

# 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-0200, Pressurizer Safety Valve
- All Engineering Safeguard Features (ESF) 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 the natural circulation mode to use the Reactor Vessel Level Monitoring System (RVLMS) RTD's.
- D. The REP CET's are calculated in a manner that results in the most representative sub-cooling margin of the RCS.

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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	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

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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	Group #	<u>1</u>	_____
	K/A #	<u>A15/17/AK1.05</u>	_____
	Importance Rating	<u>2.7</u>	_____

3.

The Unit is at 100% power when a single CPC speed sensor on RCP P003 fails low.

What is the plant response?

- A. A failed sensor will be indicated on the associated CPC. The associated CPC will trip on DNBR and LPD.
- B. A failed sensor will be indicated on the associated CPC. The associated CPC will NOT trip.
- C. All four CPCs will indicate failed sensors. All four CPCs will trip on DNBR and LPD.
- D. All four CPCs will indicate failed sensors. The associated CPC will trip on DNBR and LPD.

Proposed Answer:     A    

Explanation (Optional):

Technical Reference(s): SO23-3-2.13

Proposed references to be provided to applicants during examination:

Learning Objective: \_\_\_\_\_ (As available)

Question Source: Bank #     N38168      
 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     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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	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

Additionally, the following conditions exist:

- Pressurizer (PZR) level is 51% and dropping slowly
- Ion Exchange Bypass Valve, TV-0224B is in the "Direct" position
- Charging flow meter FI-0212 indicates 43gpm in the control room
- Letdown flow indicates 28gpm in the control room
- RCP 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

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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 recovery actions is performed FIRST in the Loss of Shutdown Cooling AOI, SO23-13-15?

- A. Recover SDC Flow.
- B. Recover core exit temperature.
- C. Recover RCS Pressure.
- D. Recover RCS inventory.

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 #	<u>1</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>A26/AA1.05</u>	_____
	Importance Rating	<u>3.1</u>	_____

6.

Component Cooling Water System (CCW) Train A is lined up to provide cooling water to the non-critical loop with the CCW Train 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 Train A surge tank (T-003).

The operator would 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 indicate 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 \_\_\_\_\_  
 Comprehension or Analysis   X  

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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	Tier #	<u>1</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>A27/AK1.01</u>	_____
	Importance Rating	<u>3.1</u>	_____

7.

During operation at 100% power, the Pressurizer pressure transmitter for the controlling channel fails high.

What is the first AUTOMATIC plant response which occurs to mitigate the transient?

- A. Low Pressure Reactor trip and SIAS.
- B. High Pressure Reactor trip.
- C. Backup heaters energize.
- D. Spray Valves close.

Proposed Answer:   A  

Explanation (Optional):

Technical Reference(s):   SO23-3-1.10  

Proposed references to be provided to applicants during examination:   None  

Learning Objective:   55220   (As available)

Question Source: Bank #   N12724    
 Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
 New \_\_\_\_\_

Question History: Last NRC Exam   NA  

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

10 CFR Part 55 Content: 55.41   (5,7)    
 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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	Tier #	<u>1</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>E29/EA2.07</u>	_____
	Importance Rating	<u>4.2</u>	_____

8.

The plant is operating at 100% 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, 5, 6 indicate open.
- B. Trip breakers 1, 3, 5, 7 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 5 and breakers 3 and 7 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 #	<u>1</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>A38/EK3.08</u>	_____
	Importance Rating	<u>4.1</u>	_____

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 psi 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 #	<u>1</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>A40/2.3.2</u>	_____
	Importance Rating	<u>2.5</u>	_____

### 10.

Given the following conditions:

- The plant trips from 100% power
- An ESDE has occurred downstream of the MSIV on SG E088
- A Main Steam Isolation Signal (MSIS) is generated

Which ONE (1) of the following describes the maximum allowable closure time of the MSIVs and the associated reason?

- A. MSIVs must close within 8 seconds to limit the pressure rise inside Containment.
- B. MSIVs must close within 8 seconds to minimize the reactivity effects of the RCS cooldown.
- C. MSIVs must close within 10 seconds to limit the pressure rise inside Containment.
- D. MSIVs must close within 10 seconds to minimize the reactivity effects of the RCS cooldown.

