situation, the Control Room Supervisor:

A. must comply with the technical specifications and have the plant in Mode 3 by 1200.

B. may make the decision to remain at power under authority granted by NRC Regulation.

C. may keep the plant at power if a 50.59 Evaluation indicates there is no elevated safety risk.

D. may keep the plant at power if authorization is obtained from the SONGS Senior NRC Resident Inspector.

ANSWER:	B
QUESTION TYPE:	SRO
KA# & KA VALUE:	CE/A16/AA2.2 & 3.7 - Excess RCS Leakage/Ability to determine and interpret the following as they apply to the (Excess RCS Leakage): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.
REFERENCE:	10CFR50.54 (x and y)
SOURCE:	**New** Question - Tier 1, Group 2
LEARNING OBJECTIVE:	
COGNITIVE RATING:	F
ATTACHMENTS:	None
JUSTIFICATION:	10CFR50.54 (x and y) authorize a licensed SRO to deviate from technical specifications if in the best interest of the public health and safety and no other resolution is viable. Therefore, answer C is correct (making answer A incorrect). The resident inspectors are not authorized to approve TS non-compliance making B incorrect and a 50.59 may not be used to approve TS non-compliance making D incorrect.
10CFR55 BASIS:	10CFR55.43 (5)
COMMENTS:	Q 84

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

85. A Shutdown From Outside the Control Room is in progress. All control room immediate actions are complete and the operator actions outside the control room have not been started. Plant conditions are:

- ✓ RCS pressure is 2050 psia and slowly lowering.
- ✓ T- hot is 575^{o}F and slowly lowering.
- ✓ T-cold is 555^{o}F and stable.
- ✓ Pressurizer level (actual) is 21% and slowly lowering.
- ✓ S/G E089 level (actual) is 58% narrow range.
- ✓ Off-site power is available.

Which of the following statements is correct for the current plant conditions?

A. Natural Circulation is not established and SO23-13-2, Shutdown from Outside the Control Room, should be in use.

B. Natural circulation is established and procedure SO23-13-2, Shutdown from Outside the Control Room, should be in use.

C. Forced circulation is in operation and procedure SO23-13-2, Shutdown from Outside the Control Room, should be in use.

D. Natural circulation is not established and FS-3, Monitor Natural Circulation Established, should be in use per procedure SO23-12-7, Loss of Forced Circulation/Loss of Offsite Power.

ANSWER:	B
QUESTION TYPE:	SRO
KA# & KA VALUE:	CEA13/AA2.1 & 3.7 - Natural Circulation Operations/Facility conditions and selection of appropriate procedures during abnormal and emergency operations.
REFERENCE:	SO23-13-2, Shutdown From Outside the Control Room, Revision 7
SOURCE:	Modified Bank Question 73899 - Tier 1, Group 2
LEARNING OBJECTIVE:	
COGNITIVE RATING:	H
ATTACHMENTS:	None
JUSTIFICATION:	Per the referenced procedure, the plant condition satisfy the criteria for determining natural circulation is established making answers C and D incorrect. One of the immediate actions for evacuating the control room is to trip the RCPs making answer A incorrect. Answer B is correct because natural circulation is established and the SRO should be using SO23-13-2.
10CFR55 BASIS:	10CFR55.43 (5)
COMMENTS:	Q 85

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

86. With the reactor at rated thermal power (RTP), the reactor operator reports pressurizer pressure has reached 2280 psig and is rising. The operator also reports:

-Pressurizer pressure for the selected channel (PT-100-X) indicates downscale.
-Pressurizer level is stable.
-All pressurizer heaters indicate energized.
-There is no indication of pressurizer sprays.

In this situation, the control room supervisor would implement procedure:

A. S023-3-1.10, Foxboro Alarm Response, to diagnose the controller failure.

B. S023-13-27, Pressurizer Pressure and Level Malfunction, in order to restore the quick open function of the steam bypass control valves.

