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**Date:** 11/22/05 1:15PM  
**Subject:** 10/28/05 SRO Exam Question Quality Questions

Tom,

As you are aware, the SONGS as submitted SRO portion of the 10/28/05 exam contained a significant number of test items (40%) that required replacement or significant modification. In accordance with ES-501 E-3a you stated that this falls outside the industry norm and will be reported as such in the Examination report.

The preparation of this exam was our first under rev 9 and I would like to capture what can be done better bring us inside the industry norm. As I have reviewed the as submitted exam and the revised as delivered exam I am struggling with what constitutes a significantly modified question.

The following listing is our interpretation of where we stood on UNSAT vs. editorial enhancements for the SONGS October exam after our initial discussion with the reviewer and Chief Examiner: Attached is a file of questions that we had felt required editorial changes but did not fall into the significant modification category.

- SRO 77 Added procedure numbers only to go with directed action. No content or structure change. Editorial
- SRO 78 Changed 2nd half of 1 distractor to provide wording balance. No content or structure change. Editorial
- SRO 79 Changed stem words from 'which one of the following procedures will be used' to 'the control room supervisor will use which one of the following'. Editorial
- SRO 81 Added procedure numbers only to 2nd half of item to go with action directed. No structure or content change. Editorial
- SRO 82 Added the words 'Tech Spec' basis in place of 'reason'. No effect on item. Editorial
- SRO 83 Added a procedure number to distractor C only. Editorial
- SRO 84 Original submitted item did not meet SRO criteria. UNSAT
- SRO 86 Added procedure numbers to 2nd half of distractors to go with action directed. No content or structure changes. Editorial
- SRO 87 Originally submitted item asked for part B response. Reviewer required reasons (Part A). We believe editorial, but this is sometimes a gray area. (Reviewer preference)
- SRO 89 KA Mismatch. UNSAT. Our originally submitted question was a stretch for the KA
- SRO 96 Originally submitted question contained 2 implausible distractors. Replaced with a new question. UNSAT

(See attached file: Contentions.doc)

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**SRO 77 as submitted**

The following annunciators are received in the control room:

- 56C24, RCP P001 SEAL PRESS HI/LO
- 56B57, RCP BLEEDOFF FLOW HI/LO

The CRO determines the following for RCP P001:

- Middle seal cavity pressure = 2200 psia.
- Upper seal cavity pressure = 2115 psia.
- Vapor seal cavity pressure = 64 psia.

Which ONE (1) of the following describes the event in progress and the action required?

- A. Middle and Lower seals have failed. Trip the reactor. When Reactivity Control is verified, trip RCP P001.
- B. Middle and Upper seals have failed. Trip the reactor. When Reactivity Control is verified, trip RCP P001.
- C. Middle and Upper seals have failed. Initiate a controlled plant shutdown and stop RCP P001 after the reactor is tripped and CEAs have been inserted for 5 seconds.
- D. Middle and Lower seals have failed. Initiate a controlled plant shutdown and stop RCP P001 after the reactor is tripped and CEAs have been inserted for 5 seconds.

## **SRO 77 as modified**

The following annunciators are received in the control room:

- 56C24, RCP P001 SEAL PRESS HI/LO
- 56B57, RCP BLEEDOFF FLOW HI/LO

The CRO determines the following for RCP P001:

- Middle seal cavity pressure = 2200 psia.
- Upper seal cavity pressure = 2115 psia.
- Vapor seal cavity pressure = 64 psia.

Which ONE (1) of the following describes the event in progress and the action required?

- A. Middle and Lower seals have failed. Trip the reactor and enter SO23-12-1, Standard Post Trip Actions. When Reactivity Control is verified, trip RCP P001.
- B. Middle and Upper seals have failed. Trip the reactor and enter SO23-12-1, Standard Post Trip Actions. When Reactivity Control is verified, trip RCP P001.
- C. Middle and Upper seals have failed. Initiate a controlled plant shutdown in accordance with SO23-5-1.7, Power Operations, and stop RCP P001 after the reactor is tripped and CEAs have been inserted for 5 seconds.
- D. Middle and Lower seals have failed. Initiate a controlled plant shutdown in accordance with SO23-5-1.7, Power Operations, and stop RCP P001 after the reactor is tripped and CEAs have been inserted for 5 seconds.

### **SRO 78 as submitted**

Given the following conditions:

- The plant is at 100% power.
- Three (3) Charging Pumps are operating.
- Letdown flow is 28 GPM and stable.
- VCT Level is 41% and lowering.
- Pressurizer level is 51% and lowering.
- CFMS page 122, Cmt Sump Tank 30 minute flow indicates 132 GPM.
- TI-221 and TI-9267, Regenerative Heat Exchanger Outlet Temperature, is rising.