Proposed Answer:   B    
 Explanation (Optional): \_\_\_\_\_  
 Technical Reference(s): TSB 3.7\_  
 Proposed references to be provided to applicants during examination: None

Learning Objective: \_\_\_\_\_ (As available)  
 Question Source: Bank #   X   \_\_\_\_\_  
                           Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
                           New \_\_\_\_\_  
 Question History: Last NRC Exam \_\_\_\_\_  
 Question Cognitive Level: Memory or Fundamental Knowledge \_\_\_\_\_  
                                   Comprehension or Analysis   X    
 10 CFR Part 55 Content: 55.41   10,12    
                                   55.43 \_\_\_\_\_

Comments: A40/2.3.2 - Steam Line Rupture - Excessive Heat Transfer /Knowledge of the facility ALARA program.

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	Tier #	<u>1</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>A54/AK3.01</u>	_____
	Importance Rating	<u>4.1</u>	_____

11.

Which ONE (1) of the following describes the basis for the SG Low Level reactor trip setpoint?

- A. Minimizes amount of time that SG tubes are uncovered prior to EFAS actuation for loss of feedwater events.
- B. Prevents exceeding design pressure of the RCS during loss of feedwater events.
- C. Prevents dryout of steam generators for ATWS events coincident with failure of automatic turbine trip.
- D. Minimizes positive reactivity excursion due to RCS cooldown for all loss of SG inventory events.

Proposed Answer:   B    
 Explanation (Optional): \_\_\_\_\_  
 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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	Tier #	<u>1</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>A55/EA2.03</u>	_____
	Importance Rating	<u>3.9</u>	_____

12.

The Station has experienced a loss of off site power.

Which of the following is the preferred EOI method of powering the Unit 2 ESF 4160VAC buses?

- A. Align EDGs 2G002 and 2G003
- B. Align power from the Unit 2 Reserve Aux Transformers
- C. Align power from Reserve Aux Transformers from Unit 3
- D. Align power from Unit 3 EDGs

Proposed Answer:   A  

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 #	<u>1</u>	<u>      </u>
	Group #	<u>1</u>	<u>      </u>
	K/A #	<u>A57/AA1.01</u>	<u>      </u>
	Importance Rating	<u>3.7</u>	<u>      </u>

**13.**

When transferring 1E 120 VAC Vital Busses to the alternate source per SO23-6-17, a Kirk Key interlock is employed on the alternate line power supply panels Q062 and Q063.

What is the purpose of this interlock?

- A. Ensures channel separation of the 1E 120 VAC Vital Busses.
- B. Ensures ONLY dead bus transfer capability exists between the inverter and line source.
- C. Ensures only ONE of the four 1E 120 VAC Vital Busses may be powered from the alternate source at any time
- D. Prevents transferring the 1E 120 VAC Vital Bus loads to a de-energized source.

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 #          N57490    
 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: 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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	Tier #	<u>1</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>A58/AK3.01</u>	_____
	Importance Rating	<u>3.4</u>	_____

**14.**

A loss of 125VDC power has occurred for EDG 2G002. In this circumstance, procedure requires that the emergency diesel:

- A. Should only be started locally.
- B. Could be started from the control room but shutdown will be manual local action.
- C. Could be started from the control room but will only have local governor control.
- D. Should be placed in maintenance lockout and not started.

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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	Tier #	<u>1</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>A62/2.1.27</u>	_____
	Importance Rating	<u>2.8</u>	_____

**15.**

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

- A. Provides cooling water to the emergency diesel generators.
- 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 makeup in case of a 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   X    
Comprehension or Analysis \_\_\_\_\_

10 CFR Part 55 Content: 55.41   7    
55.43 \_\_\_\_\_

Comments: Knowledge of system purpose and or function.



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	Tier #	<u>1</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>A65/AA2.08</u>	_____
	Importance Rating	<u>2.9</u>	_____

**16.**

Which ONE (1) of the following valves fails CLOSED on Loss of Instrument Air?

- A. Feedwater Regulating Valve FV-1111.
- B. Shutdown Cooling Heat Exchanger CCW outlet return valves.
- C. Pressurizer Spray Valve PV-0100A.
- D. TPCW Heat Exchanger outlet control valves.

Proposed Answer:   C    
Explanation (Optional):

Technical Reference(s):   SD SO23-390   (Attach if not previously provided)  
  SO23-13-18  

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



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

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

**18.**

According to SO23-12-1, "Standard Post Trip Actions," 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°F.
- D. Both S/G levels are less than 21%NR.

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     (10)      
 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.

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

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

**19.**

The main turbine trip setpoint associated with degraded condenser vacuum varies as a function of low pressure (LP) turbine load.

With 100% 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% 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, 10)   
 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 April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>1</u>	<u>      </u>
	Group #	<u>2</u>	<u>      </u>
	K/A #	<u>028-G2.2.23</u>	
	Importance Rating	<u>2.6</u>	<u>      </u>

**20.**

What is the maximum pressurizer level for the pressurizer to be considered OPERABLE in Mode 1?