C. S023-13-14, Reactor Coolant Leak, in order to determine if there is a reactor coolant leak.

D. S023-13-27, Pressurizer Pressure and Level Malfunction, in order to restore pressurizer pressure to the normal band.

ANSWER: D
QUESTION TYPE: SRO
KA# & KA VALUE: 010/A2.02 & 3.9 - Pressurizer Pressure Control/Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Spray Valve Failures.
REFERENCE:
SOURCE: **New** Question - Tier 2, Group 1
LEARNING OBJECTIVE:
COGNITIVE RATING: H
ATTACHMENTS: None
JUSTIFICATION:
10CFR55 BASIS: 10CFR55.43 (5)
COMMENTS: Q 86

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

87. An off-site agency has notified SONGS Security that they have a credible report stating five bombs have been planted on-site. An on-going search has discovered two bombs on the Unit 2 main steam lines just outside containment. In response, Security has just informed the control room they have declared a SECON RED.

According to procedure S023-13-25, Operator Actions During Security Events, the control room SRO should immediately direct:

A. the NRC be notified.

B. off-site law enforcement officials be notified.

C. an immediate evacuation of all non-essential personnel from the site.

D. both reactors be tripped.

ANSWER:	D
QUESTION TYPE:	SRO
KA# & KA VALUE:	039/G2.4.28 & 3.3 - Main and Reheat Steam/Knowledge of Procedures relating to emergency response to sabotage.
REFERENCE:	S023-13-25, Operator Actions During Security Events, Revision 2, TCN 2-2, steps 1 and 2.
SOURCE:	**New** Question - Tier 2, Group 1
LEARNING OBJECTIVE:	CAF
COGNITIVE RATING:	F
ATTACHMENTS:	None
JUSTIFICATION:	The reference procedure states that when a SECON RED is declared, both units reactors are to be tripped. Therefore, answer D is correct.
10CFR55 BASIS:	10CFR55.43 (5)
COMMENTS:	Q 87

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

88. The plant is in Mode 2 with all CEAs fully inserted with the RPS trip breakers open. Several problems have recently developed during the shutdown. Currently, the plant situation is:

- ✓ RCS pressure and temperature are stable and being controlled by the pressurizer and atmospheric dump valves
- ✓ Pressurizer level is stable
- ✓ MSIVs are closed due to an unisolable steam leak downstream of the MSIVs
- ✓ Steam generator levels are at 37% and 54%
- ✓ AFW pump P141 in service
- ✓ AFW pump P504 tripped on overspeed and cannot be reset
- ✓ The turbine driven AFW pump is tagged out of service
- ✓ All other plant equipment is operable.

Currently the Shift Manager, Plant Manager, and Operations Manager are in a meeting discussing a recovery strategy for the current situation.

If AFW pump P141 is lost, the crew would eventually be forced to:

A. enter AOI - Loss of Feedwater and then trip the RCPs.

B. trip the RCPs and enter AOI - Loss of Forced Circulation/Loss of Offsite Power.

C. enter AOI - Loss of Feedwater and then transition to FR-5, Recovery - Heat Removal.

D. enter AOI - Loss of Feedwater and then implement EOI Attachment 3, Cooldown / Depressurization.

ANSWER:	A
QUESTION TYPE:	SRO
KA# & KA VALUE:	061/A2.04 & 3.8 - Auxiliary/Emergency Feedwater/Ability to (a) predict the impacts of the following malfunctions or operations on the AFW; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: pump failure or improper operation.
REFERENCE:	SO23-12-6, Loss of Feedwater, Revision 19
SOURCE:	**New** Question, Tier 2, Group 1
COGNITIVE RATING:	H
ATTACHMENTS:	None
JUSTIFICATION:	With the reactor trip breakers open, a loss of all feedwater will require the operators to directly enter EOI Loss of Feedwater. The first action is to trip the RCPs. The procedure will direct the crew to depressurize and line up for injecting to the SG's using condensate pumps. This makes B the only correct answer. EOI Attachment 3, FRP - 5, and Loss of Forced Circulation will not be used/implemented making answers A, C, and D incorrect.
10CFR55 BASIS:	10CFR55.43 (5)
COMMENTS:	Q 88