The crew is attempting to locate and isolate the leak in accordance with SO23-13-14, Reactor Coolant Leak.

Which ONE (1) of the following describes the location of the leak and the action required?

- A. Charging Header downstream of the Regenerative Heat Exchanger. Initiate a Rapid Shutdown in accordance with SO23-13-14 Reactor Coolant Leak AOI.
- B. Charging Header upstream of the Regenerative Heat Exchanger. Isolate Letdown in accordance with SO23-13-14 Reactor Coolant Leak AOI.
- C. Letdown Header downstream of the Regenerative Heat Exchanger. Isolate Letdown in accordance with SO23-13-14 Reactor Coolant Leak AOI.
- D. Letdown Header upstream of the Regenerative Heat Exchanger. Trip the reactor and enter SO23-12-1, Standard Post Trip Actions.

### **SRO 78 as modified**

Given the following conditions:

- The plant is at 100% power.
- Three (3) Charging Pumps are operating.
- Letdown flow is 28 GPM and stable.
- VCT Level is 41% and lowering.
- Pressurizer level is 51% and lowering.
- CFMS page 122, Ctmt Sump Tank 30 minute flow indicates 132 GPM.
- TI-0221 and TI-9267, Regenerative Heat Exchanger Outlet Temperature, is rising.

The crew is attempting to locate and isolate the leak in accordance with SO23-13-14, Reactor Coolant Leak.

Which ONE (1) of the following describes the location of the leak and the action required?

- A. Charging Header downstream of the Regenerative Heat Exchanger. Initiate a Rapid Shutdown in accordance with SO23-5-1.7, Power Operations.
- B. Charging Header upstream of the Regenerative Heat Exchanger. Isolate Letdown in accordance with SO23-13-14 Reactor Coolant Leak AOI.
- C. Letdown Header downstream of the Regenerative Heat Exchanger. Isolate Letdown in accordance with SO23-13-14 Reactor Coolant Leak AOI.
- D. Letdown Header upstream of the Regenerative Heat Exchanger. **Initiate a Rapid Shutdown in accordance with SO23-5-1.7, Power Operations.**

**SRO 79 as submitted**

Given the following plant conditions:

- The plant tripped due to a small break Loss of Coolant Accident (LOCA) inside Containment.
- The Optimal Recovery Procedure for a LOCA, SO23-12-3, has been entered.

If an Excess Steam Demand Event (ESDE) were to now occur, the guidance to mitigate both of these events would be found in which ONE (1) of the following?

- A. Reactor Trip Recovery Procedure, SO23-12-2.
- B. ESDE Optimal Recovery Procedure, SO23-12-5.
- C. LOCA Optimal Recovery Procedure, SO23-12-3.
- D. Functional Recovery Procedure, SO23-12-9.

## **SRO 79 as modified**

Given the following plant conditions:

- The plant tripped due to a small break Loss of Coolant Accident (LOCA) inside Containment.
- The Optimal Recovery Procedure for a LOCA, SO23-12-3, has been entered.

If an Excess Steam Demand Event (ESDE) were to now occur, the Control Room Supervisor will use which ONE (1) of the following procedures to mitigate the event?

- A. Reactor Trip Recovery Procedure, SO23-12-2.
- B. ESDE Optimal Recovery Procedure, SO23-12-5.
- C. LOCA Optimal Recovery Procedure, SO23-12-3.
- D. Functional Recovery Procedure, SO23-12-9.



**SRO 81 as submitted**

The plant is at 100% power.

A loss of Instrument Bus Y01 has occurred.

Which ONE (1) of the following describes (1) automatic action that occurs, and (2) the actions you will direct after restoration of the bus?

- A. (1) Reactor Trip Paths 1 and 2 are actuated.  
(2) Reset and reclose associated RTCBs at PPS Cabinet L-032.
- B. (1) Reactor Trip Paths 1 and 3 are actuated.  
(2) Reset and reclose associated RTCBs at PPS Cabinet L-032.
- C. (1) Reactor Trip Paths 1 and 2 are actuated.  
(2) Reset and reclose associated RTCBs locally at the breakers.
- D. (1) Reactor Trip Paths 1 and 3 are actuated.  
(2) Reset and reclose associated RTCBs locally at the breakers.

### **SRO 81 as modified**

The plant is at 100% power.

A loss of Instrument Bus Y01 has occurred.

Which ONE (1) of the following describes (1) automatic action that occurs, and (2) the actions you will direct after restoration of the bus?

