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To: Richard J Brooks
Date: 03-Oct-05 3:10:35 PM
Subject: SSES December 2005 Exam

48 of the first 50 questions are their way to you under FedEx air bill 8488 1074 1730. I've attached them to this email as a password protected *.pdf file as well.

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Facility: Susquehanna Steam Electric Station		Date of Exam: December 2005		Exam Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		
Item Description	Initial			a	b*	c'
	a	b*	c'			
1. Questions and answers are technically accurate and applicable to the facility.	HB	n/a	TF			
2. a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.	HB	n/a	TF			
3. SRO questions are appropriate in accordance with Section D.2.d of ES-401	HB	n/a	NA			(1st 50)k
4. The sampling process was random and systematic (if more than 4 RO and 2 SRO questions are repeated from the last 2 NRC licensing exams, consult with NRR OL program office.)			TF			
5. Question duplication from the license screening/audit exam was controlled as indicated below (check the item that applies) and appears appropriate: <input checked="" type="checkbox"/> the audit exam was systematically and randomly developed; or <input type="checkbox"/> the audit exam was completed before the license exam was started; or <input checked="" type="checkbox"/> the examinations were developed independently; or <input type="checkbox"/> the licensee certifies that there is no duplication; or <input type="checkbox"/> other (explain)	HB	n/a	TF			
6. Bank use meets limits (no more than 75 percent from the bank, at least 10 percent new, and the rest new or modified); enter the actual RO / SRO-only question distribution(s) at right.	Bank	Modified	New	HB	n/a	TF
	1 1 1	1 1 1	2 2 8			
7. Between 50 and 60 percent of the questions on the RO exam are written at the comprehension/ analysis level; the SRO exam may exceed 60 percent if the randomly selected K/As support the higher cognitive levels; enter the actual RO / SRO question distribution(s) at right.	Memory		C/A	HB	n/a	TF
	1 1 9	3 3 1				
8. References/handouts provided do not give away answers or aid in the elimination of distractors.	HB	n/a	TF			
9. Question content conforms with specific K/A statements in the previously approved examination outline and is appropriate for the tier to which they are assigned; deviations are justified.	HB	n/a	TF			
10. Question psychometric quality and format meet the guidelines in ES Appendix B.	HB	n/a	TF			
11. The exam contains the required number of one-point, multiple choice items; the total is correct and agrees with the value on the cover sheet.	HB	n/a	TF			(1st 50)k
Printed Name / Signature				Date		
a. Author	Harry Balian / <i>[Signature]</i>			28 Sep 05		
b. Facility Reviewer (*)	Not applicable - NRC developed exam			N/A		
c. NRC Chief Examiner (#)	Todd H. Fish / <i>[Signature]</i>			30 Sep 05		
d. NRC Regional Supervisor	Richard J. Conte / <i>[Signature]</i>			30 Sep 05		
Note: * The facility reviewer's initials/signature are not applicable for NRC-developed examinations. # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.						

* This is the first 50 questions of a 75 question RO exam and a 100 question SRO exam. The 50 questions submitted hereunder are all considered RO level examination questions. *except numbers 25 and 47.*

[Signature] 30 Sep 05

From 100% power and 100% flow, what individual jet pump flow indications would you see on flow transmitters FT-B21-1N034A through W (at Panel 1C619902-38 in the Upper Relay Room) if the "B" reactor recirculation pump (RRP) inadvertently trips?

- A** Flow indications for the "A" loop jet pumps will initially increase, then return to their original values. Flow indication for the "B" jet pumps will decrease to zero as the pump coasts down, then increase to a positive value as flow reverses in the "B" loop jet pumps.
- B** Flow indications for the "A" loop jet pumps decrease, then increase to their original values as flow through the "B" loop jet pumps slows, then reverses. Flow indication for the "B" jet pumps will immediately read zero.
- C** Flow indications for the "A" loop jet pumps will increase during the transient. Flow indication for the "B" loop jet pumps will decrease to zero as the "B" RRP coasts down, then remain at zero.
- D** Flow indications for the "A" loop jet pumps will increase during the transient. Flow indications for the "B" loop jet pumps will decrease to zero as the "B" RRP coasts down, then increase to a positive value as flow reverses in the "B" loop jet pumps.

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

CHOICE (A) - No

WRONG:

VALID DISTRACTOR: Plausible if the Applicant does not understand that the operating loop system characteristic changes when in single RRP operation. The operating RRP will have a lower flow resistance because it can now discharge into the ten idle jet pumps in addition to the core inlet plenum.

CHOICE (B) - NO

WRONG:

VALID DISTRACTOR: Plausible if the Applicant does not fully understand how the core flow signal is developed. The individual jet pump flow transmitters produce signals before they are summed to determine total core flow. FY-1K607 is substituted for FY-1K606 if a RRP generator exciter breaker is open or discharge valve is less than 90% open. FY-1K607 subtracts the idle loop jet pump flow from operating loop jet pump flow to determine actual core flow (operating loop flow less backflow through the idle loop).

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible if the Applicant does not understand that the idle loop jet pumps have no method of backflow prevention or if the Applicant misunderstands signal development.

CHOICE (D) - Yes

References**Comments and Question Modification History**

1. (HB 09/08/05) Mod from INPO Bank QuestionID 20448 (Quad Cities exam in August 2001)

2. (THF 09/08/05) - no comment

3. Gil 09/09/05 - no comment.

4. Gil 09/26/05 - Should be HCL
R: o.k. - classified Higher Cognitive Level.

Todd 09/30/05 - OK.

NRC K/A System/E/A

System 2950 Partial or Complete Loss of Forced Core Flow Circ
01

Number AK2.07 **RO** 3.4 **SRO** 3.4 **CFR Link** (CFR: 41.7 / 45.8)

AK2. Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION and the following:

AK2.07 Core flow indication

NRC K/A Generic

System

Number

RO

SRO

CFR Link

Given the following conditions:

- SSES Unit 1 recently entered Mode 4 to start a refueling outage following a 500 day run.
- SSES Unit 2 is in mode 1 at full power and flow.
- The station experiences a loss of Startup Transformer T-20.
- the Shift Manager has just declared an UNUSUAL EVENT.

Why has Shift Manager declared an UNUSUAL EVENT?

- A** CU1: Loss of All Offsite Power to Essential Busses for Greater than 15 Minutes.
- B** CU2: UNPLANNED Loss of Required DC Power for Greater than 15 Minutes.
- C** CU3: UNPLANNED Loss of Decay Heat Removal Capability with Irradiated Fuel in the RPV.
- D** MU1: Loss of all Offsite Power to Essential Busses for Greater than 15 Minutes.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - NO

WRONG: requires loss of both T-10 AND T-20.

VALID DISTRACTOR: Loss of power c/b reasonable cause for entering the EAL.

CHOICE (B) - NO

WRONG: requires loss of ALL vital DC power for >15 minutes.

VALID DISTRACTOR: Applicant may believe loss of T-20 causes loss of DC power.