- 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   10    
 55.43 \_\_\_\_\_

Comments: Pressurizer Level Malfunction: Ability to track limiting conditions for operation.

# San Onofre Generating Station SRO Written Examination Key

## April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>1</u>	_____
	Group #	<u>2</u>	_____
	K/A #	<u>032-AK2.01</u>	_____
	Importance Rating	<u>2.7</u>	_____

**21.**

Startup Channel 1 (JI0006) will be lost if which of the following power supplies fail?

- A. BY
- B. Y01
- C. BH
- D. Y02

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

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 #	<u>1</u>	_____
	Group #	<u>2</u>	_____
	K/A #	<u>037-AK1.01</u>	_____
	Importance Rating	<u>2.9</u>	_____

**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 20°F.

Step 12 (Lowering Pzr Pressure) of SO23-12-4, "Steam Generator Tube Rupture," is being implemented.

If ruptured SG pressure is currently 600 psia, then an acceptable initial target temperature for RCS  $T_{hot}$  would be:

- A. 525°F
- B. 475°F
- C. 425°F
- D. 375°F

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 475°F.

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     (5,10)      
 55.43 \_\_\_\_\_

Comments:

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

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 #	<u>1</u>	<u>      </u>
	Group #	<u>2</u>	<u>      </u>
	K/A #	<u>061-AA2.01</u>	<u>      </u>
	Importance Rating	<u>3.5</u>	<u>      </u>

**23.**

When the "Nor-AD" pushbutton of the Condenser Air Ejector Radiation Monitor control module RE7818 is (depressed) 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

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

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

**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 C 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



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

**26.**

Given the following plant conditions:

- A SGTR is in progress.
- HPSI Pump P-017 has failed to start.
- Pressurizer pressure is 1060 psia and slowly lowering.
- REP CET is 560°F and slowly lowering.
- There are no Reactor Coolant Pumps running.

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 reactor vessel upper head 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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April 2005 - Revision 0**

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

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

**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  $T_{cold}$  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  $T_{cold}$  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   X    
 Comprehension or Analysis \_\_\_\_\_

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 #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  003-A2.02  </u>	<u>      </u>
	Importance Rating	<u>  3.7  </u>	<u>      </u>

**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, SO23-12-1 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. Stop all four RCPs due to loss of NPSH.
- D. Maintain all four RCPs running to maximize heat removal capability with forced circulation.

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



# **San Onofre Generating Station SRO Written Examination Key**

## **April 2005 - Revision 0**

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 #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  004-K1.01  </u>	<u>      </u>
	Importance Rating	<u>  3.6  </u>	<u>      </u>

**30.**

Which ONE (1) of the following actions occur when the in-service control channel T<sub>hot</sub> instrument fails low? (Assume 100% power and all systems are operating normally)

	<u>Letdown FLOW</u>	<u>Backup HEATERS</u>	<u>Backup CHARGING PUMPS</u>
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 #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  004-A3.10  </u>	<u>      </u>
	Importance Rating	<u>  3.9  </u>	<u>      </u>

**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-0110-2 failed low.
- B. Channel X PT-0100X failed low.
- C. Channel Y LT-0110-2 failed high.
- D. Channel X PT-0100X failed high.

Proposed Answer:   A    
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             
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 #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>005-G2.1.32</u>	<u>      </u>
	Importance Rating	<u> 3.4 </u>	<u>      </u>

**32.**

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

- A.  $\leq 340^{\circ}\text{F}$  (normal operations)
- B.  $\leq 350^{\circ}\text{F}$  (normal operations)
- C.  $\leq 370^{\circ}\text{F}$  (post-accident)
- D.  $\leq 380^{\circ}\text{F}$  (post-accident)

Proposed Answer:   B  

Explanation (Optional): SO23-3-2.6 L&S 1.1 indicates that  $350^{\circ}\text{F}$  is the normal operations limit for the SDCS and interconnecting piping;  $T_{\text{hot}}$  must be  $< 340^{\circ}\text{F}$  to place SDC in service for normal operations and  $< 375^{\circ}\text{F}$  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 #         
                           Modified Bank #   N3191\*    
                           New        (Note changes or attach parent)  
 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 #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  006-K5.02  </u>	<u>      </u>
	Importance Rating	<u>  2.8  </u>	<u>      </u>

**33.**

Given the following conditions:

The following alarms are received in the control room:

- SIT High pressure. Pressure indicates 650 psia.
- SIT High level. Level indicates 84%.