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

89. This morning at 0800, with the reactor in Mode 1, a maintenance supervisor reports that Technical Specification Surveillance SR 3.8.4.2, DC Sources - Operating (attached), has not been performed on the safety related batteries for Trains A and C. The supervisor also reports the special tool needed for the surveillance is off-site for calibration. Both surveillances are now beyond the 1.25 grace period allowed by the technical specification.

Without a risk evaluation, if the surveillances are not performed the plant must be in Mode 3 by:

A. 1500 today.

B. 1600 today.

C. 1500 tomorrow.

D. 1600 tomorrow.

ANSWER:	C
QUESTION TYPE:	SRO
KA# & KA VALUE:	063/G2.2.12 & 3.4 - D. C. Electrical Distribution/Ability to apply technical specifications for a system.
REFERENCE:	Technical Specifications
SOURCE:	**New** Question - Tier 2, Group 1
LEARNING OBJECTIVE:	CAF
COGNITIVE RATING:	H
ATTACHMENTS:	**Technical Specification 3.8.4, DC Sources - Operating including the SRs**
JUSTIFICATION:	Technical Specification SR 3.0.3 states that if a surveillance is missed it must be performed within 24 hours unless a risk evaluation is performed. Therefore, without a risk evaluation, TS 3.8.4 would be entered for the two batteries being inoperable at 0800 tomorrow. Because there is no LCO condition addressing two inoperable batteries, LCO 3.0.3 would be entered requiring Mode 3 within 7 hours of entering the LCO. Therefore, C is correct (24 plus 7 hours).
10CFR55 BASIS:	10CFR55.43 (2)
COMMENTS:	Q 89

San Onofre Generating Station SRO Written Examination Key
April 2005 - Revision 0

90. Unit 2 is operating at 100 % power. All valves and controls in the Pressurizer Pressure and Level Control Systems are in automatic. Due to an break in the line around the air filter coincident with maintenance on the Nitrogen system, the alarms listed below annunciate, indicating a LOSS of INSTRUMENT AIR (IA) and its Nitrogen backup (N2). Efforts to restore these systems to service have been unsuccessful. Annunciated Alarms:

* 50A22, Pzr Level Error Hi
* 58A21, Letdown Backpressure Hi/Lo
* 61B58, Instrument Air Compressor Control Panel Trouble
* 61B59, Instrument Air Compressor OC
* 61B38, N2 Supply to Inst Air Header On

The effect on Technical Specification system operability is:

A. AFW system remains operable since its steam supply valve fails open.

B. PZR is inoperable because the spray valves fail closed.

C. SITs are inoperable because the fill valves fail closed.

D. ADVs are inoperable due to loss of operating air.

ANSWER:	A
QUESTION TYPE:	SRO
KA# & KA VALUE:	078/A2.01 & 2.9 - Instrument Air/Ability to (a) predict the impacts of the following malfunctions or operations on the IAS; and (b) based on the those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Air dryer and filter malfunctions.
REFERENCE:	S023-13-5, Loss of Instrument Air, Revision 4, TCN 4-1, Attachment 2 and SO23-12-1, Standard Post Trip Actions, Revision 19.
SOURCE:	**New** Question - Tier 2, Group 1
LEARNING OBJECTIVE:	CAF
COGNITIVE RATING:	H
ATTACHMENTS:	None
JUSTIFICATION:	AFW steam supply valve fails open and it remains operable; the valves fail as indicated on the other systems, but they do not become inoperable.
10CFR55 BASIS:	10CFR55.43 (2)
COMMENTS:	Q 90

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91. A Loss of Coolant Accident is in progress and the following conditions exist:

- ✓ There is no AC power (station blackout).
- ✓ QSPDS is operable.
- ✓ Pressurizer level has been below the indicating range for >1 hour.
- ✓ The reactor operator just reported a CET temperature of 713 degrees.
- ✓ EOI - Station Blackout is currently in use.
- ✓ One AFW pump is in operation.