- A. (1) Reactor Trip Paths 1 and 2 are actuated.  
(2) Reset and reclose associated RTCBs at PPS Cabinet L-032 in accordance with SO23-13-18, Reactor Protection System Failure/Loss of Vital Bus.
- B. (1) Reactor Trip Paths 1 and 4 are actuated.  
(2) Reset and reclose associated RTCBs at PPS Cabinet L-032 in accordance with SO23-13-18, Reactor Protection System Failure/Loss of Vital Bus.
- C. (1) Reactor Trip Paths 1 and 3 are actuated.  
(2) Reset and reclose associated RTCBs locally at the breakers in accordance with SO23-12-1, Standard Post Trip Actions.
- D. (1) Reactor Trip Paths 2 and 4 are actuated.  
(2) Reset and reclose associated RTCBs locally at the breakers in accordance with SO23-12-1, Standard Post Trip Actions.

**SRO 82 as submitted**

With the Unit operating at 90% power, one full length CEA is determined to be misaligned from its group by more than 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 Moderator Temperature Coefficient 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 Moderator Temperature Coefficient is maintained.

### **SRO 82 as modified**

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

Which ONE (1) of the following describes the required operator action over the next 60 minutes and the Technical Specification basis 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 Moderator Temperature Coefficient 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 Moderator Temperature Coefficient is maintained.

**SRO 83 as submitted**

Given the following conditions:

- A Turbine Load Rejection has occurred.
- The CRO manually inserted CEAs attempting to maintain Tcold on program.
- Reactor power is currently 80%.
- Pre-PDIL and PDIL alarm windows are illuminated.
- Group 6 CEA's indicate 40 inches.
- SBCS valves are modulating closed.

Which ONE (1) of the following actions is required?

- A. Trip the reactor and enter SO23-12-1, Standard Post-Trip Actions.
- B. Realign Group 6 CEA's in accordance with SO23-13-13, Misaligned or Immovable Control Element Assembly.
- C. Raise Turbine load to ensure SBCS valve closure and maintain Tcold on program.
- D. Initiate Emergency Boration in accordance with SO23-13-11, Emergency Boration of the RCS/Inadvertent Dilution or Boration.

### **SRO 83 as modified**

Given the following conditions:

- A Turbine Load Rejection has occurred.
- The CRO manually inserted CEAs attempting to maintain Tcold on program.
- Reactor power is currently 80%.
- Pre-PDIL and PDIL alarm windows are illuminated.
- Group 6 CEA's indicate 40 inches.
- SBCS valves are modulating closed.

Which ONE (1) of the following actions is required?

- A. Trip the reactor and enter SO23-12-1, Standard Post-Trip Actions.
- B. Realign Group 6 CEA's in accordance with SO23-13-13, Misaligned or Immovable Control Element Assembly.
- C. Raise Turbine load to ensure SBCS valve closure and maintain Tcold on program in accordance with SO23-5-1.7, Power Operations.
- D. Initiate Emergency Boration in accordance with SO23-13-11, Emergency Boration of the RCS/Inadvertent Dilution or Boration.

## **SRO 86 as submitted**

Given the following conditions:

- The plant is at 100% power.
- CCW Train A and B are in service.
- CCW Train A is supplying the Non-Critical Loop and Letdown Heat Exchanger.
- TIC-223, Letdown Heat Exchanger Temperature Control, is at 100% DEMAND.
- Letdown Heat Exchanger Outlet Temperature is RISING.
- All other CCW indications are NORMAL.

Which ONE (1) of the following describes (1) the event in progress, and (2) the action that will be required to mitigate the condition?

- A. (1) CCW pipe rupture on the Letdown HX supply line.  
(2) Transfer the Letdown HX to CCW Train B. Non-Critical Loop remains on Train A to maintain CCW flow balancing.
- B. (1) CCW supply isolation valve to the Letdown HX failed closed.  
(2) Transfer the Letdown HX to CCW Train B. Non-Critical Loop remains on Train A to maintain CCW flow balancing.
- C. (1) CCW pipe rupture on the Letdown HX supply line.  
(2) Transfer the Letdown HX and the Non-Critical Loop to CCW Train B.
- D. (1) CCW supply isolation valve to the Letdown HX failed closed.  
(2) Transfer the Letdown HX and the Non-Critical Loop to CCW Train B.

## **SRO 86 as modified**

Given the following conditions:

- The plant is at 100% power.
- CCW Train A and B are in service.
- CCW Train A is supplying the Non-Critical Loop and Letdown Heat Exchanger.
- TIC-223, Letdown Heat Exchanger Temperature Control, is at 100% DEMAND.
- Letdown Heat Exchanger Outlet Temperature is RISING.
- All other CCW indications are NORMAL.