Which ONE (1) of the following describes the preferred method used to restore pressure and level to within limits?

- A. Drain the SIT
- B. Vent the SIT, then drain
- C. Shut affected SIT Outlet valve
- D. Vent the SIT, and then shut the affected outlet valve

Proposed Answer:   A    
Explanation (Optional):

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.



# **San Onofre Generating Station SRO Written Examination Key**

## **April 2005 - Revision 0**

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.

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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  008-K4.02  </u>	<u>      </u>
	Importance Rating	<u>  2.9  </u>	<u>      </u>

**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 Non-Critical Loop 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.



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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  010-K6.01  </u>	<u>      </u>
	Importance Rating	<u>  2.7  </u>	<u>      </u>

**36.**

What are TWO of the 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         
 Comprehension or Analysis   X  

10 CFR Part 55 Content: 55.41   7,8    
 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.

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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  010-K2.01  </u>	<u>                                  </u>
	Importance Rating	<u>  3.0  </u>	<u>      </u>

**37.**

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

- A. Backup heater Train A (E128)
- B. Backup heater Train B (E129)
- C. Proportional heater Train A (E123)
- D. Proportional heater Train 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

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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  012-K4.09  </u>	<u>      </u>
	Importance Rating	<u>  2.8  </u>	<u>      </u>

**38.**

Plant conditions are as follows:

- Unit 2 at 100% power
- Pressurizer Channel-A NR Pressure detector PT-0101-1 output fails high
- Pressurizer Pressure detector PT-0100X output 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.

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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  012-K2.01  </u>	<u>      </u>
	Importance Rating	<u>  3.3  </u>	<u>      </u>

**39.**

Which of the following describes what will be a result from a loss of Vital Bus Inverter 2Y001 per SO23-13-18, "Reactor Protection System Failure/Loss of Vital Bus Inverter"?

- A. CEAC 2 failure
- B. PPS Channel A Hi Log Power trip
- C. Reactor Trip Breakers 2 and 4 (only) 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         
 Comprehension or Analysis   X    
 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.

# San Onofre Generating Station SRO Written Examination Key

## April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  013-A1.07  </u>	<u>      </u>
	Importance Rating	<u>  3.6  </u>	<u>      </u>

**40.**

Given the following conditions:

- A small break LOCA has occurred and the Control Room crew is performing the actions of SO23-12-3, LOCA.
- Pressurizer pressure is 980 psia and very slowly lowering.
- A plant cooldown has been initiated using the Steam Generators and Auxiliary Feedwater.
- Safety Injection throttle/stop criteria have been met and the operator is ready to throttle one train of HPSI.

What plant response should the operator expect when throttling Safety Injection for the above conditions?

- A. The cooldown rate will LOWER unless the operator raises the steaming rate.
- B. The cooldown rate will RISE unless the operator lowers the steaming rate.
- C. The resulting unbalanced loop injection flows will interrupt natural circulation unless the operator raises the steaming rate.
- D. The resulting Pressurizer pressure reduction may result in core voiding unless the operator lowers the steaming rate.

Proposed Answer:   A  

Explanation (Optional): .

Technical Reference(s):        FS 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 #        X   VB    
 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   8,10    
 55.43       

Comments: 013/A1.10 & 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

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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  022-A1.02  </u>	<u>      </u>
	Importance Rating	<u>  3.6  </u>	<u>      </u>

**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.

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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  022-A3.01  </u>	<u>      </u>
	Importance Rating	<u>  4.1  </u>	<u>      </u>

**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.

# San Onofre Generating Station SRO Written Examination Key

## April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  026-K1.02  </u>	<u>      </u>
	Importance Rating	<u>  4.1  </u>	<u>      </u>

**43.**

- The reactor has tripped from 100% power due to a large break LOCA.
- SIAS, CIAS, and CSAS have all actuated.
- 4KV Bus 2A06 is deenergized due to a fault.
- HV-6501 "Shutdown Cooling Train A Heat Exchanger ME-004 CCW Return Isolation Valve" is failed closed.

Which ONE (1) of the following describes the effect on plant operation?