CHOICE (C) - YES

Applicant must recognize that loss of T-20 causes RPS Bus "B" to deenergize on SSES Unit 1. This causes PCIS initiation which, subsequently, isolates the RHR SDC drop line. Finally, Applicant should recognize that decay heat load is high and an uncontrolled heat up could cause RCS temperature to rise above 200 degrees Fahrenheit. This is the entry condition for EAL CU3 per EP-TP-001

CHOICE (D) - NO

WRONG: requires loss of both T-10 AND T-20.

VALID DISTRACTOR: Loss of power c/b reasonable cause for entering the EAL.

References

Comments and Question Modification History

1. (HB 09/08/05) Modified from SSES Bank.

24 month 700 days or 18 month 500 days for SQ to answer

2. THF 09/08/05 - clarified stem.

3. Gil 09/09/05 - concerned about K/A match.

4. Gil 09/26/05 - K/A mismatch. Relationship between containment isolation and EAL?

R: on a loss of T-20, RPS buss "B" is deenergized. This causes Primary CTMT isolation including isolation of RHR in SDC mode. The successful Applicant must recognize the reason PCIS isolated is the loss of RPS buss "B" and that the isolation interrupted SDC which must be restored to prevent entry into an EAL. If SDC not restored, the threshold for an EAL will be crossed.

5. Todd 09/30/05 - OK.

6. Rich 10/03/05 - odd way to ask response question?

R: change to "why did the SM declare the event". Saved original question as number 21.

NRC K/A System/E/A

System 2950 Partial or Complete Loss of A.C. Power
03

Number AK3.06

RO 3.7 SRO

CFR Link

AK3. Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER :
AK3.06 Containment isolation

NRC K/A Generic

**System
Number**

RO

SRO

CFR Link

While operating at full power on Unit 2, control power to the operating control rod drive (CRD) pump is lost. What effect will this have on the CRD pumps?

- A** The operating CRD pump will continue to run. Automatic protective trips for both pumps are functional.
- B** The operating CRD pump will trip. Automatic protective trips for both pumps are disabled.
- C** The operating CRD pump will continue to run. Automatic protective trips for both pumps are disabled.
- D** The operating CRD pump will trip. Automatic protective trips for both pumps are functional.

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

CHOICE (A) - NO

WRONG: Automatic protective trips are disabled

VALID DISTRACTOR: Plausible because the pump will continue to run.

CHOICE (B) - NO

WRONG: the operating pump will not trip

VALID DISTRACTOR: Plausible because RRP's will automatically trip on loss of 125 VDC control power, not CRD's.

Auto trips are disabled.

CHOICE (C) - YES

CHOICE (D) - NO

WRONG: Operating CRD Pump will not trip and auto trips are not functional.

VALID DISTRACTOR: Plausible if Applicant considers this a fail safe mechanism.

References**Comments and Question Modification History**

1. (HB 09/08/05) Modified from INPO Bank 23832 which was used on SSES August 2002 exam.

2. THF 09/08/05 - changed format to T-T / T-F / F-T / F-F with reasons.

3. Gil 09/09/05 - question ok but - in ATWS and directed to start both CRD pumps. Concurrent loss of DC power. Now what?

4. Gil 09/26/05 - could not validate with enclosed references.

R: need SSES to validate answer and distractors. Low risk of error because this is a bank question. Gil thinks it's reasonable from memory.

Todd 09/30/05 - OK.

NRC K/A System/E/A**System** 2950 Partial or Complete Loss of D.C. Power
04**Number** AK1.05**RO** 3.4**SRO** 3.3**CFR Link** (CFR: 41.8 to 41.10)

Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR

COMPLETE LOSS OF D.C. POWER : Loss of breaker protection

NRC K/A Generic**System****Number****RO****SRO****CFR Link**

SSES Unit 1 is refueling. Source Range Monitor (SRM) "A" is inoperable because its detector is being replaced. Fuel shuffles are in progress and a bundle is ready to be lowered into the reactor vessel when the Control Room receives the following indications:

- IRM CHAN B/D/F/H UPSCALE TRIP OR INOP (AR-104-001/A06)
- SRM UPSCALE OR INOP (AR-104-001/B06)
- 24V DC PANEL 1L680 SYSTEM TROUBLE (AR-106-001/B13)
- REMOTE SHUTDOWN PANEL 1C201 INSTR PWR FAILURE (AR-106-001/H16)

Which of the following is the correct response for the Control Room operating crew?

- A** Stop all fuel movement and enter ON-175-001, LOSS OF 24 VDC BUS.
- B** Continue fuel movement and enter ON-175-001, LOSS OF 24 VDC BUS.
- C** Stop all fuel movement and enter ON-081-002, REFUELING PLATFORM OPERATION ANOMALY.
- D** Continue fuel movement and enter ON-081-002, REFUELING PLATFORM OPERATION ANOMALY.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - YES

TS 3.3.1.2 refers to Table 3.3.1.2-1 for minimum SRM operability. Two SRMs are required when in mode 5. However, the loss of Division II 24 VDC power disables both SRM channels "B" and "C". Given that SRM channel "A" is already inoperable, the TS requirement can not be met because three out of four SRMs are now disabled. Note that this is NOT a spiral offload or reload because the stem specifies that a core "shuffle" is in progress and because SSES Training Dept indicates that spiral off/on-loads are not typical for SSES.

CHOICE (B) - NO

WRONG:

VALID DISTRACTOR: Plausible if the Applicant fails to recognize that TS 3.3.1.2 can not be met following loss of one Division of 24 VDC power because the affected SRMs are in opposite quadrants.

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible if the applicant believes that stopping fuel movement is an entry condition for the Off-Normal procedure.

CHOICE (D) - NO

WRONG:

VALID DISTRACTOR: Plausible if the applicant believes that stopping fuel movement is an entry condition for the Off-Normal procedure and fails to recognize that TS 3.3.1.2 can not be met following loss of one Division of 24 VDC power because the affected SRMs are in opposite quadrants.

References

Comments and Question Modification History

1. (HB 09/08/05) New question. Question for SSES: will SRM UPSCALE OR INOP (AR-104-001/B06) reflash? Can we delete that initial condition? Should others be added?

2. THF 09/08/05 - changes to stem and answers to simplify and clarify

3. Gil 09/09/05 - no comment

4. Gil 09/26/05 - could not validate with enclosed references. Shortest answer is correct. Should balance with other distractors.

R: Revised distractors "B" and "D" to address length of choices.

Todd 09/30/05 - OK.

System 2950
04

Number **RO** **SRO** **CFR Link**

NRC K/A Generic

System 2.2 Equipment Control

Number 2.2.30 **RO** 3.5 **SRO** 3.3 **CFR Link** (CFR: 45.12)

"Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area, communication with fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation."

Given the following Control Room indications,

- AR-106-001 (A08) GEN LOCKOUT RELAYS TRIP
- AR-106-001 (C04) STATOR COOLING WATER PUMP 1A-1B TRIP
- Generator Stator Cooling Water Pumps 1A and 1B are NOT running (both AMBER lights energized)
- Generator Stator Cooling Water control switch is selected to "1A-START 1B-RESERVE"

what AUTOMATIC action will occur and why?

- A** Main TURBINE trip due to Generator negative phase sequence.
- B** Main TURBINE trip due to Generator Stator Cooling Water high conductivity.
- C** Main GENERATOR trip due to Generator Stator Cooling Water low pressure.
- D** Main GENERATOR trip due to Generator Neutral Overvoltage (59GN) fault.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - NO

WRONG: This will cause Generator trip but not the Stator Cooling water pump trips.