Based on this situation, the SRO should conclude:

A. the RPV has just reached saturation conditions and Attachment 5, Core Exit Saturation Margin Control, should be implemented.

B. RPV water level is below the top of the core and FR-5, Recovery - Heat Removal Recovery, should be implemented.

C. RPV water level is below the top of the core and FR-3, Recovery - RCS Inventory Control, should be implemented.

D. core damage is in progress and recommend implementation of the SAMGs.

ANSWER: B
QUESTION TYPE: SRO
KA# & KA VALUE: 017/A2.02 & 4.1 - In-Core Temperature Monitor/Ability to (a) predict the impacts of the following malfunctions or operations on the ITM; and (b) based on the those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Core damage.
REFERENCE: EOI
SOURCE: **New** Question - Tier 2, Group 2
LEARNING OBJECTIVE:
COGNITIVE RATING: H
ATTACHMENTS:
JUSTIFICATION: A CET temperature indicates water level is below the top of the core and is super heated making A incorrect. Because it just went over 700 degrees no core damage has yet occurred making D incorrect. According to the EOI exceeding 700 degrees sends to operator to FR-5 making answer C the only correct answer.
10CFR55 BASIS: 10CFR55.43 (5)
COMMENTS: Q 91

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92. While operating at 90% power, a CEA DEVIATION alarm is received.

The ACO notes that a single CEA in Group 6 is misaligned from the remainder of the CEAs within that group by 15 inches.

It has been 60 minutes since the misalignment occurred, and no change in misalignment has been achieved yet. The MAXIMUM power level for plant operation at this time is:

A. 85%

B. 80%

C. 95%

D. 90%

ANSWER:	A
QUESTION TYPE:	SRO
KA# & KA VALUE:	001-A2.03 & 4.2 – CRDS: Ability to (a) predict the impacts of the following malfunction or operations on the CRDS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: effect of stuck rod or misaligned rod
REFERENCE:	Tech Spec LCS 3.1.105
SOURCE:	Tier 2, Group 2; SONGS BANK N10962
LEARNING OBJECTIVE:	54876
COGNITIVE RATING:	H
ATTACHMENTS:	**Tech Spec LCS 3.1.105**
JUSTIFICATION:	using the graphs at the back of the LCS, 60 minutes of misalignment for a Group-6 rod requires a 5% power reduction, so 85% is correct.
10CFR55 BASIS:	10CFR55.43 (2)
COMMENTS:	Q 92

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93. Due to a failed pressure switch in the Firewater Supply System, a control room fire protection alarm was declared inoperable and an Alarm Compensatory Action (ACA) was initiated. The faulty pressure switch was replaced and successfully tested.

According to S023-6-29, Operation of Annunciators and Indicators, the discontinuation of the ACA must be approved by the:

A. Control Room Supervisor.

B. Shift Manager.

C. Fire Protection System Engineer.

D. SRO Operations Supervisor.

ANSWER:	D
QUESTION TYPE:	SRO
KA# & KA VALUE:	086/G2.4.33 & 2.8 - Fire Protection/Knowledge of the process to track inoperable alarms.
REFERENCE:	S023-6-29, Operation of Annunciators and Indicators, Revision 13, Step 6.3.12
SOURCE:	**New** Question - Tier 2, Group 2
LEARNING OBJECTIVE:	CAF
COGNITIVE RATING:	F
ATTACHMENTS:	None
JUSTIFICATION:	According to the referenced procedure, approval is obtained from the SRO Operations Supervisor prior to closing out the ACA. Therefore the answer is C.
10CFR55 BASIS:	10CFR55.43 (3)
COMMENTS:	Q 93

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94. Reactor power has been reduced to 75 % and:

- ✓ The COLSS and COLSS Backup Computers are out of service
- ✓ All COLSS out of service surveillances are satisfied
- ✓ The ESI for this power level is -0.020
- ✓ ASI average is -0.0412 as read on the CPCs
- ✓ Part Length CEAs are at 130" and Group 6 CEAs are ARO.