- A. "Shutdown HX Train A CCW Flow Lo" alarm
- B. "Containment Spray Pump P012 CCW Flow Lo" alarm
- C. Failure to meet 100% Containment heat removal capacity during Containment Spray operation following a Recirculation Actuation Signal (RAS)
- D. Failure 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 #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  039-K1.01  </u>	<u>      </u>
	Importance Rating	<u>  3.1  </u>	<u>      </u>

**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."

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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  059-K3.04  </u>	<u>      </u>
	Importance Rating	<u>  3.6  </u>	<u>      </u>

**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 Lowering; Trip all Reactor Coolant Pumps.
- B. Stable or Rising; Trip all Reactor Coolant Pumps.
- C. Stable or Lowering; Trip only one Reactor Coolant Pump in each loop.
- D. Stable or Rising; 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 \_\_\_\_\_  
 Comprehension or Analysis   X  

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 #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>062/2.2.22</u>	<u>      </u>
	Importance Rating	<u> 3.4 </u>	<u>      </u>

**47.**

Minimum allowable starting air pressure for Emergency Diesel Generator OPERABILITY is:

- A. 150 psig
- B. 175 psig
- C. 200 psig
- D. 225 psig

Proposed Answer:   A and 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

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

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

**48.**

EDG 2G002 is being operated in parallel with normal power when the generator output breaker control power fuses blow. 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 \_\_\_\_\_  
 Comprehension or Analysis     X    

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 Tier # Group # K/A # Importance Rating	RO <u>2</u> <u>1</u> <u>064/A1.01</u> <u>3.0</u>	SRO _____ _____ _____ _____
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**50.**

The EDG automatic trip on low low lube oil pressure is:

- A. Active at all times.
- B. Active at all times except for the first 50 seconds of an engine startup.
- C. Active at all times except when a SIAS signal is present.
- D. Active at all times except for the first 50 seconds of an engine startup and when a SIAS signal is 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

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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u> 073/2.3.9 </u>	<u>      </u>
	Importance Rating	<u> 2.5 </u>	<u>      </u>

**51.**

During a board walk-down in Mode 5, you notice the following lineup for the containment purge system:

- 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. Only a Containment Purge Isolation Signal
- B. Only 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.



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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u> 076/K3.05 </u>	<u>      </u>
	Importance Rating	<u> 3.0 </u>	<u>      </u>

**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 Train A component cooling water pump trips, and the standby Train A 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

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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u> 078/A3.01 </u>	<u>      </u>
	Importance Rating	<u> 3.1 </u>	<u>      </u>

**53.**

Unit 2 is operating at 100% power with the Instrument Air system lined up for normal operations when a valid Instrument Air Header Pressure Low alarm is received due to a small air leak.

Instrument Air header pressure is at 87 psig and steady.

The current status of the Instrument air system is:

- A. Three instrument air compressors are running fully loaded and the Nitrogen backup supply system is maintaining the instrument air header via a pressure-regulating valve.
- B. Two instrument air compressors are running fully loaded and one instrument air compressor is running half loaded and Nitrogen backup supply system is maintaining the instrument air header.
- C. Two instrument air compressors are running fully loaded and one instrument air compressor is running half loaded and the service air system is maintaining the instrument air header via a pressure control valve.
- D. Three instrument air compressors are running fully loaded and the service air system is maintaining the instrument air header via a 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

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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  1  </u>	<u>      </u>
	K/A #	<u>  103/A2.05  </u>	
	Importance Rating	<u>  2.9  </u>	<u>      </u>

**54.**

Which of the following conditions would prevent an emergency containment entry in accordance with SO23-3-2.34, "CONTAINMENT ACCESS CONTROL, INSPECTIONS AND AIRLOCKS OPERATION"?

- A. Containment Pressure is 3.4 psig.
- B. Containment Humidity is 100%.
- C. Containment Temperature is 158°F.
- D. Containment atmosphere Oxygen level is 14%.

Proposed Answer:   A and C    
 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 #	<u>2</u>	_____
	Group #	<u>1</u>	_____
	K/A #	<u>103/A4.06</u>	_____
	Importance Rating	<u>2.7</u>	_____

**55.**

Given the following:

- Unit 2 is in a refueling outage.
- Spent 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 or operable.
- 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   X    
 Comprehension or Analysis \_\_\_\_\_

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 #	<u>  2  </u>	<u>      </u>
	Group #	<u>  2  </u>	<u>      </u>
	K/A #	<u>  015-A1.04  </u>	<u>      </u>
	Importance Rating	<u>  3.5  </u>	<u>      </u>

**56.**

Which of the following is a function of the Incore Nuclear Instrument System?

- A. Provide neutron flux input to COLSS for calculating axial shape index and azimuthal tilt.
- B. Provide neutron flux input to COLSS for calculating radial peaking factors and delta-T power.
- C. Provide neutron flux input to the Core Protection Calculators for calculating radial peaking factors and delta-T power.
- D. Provide neutron flux input to the Core Protection Calculators for calculating axial shape index and azimuthal tilt.