VALID DISTRACTOR: Plausible because a Negative Phase Sequence will cause GENERATOR trip.

CHOICE (B) - NO

WRONG: No automatic turbine trip on high conductivity.

VALID DISTRACTOR: Plausible because Operators are expected to perform reactor scram / turbine trip if conductivity can not be maintained below 9.9. However, there is no automatic stator cooling or turbine trip on stator water conductivity. Moreover, the question calls for what would cause a GENERATOR trip v. TURBINE trip.

CHOICE (C) - NO

WRONG: This is a TURBINE, not GENERATOR trip.

VALID DISTRACTOR: Plausible because low stator cooling water pressure (< 44 psig) will cause a TURBINE trip after a 70 second time delay (normal pressure is 50 to 65 psig). However, a simple pump trip is not expected to cause this condition because the reserve pump should start if low discharge pressure (first signal at < 102 psig, second signal at < 92 psig) is sensed at the discharge of the running pump. The stem indicates that the reserve pump would have started. Moreover, the question calls for what would cause a GENERATOR trip v. TURBINE trip.

CHOICE (D) - YES

References

Comments and Question Modification History

1. (HB 09/08/05) Question for SSES: how to describe Pp 1B status?

2. Gil 09/09/05 - no comments

3. Gil 09/26/05 - OK

4. Todd 09/30/05 - OK.

5. Rich 10/03/05 - Backward logic at memory level. Can we increase cognitive level?

R: revised question and answer choice to be forward looking. Saved original question as number 51. Still considered on the high side of memory level.

NRC K/A System/E/A

System 2950 Main Turbine Generator Trip
05

Number AK2.04 **RO** 3.3 **SRO** 3.3 **CFR Link** (CFR: 41.7 / 45.8)

Knowledge of the interrelations between MAIN TURBINE GENERATOR TRIP and the following: Main generator protection

NRC K/A Generic

**System
Number**

RO

SRO

CFR Link

Ten minutes after a reactor scram late in core life, the Shift Technical Advisor reports that steady state Reactor Pressure has risen from about 955 psig to almost 960 psig.

Which of the following caused this?

- A** A Reactor Feed Pump (RFP) tripped.
- B** Steam Pressure Transmitter PT10101A failed low.
- C** Steam Pressure Transmitter PT10101A failed high.
- D** Steam Pressure Transmitter PT10101B failed high.

Answers:

 A B C DReferences Provided to Applicant: **Justification**

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible because a high failure will cause a plant depressurization because the HVG will pass the full OPEN signal to the TBVs.

CHOICE (B) - YES

This failure will cause EHC to maintain a new steady state pressure 3 psig GREATER THAN the pre-failure steady state pressure.

CHOICE (A) - NO

WRONG:

VALID DISTRACTOR: Plausible if the Applicant believes that reactor coolant throughput is reduced; thereby causing a slight pressure drop. Alternatively, the Applicant may conclude that the tripped RFP reduces steam flow such that pressure goes down. In fact, should a RFP trip, the EHC system will respond to maintain steady state pressure per program.

CHOICE (D) - NO

WRONG:

VALID DISTRACTOR: Plausible because this is redundant to PT10101A and an Applicant may incorrectly conclude that the signal will bias the output of the HVG somehow. However, this failure will cause a plant depressurization because the HVG will pass the full OPEN signal to the TBVs.

References**Comments and Question Modification History**

1. (HB 09/08/05) New.

Need reasonable pressure drop from SQ

2. THF 09/08/05 - changes to stem and answer.

3. Gil 09/08/05 - not realistic. Suggests scram condition but Rx Press stays at full power value - then ask what procedure to enter.

4. Gil 09/26/05 - Distractor "A" not plausible with electric feed pumps.

R: SSES has steam driven feed pumps. This is the result of comments to date. We need to reconsider "A" in light of making it mirror image of B-C-D.

Todd 09/30/05 - OK.

NRC K/A System/E/ASystem 2950 SCRAM
06

Number AA2.04

RO 4.1

SRO 4.1

CFR Link (CFR: 41.10 / 43.5 / 45.13)

Ability to determine and/or interpret the following as they apply to SCRAM: Reactor Pressure

NRC K/A Generic

**System
Number**

RO

SRO

CFR Link

7 RO SRO

Question ID:

28352 Origin: Bank

 Memory Level

What is the DESIGN BASIS for disabling control room controls when control is transferred from the Control Room to the Remote Shutdown Panel per ON-100-009, PLANT SHUTDOWN FROM OUTSIDE THE CONTROL ROOM?

- A** To prevent unauthorized component operation from the Control Room.
- B** To prevent spurious component operation caused by hot shorts.
- C** To simplify design and construction of the Remote Shutdown system.
- D** To minimize time to evacuate the Control Room once deciding to evacuate.

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

CHOICE (B) - YES

CHOICE (A) - NO

WRONG:

VALID DISTRACTOR: Plausible because it does fulfill the purpose proposed by this distractor. However, the design reason is to prevent spurious hot short operation.

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible because it may simplify design and construction of the RSD system. However, the design reason is to prevent hot short operation.

CHOICE (D) - NO

WRONG:

VALID DISTRACTOR: Plausible because it may minimize evacuation time. However, the design reason is to prevent hot short operation.

References**Comments and Question Modification History**

- (HB 09/08/05) Bank - minor revisions
 - THF 09/08/05 - editorial and deleted window dressing in stem.
 - PAP 9/9/05 - too easy, consider asking what the CR indication would be when the instrument were swapped to RSD.
 - Gil 09/26/05 - Revise first sentence of stem: "What is design basis for disabling control room controls . . ." R: done.
- Todd 09/30/05 - OK.

NRC K/A System/E/A

System 2950 Control Room Abandonment
16

Number AK3.03 **RO** 3.5 **SRO** 3.7 **CFR Link** (CFR: 41.5 / 45.6)

Knowledge of the reasons for the following responses
as they apply to CONTROL ROOM ABANDONMENT : Disabling control room controls

NRC K/A Generic**System****Number****RO****SRO****CFR Link**

The plant is at 100% power when a loss of Reactor Building Closed Cooling Water (RBCCW) occurs.

With NO Operator action, which of ONE of the following will occur and why?

- A** Inboard MSIVs will close because Containment Instrument Gas is lost when RBCCW is lost.
- B** Outboard MSIVs will close because Instrument Air is lost when RBCCW is lost.
- C** Inboard MSIVs will close due to Main Steam Tunnel High Temperature when RBCCW is lost.
- D** Outboard MSIVs will close due to Main Steam Tunnel High Differential Temperature when RBCCW is lost.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - YES

CTMT Inst Gas compressors cooled by RBCCW.

CHOICE (B) - NO

WRONG: IA compressors are cooled by TBCCW.

VALID DISTRACTOR:

CHOICE (C) - NO

WRONG: Tunnel coolers cooled by SW (Secondary CTMT). Moreover, Hi Tunn Temp closes ALL MSIVs.