If it is desired to start ASI trending towards ESI, procedures should be implemented that will:

A. insert Part Length CEAs.

B. withdraw Part Length CEAs.

C. insert Group 6 CEAs.

D. withdraw Group 6 CEAs.

ANSWER:	A
QUESTION TYPE:	SRO
KA# & KA VALUE:	G2.1.7 & 4.4 - Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.
REFERENCE:	
SOURCE:	Bank Question 74295 - Tier 3
LEARNING OBJECTIVE:	
COGNITIVE RATING:	H
ATTACHMENTS:	None
JUSTIFICATION:	As per the licensee bank answer key
10CFR55 BASIS:	10CFR55.43 (5)
COMMENTS:	Q 94

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95. Fuel handling is in progress in both the Fuel Handling Building and Containment Refueling Area when voice communications with Containment is lost.

Without voice communications between the Control Room and Containment, the SRO in charge of refueling:

A. must stop all fuel movements.

B. may continue moving fuel in the Fuel Handling Building.

C. may continue moving fuel with the approval of the Shift Manager.

D. may continue moving fuel with the approval of the Refueling Engineer.

ANSWER:	B
QUESTION TYPE:	SRO
KA# & KA VALUE:	G2.2.26 & 3.7 - Knowledge of refueling administrative requirements.
REFERENCE:	Procedure S023-X-7, Nuclear Fuel Movement for Refueling Cycles, Revision 11, Step 4.8.2.
SOURCE:	**New** Question - Tier 3
LEARNING OBJECTIVE:	
COGNITIVE RATING:	H
ATTACHMENTS:	None
JUSTIFICATION:	The referenced procedure states fuel movement may continue in the unaffected area if voice communications are lost in one area. There is no provision for continuing moving fuel after obtaining the approval of the Shift Manager or Refueling Engineer. Therefore, the correct answer is B.
10CFR55 BASIS:	10CFR55.43 (7)
COMMENTS:	Q 95

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96. The reactor is operating at rated thermal power. On April 1, the Turbine Driven AFW (TDAFW) pump was tagged out and declared inoperable at 1200 to allow maintenance to work on HV 8200, (TDAFW pump steam admission valve from E089 Main Steam Header). On April 3 at 1800, the supply breaker for motor driven AFW pump P141 was found in the tripped free position and cannot be reset. Also on April 3, the TDAFW pump was restored to an operable status at 2300.

If AFW pump P141 is not repaired, when does technical specification 3.7.5 (attached) require the reactor be in Mode 4?

A. April 5 at 0600

B. April 7 at 0600

C. April 7 at 1200

D. April 13 at 1800

ANSWER:	B
QUESTION TYPE:	SRO
KA# & KA VALUE:	G2.2.24 & 3.8 - Ability to analyze the affect on maintenance on LCO status.
REFERENCE:	Technical Specification 3.7.5.
SOURCE:	**New** Question - Tier 3
LEARNING OBJECTIVE:	CAF
COGNITIVE RATING:	H
ATTACHMENTS:	**Tech Spec 3.7.5.**
JUSTIFICATION:	When the TDAFW is returned to an operable status the only tech spec in effect is for the MDAFW pump. That clock started at 1800 on April 3. The spec allows 72 hours (3.7.5.B) and then 12 hours (3.7.5.E) for Mode 4. Therefore, answer B is correct.
10CFR55 BASIS:	10CFR55.43 (2)
COMMENTS:	Q 96

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97. It is 0300 in the morning and the Control Room Supervisor has been asked to authorize a work package for a specialized contract welder to perform work in a high radiation area (HRA). The CRS notes that the welder is a qualified radiation worker and has accumulated 3.5 rem of exposure thus far this year (2.5 rem during the first quarter and 1.0 rem during the second quarter). The expected dose rate in the work area is 250 mrem/hr general background radiation. According to 10CFR20 - Standards For Protection Against Radiation;