Proposed Answer:   A  

Explanation (Optional):

Technical Reference(s):   SD-SO23-460   (Attach if not previously provided)

Proposed references to be provided to applicants during examination:

Learning Objective:   54385   (As available)

Question Source: Bank #   N2797    
 Modified Bank #        (Note changes or attach parent)  
 New       

Question History: Last NRC Exam       

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

10 CFR Part 55 Content: 55.41   (5,7)    
 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









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

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  2  </u>	<u>      </u>
	K/A #	<u>  002-K5.08  </u>	<u>      </u>
	Importance Rating	<u>  3.4  </u>	<u>      </u>

**60.**

The following plant conditions exist:

- Reactor Power is 100%
- RCS Pressure is 2250 psia
- PZR Level is 65%

Allowing these conditions to persist creates a concern that:

- 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.

# San Onofre Generating Station SRO Written Examination Key

## April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>2</u>	_____
	Group #	<u>2</u>	_____
	K/A #	<u>045-K4.13</u>	_____
	Importance Rating	<u>2.6</u>	_____

**61.**

Unit 2 is at 45% 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. Trip 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 and initiate a reactor trip.

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 April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>2</u>	_____
	Group #	<u>2</u>	_____
	K/A #	<u>011/A3.03</u>	_____
	Importance Rating	<u>3.2</u>	_____

**62.**

When pressurizer level is less than program level by:

- A. 0.75%, the letdown flow control valve will have reached its' minimum flow position.
- B. 2%, the 1<sup>st</sup> backup charging pump will automatically start.
- C. 3%, the 2<sup>nd</sup> backup charging pump will automatically start.
- D. 6%, will provide a backup start signal to both backup 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 1<sup>st</sup> backup charging pump starts making b. incorrect. When level reaches -3.9%, the 2<sup>nd</sup> 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 April 2005 - Revision 0

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>2</u>	_____
	Group #	<u>2</u>	_____
	K/A #	<u>071-A3.03</u>	_____
	Importance Rating	<u>3.6</u>	_____

**63.**

Which of the following describes the action(s) that occur when RE-7865, Containment Purge and Plant Vent Stack Wide Range Effluent Monitor, receives a HIGH radiation alarm while it is aligned to the Plant Vent Stack?

- A. Closes FV-7202, Waste Gas Isolation valve.
- B. Shuts the outside Containment Purge valves.
- C. Trips the Continuous Exhaust Fans A310, A311 and A312.
- D. Closes Containment Purge and Mini-purge Supply and Exhaust valves.

Proposed Answer:   A    
Explanation (Optional):

Technical Reference(s):   System Description DS-SO23-700  

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   (5,7)    
55.43 \_\_\_\_\_

Comments: 071/A3.03 & 3.6 - Waste Gas Disposal/Ability to monitor automatic operation of the WGDS including: radiation monitoring system alarm and actuating signals

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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  2  </u>	<u>      </u>
	Group #	<u>  2  </u>	<u>      </u>
	K/A #	<u>  072-K3.01  </u>	<u>      </u>
	Importance Rating	<u>  3.2  </u>	<u>      </u>

**64.**

A malfunction of which Radiation Monitor 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             
Comprehension or Analysis   X    
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 #	<u>2</u>	_____
	Group #	<u>2</u>	_____
	K/A #	<u>041-K1.05</u>	_____
	Importance Rating	<u>3.5</u>	_____

**65.**

While operating in Mode 1 at 100% steady state, a permissive is received on the Steam Bypass Control System (SBCS).

If this were the only abnormal indication on the SBCS, which of the following describes a possible cause of this indication?

- A. A pressurizer pressure transmitter failed high.
- B. A steam flow transmitter failed low.
- C. A steam pressure transmitter failed low.
- D. A T<sub>cold</sub> transmitter failed high.

Proposed Answer:   A  

Explanation (Optional):

Technical Reference(s):   —  

Proposed references to be provided to applicants during examination:   None  

Learning Objective:   52446   (As available)

Question Source: Bank #   N4821    
Modified Bank #            (Note changes or attach parent)  
New           

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: 041/K1.05 & 3.5 Steam Dump/Turbine Bypass Control: Knowledge of the physical connections and/or cause-effect relationships between the SDS and the following: RCS











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Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>  3  </u>	<u>      </u>
	Group #	<u>      </u>	<u>      </u>
	K/A #	<u>  G2.2.13  </u>	<u>      </u>
	Importance Rating	<u>  3.6  </u>	<u>      </u>

**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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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 loss of cooling water procedures.

# San Onofre Generating Station SRO Written Examination Key

## April 2005 - Revision 0

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. Reactor power is lowering and startup rate is negative.