VALID DISTRACTOR:

CHOICE (D) - NO

WRONG: Tunnel coolers cooled by SW (Secondary CTMT). Moreover, Hi Tunn Diff Temp closes ALL MSIVs.

VALID DISTRACTOR:

References

Comments and Question Modification History

1. (HB 09/06/05) Bank question.

2. THF 09/08/05 - editorial changes. changed choics to just INBD/OUTBD

3. Gil 09/09/05 - added stem conditions to improve operational orientation.

4. Gil 09/26/05 - could not validate with enclosed references.

R: Risk of error is low because this is a BANK question. Also noted that RBCCW cools the steam tunnel HVAC during exam development.

5. Rich 10/03/05 - Backward logic at memory level. Can we increase cognitive level?

R: revised wording to forward looking. Still lower level cause BANK and it is memory.

NRC K/A System/E/A

System 2950 Partial or Complete Loss of Component Cooling Wtr
18

Number AK1.01 **RO** 3.5 **SRO** 3.6 **CFR Link** (CFR: 41.8 to 41.10)

Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR

COMPLETE LOSS OF COMPONENT COOLING WATER : Effects on component/system operations

NRC K/A Generic

System

Number

RO

SRO

CFR Link

SSES Units 1 and 2 are operating at full power. For both units:

- "A" Containment Instrument Gas compressors (1K205A and 2K205A) are in LEAD
- "B" Containment Instrument Gas compressors (1K205B and 2K205B) are in STANDBY
- "A" Instrument Air compressors (1K107A and 2K107A) are in LEAD
- "B" Instrument Air compressors (1K107B and 2K107B) are in STANDBY
- "A" Service Air compressors (1K108A and 2K108A) are in LEAD
- "B" Service Air compressors (1K108B and 2K108B) are in STANDBY

The plant suffers a loss of Bus 2A201. Which of the following correctly describes the plant response:

- A** PCV-22560 will open, allowing the Service Air system to supply Instrument Air system loads.
- B** Service Air compressor 2K108B will start and cycle between 118 psig and 127 psig.
- C** Instrument Air compressor 2K107B will start and cycle between 87 psig and 102 psig.
- D** Containment Instrument Gas compressor 2K205B will start and cycle between 152 psig and 170 psig.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (D) - YES

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible because a unit 2 bus was lost and the STBY IA compressor does cycle between 87 and 102. Incorrect because the power supply to lead IA compressor 2K107A (2A204) remains energized.

CHOICE (B) - NO

WRONG:

VALID DISTRACTOR: Plausible because a unit 2 bus was lost and the STBY SA compressor does cycle between 118 and 127. Incorrect because the power supply to lead SA compressor 2K108A (1B130) remains energized.

CHOICE (A) - NO

WRONG:

VALID DISTRACTOR: Plausible because PCV-12560 will open as described on a loss of IA. However, no loss of IA occurred as described in Distractor 1.

References

Comments and Question Modification History

1. (HB 09/08/05) New. Check cycle pressures with SSES.

2. THF 09/08/05 - formatting

3. Gil 09/09/05 - no comment

4. Gil 09/26/05 - could not validate with enclosed references.

R: will reverify if time permits. Did reverify once during development of subsequent question and am confident in question.

5. Todd 09/30/05 - OK.

6. Rich 10/03/05 - are we sure it is Memory Level?

R: yes - really only need to know the power supplies for each of the compressors. Once loss of power to 2K205A is recognized, the question is straightforward memory.

NRC K/A System/E/A

System 2950 Partial or Complete Loss of Instrument Air
19

Number AA1.03

RO 3.0

SRO 3.0

CFR Link (CFR: 41.7 / 45.6)

Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : Instrument air compressor power supplies

NRC K/A Generic

System Number	RO	SRO	CFR Link
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Reactor Vessel Water Level must be above a MINIMUM water level before starting Residual Heat Removal (RHR) in Shutdown Cooling (SDC) mode.

The minimum water level is ___(1)___ and the reason(s) for this minimum level are ___(2)___.

- A** (1) 45 inches.
(2) to ensure natural circulation flow for core cooling and to prevent thermal stratification if Shutdown Cooling is lost.
- B** (1) 90 inches.
(2) to ensure natural circulation flow for core cooling and to provide adequate NPSH to the Fuel Pool Cooling (FPC) pumps.
- C** (1) 45 inches
(2) to prevent thermal stratification and to provide adequate NPSH to the Fuel Pool Cooling (FPC) pumps.
- D** (1) 90 inches.
(2) to provide adequate NPSH to the Fuel Pool Cooling (FPC) pumps and to the RHR pumps.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - YES

CHOICE (B) - NO

WRONG: NPSH to FPC pumps is NOT the reason.

VALID DISTRACTOR: Plausible because 90 inches is the administrative limit per OP-149-002 and because NC flow is partially correct. Static head is a common issue wrt NPSH.

CHOICE (C) - NO

WRONG: NPSH to FPC pumps is NOT the reason.

VALID DISTRACTOR: Plausible because 45 inches is correct and thermal stratification is part of the reason. Static head is a common issue wrt NPSH.

CHOICE (D) - NO

WRONG: NPSH to pumps is NOT the reason.

VALID DISTRACTOR: Plausible because 90 inches is the administrative limit per OP-149-002. Static head is a common issue wrt NPSH.

References

Comments and Question Modification History

1. (HB 09/08/05) New.

2. Gil 09/09/05 - no changes.

3. PAP 9/9/05 comment - Applicant could argue that "C" is a second correct answer. Changed RFR to Fuel Pool Cleanup pumps.

!!! ASK SSES IF "C" IS POTENTIALLY CORRECT !!!!

4. Gil 09/26/05 - K/A mismatch.

R: possibly but on a loss of SDC, unlikely to see any recirc flow changes.

Todd - unable to agree. SSES input seems to support my view but I asked for further clarification.

09/28/05 Phone Conversation with SSES - they agree that the original question as written did not appear to match the K/A. However, they recommended changes to the entire question to better align it to the K/A. These changes were incorporated into the question.

Todd 09/30/05 - OK.

NRC K/A System/E/A

System 2950 Loss of Shutdown Cooling
21

Number AA2.07

RO 2.9

SRO 3.1

CFR Link (CFR: 41.10 / 43.5 / 45.13)

Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING : Reactor recirculation flow

NRC K/A Generic

System Number	RO	SRO	CFR Link
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Which one of the following is the Safety Related Basis for maintaining Fuel Pool level 22 feet above the top of fuel?

- A** To provide a floodable volume for RHRFPC following a postulated seismic event.
- B** To limit Iodine release during a fuel handling accident to 25% or less of 10 CFR 100 limits.
- C** To minimize localized boiling within individual fuel assemblies following a loss of fuel pool cooling.
- D** To properly seat the Fuel Pool Gate Inflatable Seals with a static head of water in the fuel pool

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

CHOICE (B) - YES

CHOICE (A) - NO

WRONG:

VALID DISTRACTOR: SQ has committed to providing RHRFPC to maintain temperatures below 125 degrees fahrenheit following a seismic event. However, this is not the safety related basis.

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: This is the basis for maintaining fuel pool temperature below 125 degrees fahrenheit. However, it is not the safety related basis for maintaining 22 feet of water above the fuel.