Which ONE (1) of the following describes (1) the event in progress, and (2) the action that will be required to mitigate the condition?

- A. (1) CCW pipe rupture on the Letdown HX supply line.  
(2) Transfer the Letdown HX to CCW Train B. Non-Critical Loop remains on Train A to maintain CCW flow balancing in accordance with SO23-2-17, Component Cooling Water System Operations.
- B. (1) CCW supply isolation valve to the Letdown HX failed closed.  
(2) Transfer the Letdown HX to CCW Train B. Non-Critical Loop remains on Train A to maintain CCW flow balancing in accordance with SO23-2-17, Component Cooling Water System Operations.
- C. (1) CCW pipe rupture on the Letdown HX supply line.  
(2) Transfer the Letdown HX and the Non-Critical Loop to CCW Train B in accordance with SO23-13-7, Loss of Component Cooling Water – Salt Water Cooling.
- D. (1) CCW supply isolation valve to the Letdown HX failed closed.  
(2) Transfer the Letdown HX and the Non-Critical Loop to CCW Train B in accordance with SO23-13-7, Loss of Component Cooling Water – Salt Water Cooling.



**SRO 87 as submitted**

Unit 2 has sustained a small break LOCA and S023-12-3 "Loss of Coolant Accident" has been entered. All three HPSI pumps have FAILED.

Which ONE (1) of the following describes the action required by the CRS?

- A. Continue use of S023-12-3 until an alternate procedure is designated by S023-12-3 or the Safety Function Status Check.
- B. Continue the use of S023-12-3 since the event has been diagnosed as a LOCA and the LOCA procedure is designed to mitigate the event under all postulated scenarios.
- C. Immediately exit S023-12-3 since no HPSI flow is available.
- D. Return to the Event Diagnosis chart in S023-12-1 "Standard Post Trip Actions"; remain in the LOCA procedure, and continue trying to restore HPSI to operable.

**SRO 87 as modified**

Unit 2 has sustained a small break LOCA and S023-12-3 "Loss of Coolant Accident" has been entered. All three HPSI pumps have FAILED.

Which ONE (1) of the following describes the action required by the CRS?

- A. Continue use of S023-12-3 until an alternate procedure is designated by S023-12-3 or the Safety Function Status Check, **because the Inventory Control Safety Function Status will be UNSAT.**
- B. Continue the use of S023-12-3 since the event has been diagnosed as a LOCA **and all of the Safety Function Status Checks will remain SATISFIED.**
- C. **Return to the Event Diagnosis chart in S023-12-1 "Standard Post Trip Actions"; continue in the LOCA procedure since SI Tanks remain available for Inventory Control.**
- D. Return to the Event Diagnosis chart in S023-12-1 "Standard Post Trip Actions"; continue in the LOCA procedure **since LPSI remains available for Inventory Control.**

We have reviewed the licensee's comments regarding the classification of the exam questions. The following is the result of this review:

- Questions 77, 81, and 86: We still consider the initial draft questions to be unacceptable because they were RO questions that were designated as "SRO Only" questions. These questions needed to be revised by adding procedure numbers to make them "SRO Only" questions. By adding procedure numbers, the question now required the candidate to assess facility conditions and select appropriate procedures. This is consistent with the requirements of 55.43(5) for a senior operator question.
- Question 82: We still consider the initial draft question to be unacceptable because a change was required to make a RO question a SRO question. The initial question asked for the reason for an operator action which is RO knowledge. However, by changing the question and asking what the Tech Spec basis for the action is, the question became a question that asked for information that is considered to be SRO knowledge. This is consistent with the requirements of 55.43(2) for a senior operator question.
- Question 87: We considered this question as unacceptable because it did not meet all the requirements of the KA. That particular KA has two parts (A & B), therefore to meet this KA the question must address both parts. As you identified in your e-mail, the question addressed Part B, but not Part A. Since the KA was not met, we consider this to be a KA mismatch, therefore making the question unacceptable. We do not consider this to be a "grey area". The reviewer required Part A to be addressed because meeting the complete KA is a requirement of NUREG 1021 (ES-401, E.2.d and Appendix B, C.1.b).
- Questions 78, 79, and 83: We agree with your comments for these questions and will change those questions from unacceptable to editorial on the ES-401-9 form.

These changes reduced the amount of unacceptable questions for the SRO examination from 11 questions to eight questions. While this does improve your percentage of unacceptable questions, your percentage of questions (32%) is still greater than the 20% listed in ES-501, E.3.a and, therefore, will be reported as such in the examination report.