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

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

77.

SONGS experienced an earthquake that annunciated the Operating Basis Earthquake Detected alarm and caused a loss of offsite power.

Since then, Unit 2 has been in a transient involving a loss of RCS inventory.

Current plant status is:

- Reactor coolant average temperature is 540°F
- Pressurizer pressure is 2000 psia 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:	<a href="#">New</a> Question - Tier 1, Group 1
LEARNING OBJECTIVE:	
COGNITIVE RATING:	H
ATTACHMENTS:	<a href="#">Emergency Plan Classification Chart</a>
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

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## 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°F 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  $\pm 20$  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 SO23-12-3, "Loss of Coolant Accident."
- B. Pressurizer level control and enter SO23-13-27, "Pressurizer Pressure and Level Malfunction."
- C. SDC and enter SO23-13-15, "Loss of Shutdown Cooling."
- D. RCS heat removal and enter SO23-12-9, "Functional Recovery."

---

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:	<b>New</b> 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, a .5 gpm leak develops in the RCP P-001 seal cooler.

The operating CCW Pump trips due to overcurrent.

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:	<b>New</b> Question - Tier 1, Group 1
LEARNING OBJECTIVE:	
COGNITIVE RATING:	H
ATTACHMENTS:	None
JUSTIFICATION:	
10CFR55 BASIS:	10CFR55.43 (5)
COMMENTS:	Q 79

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## 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. Initiate an Emergency Boration per 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. Bus: RPS panel alarm annunciators and trip indicators.
REFERENCE:	SO23-13-18 step 1.a
SOURCE:	Tier 1, Group 1; SONGS <b>BANK</b> #N56791
LEARNING OBJECTIVE:	55183
COGNITIVE RATING:	H
ATTACHMENTS:	None
JUSTIFICATION:	Step 1.a states that a rapid downpower is required if "2 or more Redundant Functional Units have failed, such that a RX Trip <b>would NOT occur</b> if a RX Trip were required." Since a RX Trip should have occurred on loss of 2Y004 but didn't, that means that the functional units affected by 2Y004 will not now be able to cause a RX trip if the affected plant parameters do indeed exceed RPS trip setpoints for those functional units (even though no parameter trip point has been exceeded yet).
10CFR55 BASIS:	10CFR55.43 (5)

**San Onofre Generating Station SRO Written Examination Key  
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COMMENTS:

Q 80

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## 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:	<b>New</b> 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

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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°F; 30 minutes
- B. 100°F; 60 minutes
- C. 200°F; 30 minutes
- D. 200°F; 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:	<b>NEW</b> , 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°F 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

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83.

With the Unit operating at 90% power during a power increase to 100%, one full length CEA is determined to be misaligned from its group by 8 inches.

Which ONE (1) of the following describes the required operator action and the reason for the action?

- A. Requires a reduction of thermal power providing assurance of fuel integrity during continued operation.
- B. Requires a stabilization of thermal power providing assurance that minimum shutdown margin is maintained.
- C. Requires a stabilization of thermal power providing assurance of fuel integrity during continued operation.
- D. Requires a reduction of thermal power providing assurance that minimum shutdown margin is maintained.

---

ANSWER: A  
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: **BANK** Question - Tier 1, Group 2  
LEARNING OBJECTIVE:  
COGNITIVE RATING: H  
ATTACHMENTS:  
JUSTIFICATION:  
A. Correct. SO23-13-13 specifies a thermal power reduction. T.S. Bases states action is required to provide assurance of fuel integrity.  
B. Incorrect. Reduce power within one hour.  
C. Incorrect. Reduce power within one hour.  
D. Incorrect. Shutdown Margin is only changed by boron concentration and RCS temperature changes. Rod Position does not change SDM by itself. The concern is localized power peaking causing a breach in fuel integrity  
10CFR55 BASIS: 10CFR55.43 (1)  
COMMENTS: Q 83

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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 10CFR50.54(x).
- 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:	<b>New</b> Question - Tier 1, Group 2
LEARNING OBJECTIVE:	
COGNITIVE RATING:	H
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 B is correct (making answer A incorrect). The resident inspectors are not authorized to approve TS non-compliance making D incorrect and a 50.59 may not be used to approve TS non-compliance making C incorrect.
10CFR55 BASIS:	10CFR55.43 (5)
COMMENTS:	Q 84

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85.

The reactor has been tripped from 100% power, and the control room has been evacuated due to toxic gas in the control room.