CHOICE (D) - NO

WRONG: This is not the stated reason.

VALID DISTRACTOR: Higher head of water could be expected to better seat the gates..

References**Comments and Question Modification History**

1. (HB 09/08/05) Bank - INPO 24493 (River Bend ILO in 2003)

Need to verify BASIS against SQ TS

2. THF 09/08/05

3. Gil 09/09/05: added operational orientational and raised LOD by adding conditions to the stem.

4. Gil 09/26/05: Distractor "D" not plausible if FPC pumps are non-safety related.

R: Replaced "To ensure net positive suction head to the Fuel Pool Cooling Cleanup Pumps during routine operation." with new distractor.

Todd 09/30/05 - deleted "Refueling operations are about to start. There are no known fuel failures in the core. The Shift Manager directs you to ensure the level in the Fuel Pool and Reactor Cavity are greater than 22 feet." from the stem.

NRC K/A System/E/A

System 2950 Refueling Accidents
23

Number AK1.01 **RO** 3.6 **SRO** 4.1 **CFR Link** (CFR: 41.8 to 41.10)

Knowledge of the operational implications of the following concepts as they apply to REFUELING ACCIDENTS : Radiation exposure hazards

NRC K/A Generic**System**

Number **RO** **SRO** **CFR Link**

SSES Unit 2 Operators are responding to a High Drywell Pressure condition by venting the drywell per OP-273-003, Primary Containment Nitrogen Makeup and Venting. There is no failed fuel and the Containment atmosphere is below minimum detectable activity (MDA). How does the method of Drywell venting per Section 2.3 of OP-273-003, Venting Drywell, prevent an UNMONITORED and UNCONTROLLED release to assure radiation exposures remain as low as reasonably achievable (ALARA)?

- A** The Drywell is vented to the Standby Gas Treatment Exhaust Vent via the Standby Gas Treatment system.
- B** The Drywell is vented back through the Air Purge lines because the potential release is below MDA.
- C** The Drywell is vented to the Nitrogen Makeup system via the Containment Instrument Gas system.
- D** The Drywell is vented to the Turbine Building Ventilation Exhaust Stack via the Ambient Offgas Charcoal system.

Answers:

A**B****C****D**

References Provided to Applicant:

**Justification**

CHOICE (A) - YES

CHOICE (B) - NO

WRONG: This is not the vent path

VALID DISTRACTOR: From the Training diagram, this appears to be a possible flow path.

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible to believe that the Nitrogen gas could be compressed and reused. However, it's not done this way.

CHOICE (D) - NO

WRONG:

VALID DISTRACTOR: Plausible method of venting the Drywell. However, it's not done this way.

References**Comments and Question Modification History**

1. (HB 09/08/05) New by Gil. Check TRM 3.6.1.

2. THF 09/08/05 - no comment

3. Gil 09/09/05 - no comment

4. Gil 09/26/05 - Is the flowpath in distractor "B" possible?

R: No. none of the distractor flowpaths are possible. Replaced "The Drywell is vented to the Offgas Recombiner via the Main Condenser." with new distractor.

NRC K/A System/E/ASystem 2950
24

Number

RO

SRO

CFR Link

NRC K/A Generic

System 2.3 Radiation Control

Number 2.3.2

RO 2.5

SRO 2.9

CFR Link (CFR: 41.12 / 43.4. 45.9 / 45.10)

Knowledge of facility ALARA program.

- Reactor Pressure Vessel (RPV) pressure is steady at 1,050 psig
- One Main Turbine Bypass Valve is approximately 50% open
- The Pressure Regulator setpoints are set per GO-100-002 (GO-200-002), PLANT STARTUP, HEATUP AND POWER OPERATION
- Leading Edge Flow Meters (LEFM) are NOT in service.

Based on these conditions, what procedure MUST the Control Room Operators enter?

- A** ON-100-004, Reactor Power Greater than License Limit.
- B** ON-158-001, Loss of RPS.
- C** ON-243-001, Main Condenser Vacuum and Off Gas System Off Normal Operation.
- D** ON-247-002, Loss of Feedwater Heater String.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - YES

CHOICE (B) - NO

WRONG:

VALID DISTRACTOR: Plausible if the Applicant believes that an automatic reactor scram should have occurred for these conditions.

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible if the Applicant believes that Main Condenser backpressure is causing the high RPV pressure.

CHOICE (D) - NO

WRONG:

VALID DISTRACTOR: Plausible if the Applicant believes that reduced FW heating (more FW subcooling) is causing a high reactor power condition.

References

Comments and Question Modification History

1. 09/08/05 New. Check numbers with SQ staff.
2. 09/08/05 THF: added "Based on these conditions . . ."
3. Gil 09/09/05 - add Pressure Regulator setpoint to the stem
4. Gil 09/26/05 - could not validate with enclosed references.
R: we need to run this past SSES and, if possible, on the simulator to determine credibility of the question.
Can we add first stage turbine pressure to the list of conditions? 100% first stage pressure.

NRC K/A System/E/A

System 2950 High Reactor Pressure
25

Number EA2.02 **RO** 4.2 **SRO** 4.2 **CFR Link** (CFR 41.10, 43.5, 45.13)

Ability to determine and/or interpret the Reactor power as it applies to HIGH REACTOR PRESSURE

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

Residual Heat Removal (RHR) loop "B" is running in the Suppression Pool Cooling mode of operation per EO-100-103, PC CONTROL. The Reactor Operator notices significant fluctuations in flowrate and motor amps on both RHR Pumps "B" and "D".

Which ONE of the following caused this?

- A** Minimum flow valve HV-151F0007B failed open.
- B** Safety Relief Valve (SRV) "S" stuck open.
- C** RHR Pump "B" discharge flow orifice FO-15100B is blocked.
- D** Clogged RHR Loop "B" suction strainer..

Answers:

A

B

C

D

References Provided to Applicant:

Justification

Surveillance Requirement SR 3.5.1.7
Need to verify the procedure - done 09/07/05 by email

DISTRACTOR (A):

Plausible because a failed open min flow valve will affect the pump by increasing flowrate and NPSH requirements. The pumps are rated at 3175 gpm @ at 290 psig. The min flow line is designed to pass the full rated flow of two pumps (6350 gpm). Therefore, opening the min flow line during a test could cause pump RUNOUT. However, the stem conditions describe CAVITATION.

DISTRACTOR (C):

Plausible because blocking the discharge path will affect the pump by increasing discharge pressure and reducing flowrate. However, this effect is inconsistent with indications of cavitation.

DISTRACTOR (D):

Plausible because this was a recent industry event. However, each pump has its own suction strainer. Therefore, two clogged strainers are required to make this true.

References

Comments and Question Modification History

Gil 09/09/05 - need to amend distractors and determine best SRV to finish revision.

09/09/05: amended distractors.

09/12/05: amended distractor D

09/15/05: amended answer to "S" SRV because OP-183-001, Attachment A, shows this to be the closest to the RHR Pp suction.

Gil 09/26/05 - Revise last sentence of stem "Which one of the following is the most likely cause of this?"

R: Per Chief Examiner's direction, avoiding use of phrases like "most likely", "most probable", "could have". Revised stem to read "Which ONE of the following caused this?"