A. the work can not exceed 6 hours.

B. the work can not exceed 8 hours.

C. the work must be performed as a Planned Special Exposure.

D. the welder must be accompanied by a qualified health physics individual.

ANSWER:	A
QUESTION TYPE:	SRO
KA# & KA VALUE:	G2.3.1 & 3.0 - Knowledge of 10CFR20 and related facility radiation control requirements.
REFERENCE:	10CFR20
SOURCE:	**New** Question - Tier 3
LEARNING OBJECTIVE:	
COGNITIVE RATING:	H
ATTACHMENTS:	None
JUSTIFICATION:	The limit is 5 rem so the welder can work for 6 hours.
10CFR55 BASIS:	10CFR55.43 (4)
COMMENTS:	Q 97

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98. It is desired to perform a gaseous radioactive release from Waste Gas Decay Tank T-083.

A release permit for this radioactive release:

A. would be generated by Chemistry.

B. would be generated by Health Physics.

C. is not required as long as at least one Waste Gas Compressor is operable.

D. is not required as long as the Plant Vent Stack Radiation Monitor remains operable.

ANSWER:	A
QUESTION TYPE:	SRO
KA# & KA VALUE:	G2.3.8 & 3.2 - Knowledge of the process for performing a planned gaseous radioactive release.
REFERENCE:	Procedure S023-8-15, Radwaste Gas Discharge, Revision 16, Attachment 1, step 1.5.
SOURCE:	**New** Question - Tier 3
LEARNING OBJECTIVE:	
COGNITIVE RATING:	F
ATTACHMENTS:	None
JUSTIFICATION:	For a release of WGDT T-083 a release permit is required to be obtained from Chemistry per the referenced procedure regardless of system operability. Radiation protection is not involved in this activity. Therefore, answer C is correct.
10CFR55 BASIS:	10CFR55.43 (4)
COMMENTS:	Q 98

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99. Following the declaration of a Site Area Emergency, an EMERGENCY RADIATION EXPOSURE exceeding 10CFR20 limits can be authorized by the:

A. Shift Manager.

B. Plant Manager.

C. Operations Manager.

D. Health Physics Manager.

ANSWER:	A
QUESTION TYPE:	SRO
KA# & KA VALUE:	G2.4.40 & 4.0 - Knowledge of the SROs responsibilities in emergency plan implementation.
REFERENCE:	SO123-VIII-10 Precaution 4.3
SOURCE:	Modified Exam Bank Question #N57501 - Tier 3
LEARNING OBJECTIVE:	55369
COGNITIVE RATING:	F
ATTACHMENTS:	None
JUSTIFICATION:	Per licensee exam bank
10CFR55 BASIS:	10CFR55.43 (2)
COMMENTS:	Q 99

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100. Given the following conditions:

- A S/G tube leak of 100 gpm is in progress on S/G E089
- Subsequently, a Steam Line Safety Valve sticks open on S/G E089, causing a reactor trip
- An MSIS has occurred
- A SIAS has actuated on low Pressurizer pressure
- No equipment is out of service, and all components have operated properly

This event would be classified as meeting EAL:

A. A2-6

B. A3-3

C. B3-1

D. C4-2

ANSWER:	B
QUESTION TYPE:	SRO
KA# & KA VALUE:	G2.4.41 & 4.1 - Knowledge of the emergency action level thresholds and classifications.
REFERENCE:	SO123-VIII-1
SOURCE:	Bank #N57575 Question - Tier 3
LEARNING OBJECTIVE:	53165
COGNITIVE RATING:	H
ATTACHMENTS:	**EPIPs**
JUSTIFICATION:	Per Exam Bank
10CFR55 BASIS:	10CFR55.43 (5)
COMMENTS:	Q 100