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.
- $T_{\text{hot}}$  is 565°F and slowly lowering.
- $T_{\text{cold}}$  is 545°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. Forced circulation is in operation and procedure 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. Natural Circulation is 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."
- 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

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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

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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-0100-X) failed low.
- Pressurizer level is stable.
- All pressurizer heaters indicate energized.
- There is no indication of pressurizer sprays.

In this situation, what procedure should the control room supervisor initiate and why?

- 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

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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 CODE RED (direct armed attack).

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:	<b>New</b> 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

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88.

The plant is in Mode 3 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
- Pressurizer level is stable
- Off-Site power was lost coincident with the reactor trip
- Steam generator levels are at 37% NR and 54% NR
- AFW pump P141 in service
- AFW pump P504 tripped on overcurrent and cannot be reset
- AFW pump P140 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 trips, the crew should enter the:

- A. "Loss of Feedwater" EOI to attempt to re-establish AFW flow
- B. "Loss of Forced Circulation/Loss of Offsite Power" EOI to restore power prior to initiating feedwater flow
- C. "Functional Recovery" EOI to prioritize the actions for the 2 events in progress
- D. "FR-5, Heat Removal Recovery" Resource Assessment Charts to establish RCS Heat Removal.

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



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crew to depressurize and line up for injecting to the SG's using condensate pumps. This makes A the only correct answer. EOI Attachment 3, FRP - 5, and Loss of Forced Circulation will not be used/implemented making answers B, C, and D incorrect.

10CFR55 BASIS:  
COMMENTS:

10CFR55.43 (5)  
Q 88

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89.

The following conditions exist at San Onofre:

- Unit 2 is operating at 100% power
- Unit 3 is shutdown for an outage
- 3A06 is to be cleared for maintenance

What action, if any, is required within one hour after deenergizing 3A060, per tech specs?

- A. Perform AC sources verification for Unit 2 ONLY.
- B. Perform AC sources verification for BOTH units.
- C. Perform AC sources verification for Unit 3 ONLY.
- D. AC sources verification is NOT required in this case.

---

ANSWER:	A
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:	Bank Question - Tier 2, Group 1
LEARNING OBJECTIVE:	CAF
COGNITIVE RATING:	H
ATTACHMENTS:	
JUSTIFICATION:	
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 a 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 is inoperable because its steam supply valve fails closed.
- B. PZR becomes inoperable soon after the spray valves fail closed and letdown isolates.
- C. SITs are inoperable because the fill valves fail closed.
- D. ADVs are inoperable due to loss of operating air.

---

ANSWER: B  
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

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JUSTIFICATION: PZR pressure will increase above the TS LCO limit 2275 psia quickly after spray valves isolate and letdown isolates.

10CFR55 BASIS: 10CFR55.43 (2)

COMMENTS: Q 90

---

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

91.

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

- SO23-12-8, "Station Blackout" is currently in use.
- QSPDS is operable.
- Pressurizer level has been below the indicating range for >1 hour.
- The reactor operator just reported a CET temperature of 713°F.
- One AFW pump is in operation.

Based on this situation, the SROs TOP priority should be:

- A. The reactor vessel has just reached saturation conditions and Attachment 5, "Core Exit Saturation Margin Control," should be implemented.
- B. Remain in SO23-12-8, Station Blackout, and attempt to restore power to at least one 4KV Bus.
- C. Reactor vessel water level is below the top of the core and FR-3, "Recovery - RCS Inventory Control," should be implemented.
- D. Determine that core damage is in progress and recommend implementation of the SAMGs.

---

ANSWER: C  
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: FR-3 and FR-5 are both indicated, but FR-3 is a higher priority.  
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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## San Onofre Generating Station SRO Written Examination Key April 2005 - Revision 0

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 Operator.
- 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 D.  
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. Borate 10 gallons.
- D. Lower turbine load 5 Mw.

---

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:	<b>Bank</b> 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 all voice communications with the control room are lost.

Per Technical Specifications, without voice communications:

- A. All fuel movements must stop.
- B. Core alterations must stop.
- C. Core alterations may continue with the approval of the Shift Manager.
- D. All fuel movement may continue with the approval of the Shift Manager.

---

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:	<b>New</b> 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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## San Onofre Generating Station SRO Written Examination Key April 2005 - Revision 0

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:	<b>New</b> Question - Tier 3
LEARNING OBJECTIVE:	CAF
COGNITIVE RATING:	H
ATTACHMENTS:	<b>Tech Spec 3.7.5.</b>
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 obtained from Chemistry.
- B. Would be obtained from 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:	<b>New</b> 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 A 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:  
(NOTE: the TSC is not yet activated)

- 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

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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

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