Todd 09/30/05 - added "significant" to stem and amended grammar accordingly.

NRC K/A System/E/A

System 2950 Suppression Pool High Water Temperature
26

Number EK1.01 **RO** 3.0 **SRO** 3.4 **CFR Link** (CFR 41.8 to 41.10)

Knowledge of the operational implications of the Pump NPSH as it applies to SUPPRESSION POOL HIGH WATER TEMPERATURE

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

SSES Unit 2 has a Loss of Coolant Accident (LOCA) and the following plant conditions exist:

- RPV Pressure 25 psig
- RPV Level +40 inches and rising slowly
- Torus Level +1.5 inches
- Torus Temperature 102 degrees Fahrenheit
- Drywell Pressure 21 psig
- Drywell Temperature 296 degrees Fahrenheit
- Division I RHR Injecting into the RPV
- Division II RHR Operating in Suppression Pool Cooling/Spray mode
- Both Divisions of Core Spray Injecting into the RPV
- Instrument Run Temperature (UR 25701A&B) 276 degrees Fahrenheit

Given the above conditions, which of the following actions is required by the operating crew per EO-200-103, PC CONTROL?

- A** Go To EO-200-112, Rapid Depressurization.
- B** Initiate Drywell Spray per OP-249-004, RHR Containment Cooling.
- C** Go To EO-200-114, RPV Flooding.
- D** Shutdown All Drywell Coolers and Fans per OP-273-001, Containment Atmosphere Control System.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

Bank - Fermi 2 2 exam of March 2003 (Question ID = 23721)

Applicants may want the EOPs to refer to Figure 1 of EO-100-103, PC Control. However, they should be able to determine that RPV level instruments are unreliable due to reference leg flashing by using ordinary steam tables. The given RPV Pressure of 25 psig or 40 psia yields a saturation Temperature of 267.25 deg F. The given Instrument Run Temperature is almost 9 deg F above saturation.

DISTRACTOR (A):

Plausible because the Drywell Temperature Control procedure requires Rapid Depressurization if DW temps can not be restored/maintained below 340 deg F at step DW/T-6. However, in this question, the operator should have gone to RPV flooding earlier at step DW/T-3.

DISTRACTOR (B):

Plausible because Drywell Spray is required when Drywell Temps exceed 340 deg F.

DISTRACTOR (D):

Shutdown All Drywell Coolers and Fans per OP-273-001, Containment Atmosphere Control System.

References

Comments and Question Modification History

Gil 09/09/05 - editorial change to stem
Gil 09/26/05 - OK

NRC K/A System/E/A

System 2950 High Drywell Temperature
28

Number EK3.02 **RO** 3.5 **SRO** 3.8 **CFR Link** (CFR 41.5, 45.6)

Knowledge of the reasons for the RPV flooding as it applies to HIGH DRYWELL TEMPERATURE

NRC K/A Generic

**System
Number**

RO

SRO

CFR Link

Which of the following describes the method that provides the highest flowrate of makeup to the Suppression Pool per OP-159-001, Suppression Pool Cleanup System?

- A** Pump the Condensate Storage Tank with the Core Spray Line Fill Pump to the CORE SPRAY CONDENSATE TRANSFER ISOLATION TO LOOP "B" MINIMUM FLOW LINE 152028.
- B** Gravity drain the Condensate Storage Tank through the Reactor Core Isolation Cooling (RCIC) Pump Casing to the RCIC MIN FLOW TEST LINE 149F019.
- C** Pump the Condensate Storage Tank with the High Pressure Coolant Injection (HPCI) Pump to the HPCI MIN FLOW LINE 155F012.
- D** Gravity drain the Condensate Storage Tank through CORE SPRAY CST SUPPLY ISOLATION 152021 and CORE SPRAY PUMP B&D CST SUCTION SUPPLY 152F002B to the Core Spray suction strainers.

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

CHOICE (A) - NO
WRONG: lower flowrate than the correct response.
VALID DISTRACTOR: normal method of makeup.

CHOICE (B) - NO
WRONG: Not procedurally authorized.
VALID DISTRACTOR: would work.

CHOICE (C) - NO
WRONG: Not procedurally authorized.
VALID DISTRACTOR: Would work

CHOICE (D) - YES

References**Comments and Question Modification History**

Inspired by Peach Bottom 2 September 2002 exam (Question ID 24782)

Gil 09/09/05 - editorial change to stem

CONSIDER CHANGING ALL DISTRACTORS TO: Gravity drain CST through RHR, HPCI, RCIC suction strainers.
?????????

Gil 09/26/05 - Correct answer is longest. Should balance with other distractors.
R: added full noun name descriptions to "B" and "C" for HPCI and RCIC. However, unable to perfect length of selections without degrading operational validity of the distractors or creating new psychometric clues.

Todd 09/30/05 - deleted "SSES Unit 1 is operating at full power. A failure of PSV152-F032B, the "B" Core Spray loop pump suction relief valve has lowered Suppression Pool water level. PSV152-F032B has been gagged shut. However, Suppression Pool water level has been below 22 feet for one hour. Per Emergency Operating Procedure EO-100-103, step SP/L-1, the Unit Supervisor has directed you to raise Suppression Pool water level to 23 feet." from stem.

NRC K/A System/E/A

System 2950 Low Suppression Pool Water Level
30

Number EA1.06 **RO** 3.4 **SRO** 3.4 **CFR Link** (CFR 41.7, 45.6)

Ability to operate and/or monitor the Condensate storage and transfer (make up to the suppression pool) (Plant-Specific) as it applies to LOW SUPPRESSION POOL WATER LEVEL

NRC K/A Generic**System****Number****RO****SRO****CFR Link**

SSES Unit 1 lost all Feedwater flow. Reactor Pressure Vessel level quickly lowered to approximately -40 inches at which point all control rods inserted and both Reactor Recirculation Pumps (RRP) tripped. What FSAR described event occurred and what caused the plant response?

- A** Feedwater Line Break - Outside Containment
Backup Scram Valve (SV 147110 A & B) actuation
- B** Feedwater Controller Failure - Maximum Demand
ATWS-RPT actuation
- C** Feedwater Line Break - Outside Containment
ATWS-RPT actuation
- D** Feedwater Controller Failure - Maximum Demand
Backup Scram Valve (SV 147110 A & B) actuation

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

New

Note: The ATWS-ARI and ATWS-RPT use the same circuitry per TM-OP-058, page 46. RPS should have scrambled the plant at L3 (+13 inches). In this case, the rods inserted and RPT occurred just below L2 (-38 inches).

DISTRACTOR (A):

Plausible because FW Line Break is correct and the Backup Scram Valves are a redundant means of inserting control rods. However, per OP-TM-058, page 35, the Backup Scram Valves will not actuate unless both both RPS A and B Trip Systems trip (de-energize) to energize the Backup Scram Valve Solenoid on each valve. In this case, the RPS system failed to operate at L3.

DISTRACTOR (B):

Plausible because the FW failure to max demand would eventually cause a loss of both FW-Ps on high RPV level. However, the question stem does not support this conclusion because there is no statement indicating a rise in RPV level and the RPV level decrease to below L2 requires the main turbine to be in operation.

DISTRACTOR (D):

Plausible because Backup Scram valves are a redundant means of inserting control rods. However, per OP-TM-058, page 35, the Backup Scram Valves will not actuate unless both both RPS A and B Trip Systems trip (de-energize) to energize the Backup Scram Valve Solenoid on each valve. In this case, the RPS system failed to operate at L3.

References**Comments and Question Modification History**

Gil 09/09/05 - No comment

Gil 09/26/05 - OK

Todd 09/30/05 - change insert and trip to inserted and tripped.

NRC K/A System/E/A

System 2950 Reactor Low Water Level
31

Number EK2.13**RO** 4.1**SRO** 4.2**CFR Link** (CFR 41.7, 45.8)

Knowledge of the interrelations between REACTOR LOW WATER LEVEL and ARI/RPT/ATWS (Plant-Specific)

NRC K/A Generic**System****Number****RO****SRO****CFR Link**

SSES Unit 1 has an Anticipated Transient Without Scram (ATWS). The control room operating crew initiate Standby Liquid Control (SBLC) per LQ/Q-3. You observe the following:

- 1P208A SBLC Pump RED indicating light ILLUMINATES,
- 1P208B SBLC Pump RED indicating light does NOT illuminate,
- ONE SBLC SQUIB READY A-B White indicating light extinguishes,
- ONE SBLC SQUIB READY A-B White indicating light remains energized,
- SBLC SQUIB VALVES LOSS OF CKT CONTINUITY (A03) Energizes.

What OPERATOR action, if any, is necessary to establish REQUIRED flow (86 gpm)?

- A** OPEN the second SBLC SQUIB Valve to establish sufficient flow path for full flow.
- B** START the second SBLC Pump (1P208B) to establish full pumping capacity.
- C** INJECT Boron with RCIC IAW ES-150-002 to establish full flow.
- D** No action is necessary because a single pump and valve will provide rated flow.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

New - inspired by Browns Ferry 2 exam of September 2001 (Question ID 21039)

SSES requires both SBLC pumps to start to ensure reactor safety following an ATWS. The expected flowrate is approximately 86 gpm. In this case, the flowrate is one-half of expected (43 gpm) because one SBLC pump failed to start. The alarm will energize when 4742 less 4587 (155) gallons have been injected. This will occur in 155 divided by 43 or 3.6 minutes.

The failure of one SQUIB Valve to fire has no effect on the solution because the pumps discharge to a common header. The common header then flows through two parallel SQUIB valves.

A - Only one valve opened. Plausible if the Applicant believes that the failed SQUIB valve blocks SBLC flow to the RPV and that opening the valve will restore full flow.

C - LQ/Q-4 requires this if Boron can NOT be injected with SBLC. Here, SBLC is injecting, albeit at half the required rate.

D - SSES requires both SBLC pumps to start to ensure reactor safety following an ATWS

References

Comments and Question Modification History

Gil 09/09/05 - editorial change to stem

Gil 09/26/05 - Distractor "A" not plausible with one pump running and one squib fired; should have some flow.

R: revised "Never" to "16 minutes". Applicant may misapply pump laws.

Todd 09/30/05 - why give setpoint?

R: w/o setpoint, it may become LOD=5 because not expected to know this.

Rich 10/03/05 - K/A mismatch. CE view?

R: agreed. Changed stem and distractors to require Applicant to demonstrate ability to manipulate controls. Saved original question as 181.

*** Ask SSES to evaluate distractor "C" as a potentially second correct answer.

NRC K/A System/E/A

System 2950
37

Number RO SRO CFR Link

NRC K/A Generic

System 2.2 Equipment Control

Number 222 RO 4.0 SRO 3.5 CFR Link (CFR 45.2)

Number 4.2.2 RC 4.2 SRC 4.2 STR 4.2 (SRC 4.2)

Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.

Following an accident at the Chlorine Building, a significant release of Chlorine gas occurs. How will the Control Structure HVAC system protect control room operators from toxic gas?

- A** The system will automatically shift to the RECIRCULATION MODE. Correct configuration and operation is then verified per ON-159-001 (ON-259-002), Containment Isolation.
- B** The system can be manually started in the RECIRCULATION MODE per OP-030-002, Control Structure HVAC, by placing Control Structure Manual Isolation switches HS-07802A1 and HS-07802B1 to "ISO" and then starting CREOASS Fan OV101A or OV101B.
- C** The system can be manually started in the PRESSURIZATION/FILTRATION MODE per OP-030-002, Control Structure HVAC, by placing Emergency Outside Air Intake Radiation Monitor mode switches RISHH-D12-0K618A and RISHH-D12-0K618B to "TRIP TEST".
- D** The system will automatically shift to the PRESSURIZATION/FILTRATION MODE. Correct configuration and operation is then verified per ON-159-001 (ON-259-002), Containment Isolation.

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

New

Per TM-OP-079E, the system originally built to automatically do this on high Chlorine.

DISTRACTOR (A):

Plausible because ON-1/2 59-002 does verify configuration and operation in response to a CTMT ISO. Automatic initiation of RECIRCULATION was part of the original design basis.

DISTRACTOR (C):

Plausible because this is one of three distinct operating modes for the system. However, per the TM-OP-079E, the correct response is RECIRC mode.

DISTRACTOR (D):

Plausible because this is one of three distinct operating modes for the system. However, the system will not automatically align itself to this mode and ON-1/2 59-002 does not address this mode.

References**Comments and Question Modification History**

Gil 09/09/05 - No comment

Gil 09/26/05 - K/A mismatch. Suggests throwing the K/A out.

R: disagree. While the question does not directly ask what happens on a RADIOACTIVE release, the successful Applicant must understand operation of the Control Structure ventilation system to answer this question. The applicant must know the difference between the two suggested operating modes (Recirc and Press/Filt) and what situations cause automatic reconfigurations. Therefore, the question does discriminate between Applicants who understand the Control Structure HVAC from those who do not.

Gil: suggests new stem: "Following a significant release of Chlorine from the Chlorine building". Accepted.

NRC K/A System/E/A

System 2950 High Off Site Release Rate
38

Number EA1.07 **RO** 3.6 **SRO** 3.8 **CFR Link** (CFR 41.7, 45.6)

Ability to operate and/or monitor the Control room ventilation (Plant-Specific) as it applies to HIGH OFF SITE RELEASE RATE

NRC K/A Generic**System**

Number **RO** **SRO** **CFR Link**

The BACKUP DIESEL FIRE PUMP starts in response to a fire in the ACCESS PROCESSING FACILITY. Which one of the following locations will receive an alarm indicating actuation of the BACKUP FIRE SUPPRESSION system?

- A** PP&L Energy Dispatch
- B** SSES Central Alarm Station
- C** PP&L Corporate Security
- D** SSES Control Room

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

New

GET CORRECT TITLE FOR DISTRACTOR - for all of them.

Per TM-OP-013-ST, page 20, the Backup Fire Suppression system does not energize an alarm in the control room.

Plausible because the actual alarm goes to Security

Plausible because the actual alarm goes to Security

Plausible because generally all alarms alert the control room staff of off-normal conditions either directly or through a satellite alarm. Per TM-OP-013-ST, page 20, this is not true for the Backup Fire Suppression system.

References**Comments and Question Modification History**

Gil 09/09/05 - No comment

Gil 09/26/05 - Does "C" have the correct title.

R: Yes but will confirm with SSES.

NRC K/A System/E/A

System 6000 Plant fire on site
00

Number AA1.06 **RO** 3.0 **SRO** 3.0 **CFR Link**

Ability to operate and / or monitor the following as they apply to the Plant Fire on Site: Fire alarm

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

SSES Unit 1 is at full power when a Feedwater Level Control System malfunction causes RPV Water Level to stabilize at approximately 47.5 inches. Per ON-145-001, RPV LEVEL CONTROL SYSTEM MALFUNCTION, the Operating Crew is able to restore Feedwater Level Control to Automatic, 3-element control on LEVEL A. The Operating Crew then completes ON-145-004, RPV WATER LEVEL ANOMALY and has NOT determined the cause of the malfunction.

- (1) What malfunction caused RPV Water Level to stabilize at approximately 47.5 inches?
 (2) What procedure must the Operating Crew enter next?

- A** (1) A single feed flow instrument failed downscale while in THREE ELEMENT
 (2) GO-000-001, REACTOR VESSEL LEVEL CONTROL DURING MAINTENANCE
- B** (1) A single feed flow instrument failed upscale while in THREE ELEMENT
 (2) OI-AD-509, TROUBLESHOOTING
- C** (1) A single level instrument input failed upscale while in AVERAGE.
 (2) GO-000-001, REACTOR VESSEL LEVEL CONTROL DURING MAINTENANCE
- D** (1) A single level instrument input failed downscale while in AVERAGE.
 (2) OI-AD-509, TROUBLESHOOTING

Answers:

 A B C DReferences Provided to Applicant: **Justification**

CHOICE (A) - NO

WRONG: This procedure only applies when the mode switch is in SHUTDOWN or REFUEL.

VALID DISTRACTOR: The failure causes stable level at ~48 inches.

CHOICE (B) - NO

WRONG: Need to determine what this causes.

VALID DISTRACTOR: This is the correct procedure.

CHOICE (C) - NO

WRONG: This procedure only applies when the mode switch is in SHUTDOWN or REFUEL.

VALID DISTRACTOR: This is the correct mode but the failure will give stable level of ~22.5 inches.

CHOICE (D) - YES

Stable level of ~47.5 inches

Correct Procedure.

References**Comments and Question Modification History**

Ask SSES what Distractor B will cause.

Tough one - 6 hours to develop.

1. PAP 9/9/05 comments to balance choices.

2. Gil 09/26/05 - does not see connection of OI-AD-509 in references.

R: added OI-AD-509 to list of references. Applicants expected to answer this question without use of references.

Suggestion if Question rejected: put Applicant in T/S activity and ask how is problem prevented.

NRC K/A System/E/ASystem 2950
08

Number

RO

SRO

CFR Link

NRC K/A Generic

System 2.2 Equipment Control

Number 2.2.20

RO 2.2

SRO 3.3

CFR Link (CFR: 43.5 / 45.13)

Knowledge of the process for managing troubleshooting activities.

SSES Unit 1 is at full power when a Feedwater Level Control System malfunction causes RPV Water Level to stabilize at approximately 47.5 inches. Per ON-145-001, RPV LEVEL CONTROL SYSTEM MALFUNCTION, the Operating Crew is able to restore Feedwater Level Control to Automatic, 3-element control on LEVEL A. The Operating Crew then completes ON-145-004, RPV WATER LEVEL ANOMALY and has NOT determined the cause of the malfunction.

- (1) What malfunction caused RPV Water Level to stabilize at approximately 47.5 inches?
 (2) What procedure must the Operating Crew enter next?

- A** (1) A single feed flow instrument failed downscale while in THREE ELEMENT
 (2) GO-000-001, REACTOR VESSEL LEVEL CONTROL DURING MAINTENANCE
- B** (1) A single feed flow instrument failed upscale while in THREE ELEMENT
 (2) OI-AD-509, TROUBLESHOOTING
- C** (1) A single level instrument input failed upscale while in AVERAGE.
 (2) GO-000-001, REACTOR VESSEL LEVEL CONTROL DURING MAINTENANCE
- D** (1) A single level instrument input failed downscale while in AVERAGE.
 (2) OI-AD-509, TROUBLESHOOTING

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

CHOICE (A) - NO

WRONG: This procedure only applies when the mode switch is in SHUTDOWN or REFUEL.

VALID DISTRACTOR: The failure causes stable level at ~48 inches.

CHOICE (B) - NO

WRONG: Need to determine what this causes.

VALID DISTRACTOR: This is the correct procedure.

CHOICE (C) - NO

WRONG: This procedure only applies when the mode switch is in SHUTDOWN or REFUEL.

VALID DISTRACTOR: This is the correct mode but the failure will give stable level of ~22.5 inches.

CHOICE (D) - YES

Stable level of ~47.5 inches

Correct Procedure.

References**Comments and Question Modification History**

Ask SSES what Distractor B will cause.

Tough one - 6 hours to develop.

1. PAP 9/9/05 comments to balance choices.

2. Gil 09/26/05 - does not see connection of OI-AD-509 in references.

R: added OI-AD-509 to list of references. Applicants expected to answer this question without use of references.

Suggestion if Question rejected: put Applicant in T/S activity and ask how is problem prevented.

NRC K/A System/E/ASystem 2950
08

Number

RO

SRO

CFR Link

NRC K/A Generic

System 2.2 Equipment Control

Number 2.2.20

RO 2.2

SRO 3.3

CFR Link (CFR: 43.5 / 45.13)

Knowledge of the process for managing troubleshooting activities.

Which of the following conditions will prevent CAVITATION?

- A** Reactor Lower Water at +11 inches and Reactor Feedwater Pump "A" flow of 26% and Reactor Feedwater Pump "B" flow of 27%.
- B** Reactor Lower Water at +32 inches and Reactor Feedwater Pump "A" flow of 18% and Reactor Feedwater Pump "B" flow of 18%.
- C** Reactor Lower Water at +28 inches and Reactor Feedwater Pump "A" flow of 20% and Reactor Feedwater Pump "B" flow of 18%.
- D** Reactor Lower Water at +12 inches and Reactor Feedwater Pump "A" flow of 16% and Reactor Feedwater Pump "B" flow of 17%.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

30% limiter if below L3 and TOTAL FW less than 20%

CHOICE (A) - NO

WRONG: greater than 20% FW

VALID DISTRACTOR: below L3 is correct

CHOICE (B) - NO

WRONG: above L3

VALID DISTRACTOR: Total FW < 20% is correct

CHOICE (C) - NO

WRONG: Below L4 but above L3

VALID DISTRACTOR: This combination will actuate the 45% limit (Speed Limiter #2)

CHOICE (D) - YES

References

Comments and Question Modification History

Gil 09/26/05 - No K/A statement with question. Did validate correct answer.

R: added K/A to K/A table. Gil is OK.

Todd 09/30/05 - removed references to L3, L4 and Total v. RFP flows.

NRC K/A System/E/A

System 2950 Low Reactor Water Level
09

Number AK1.02 **RO** 3.0 **SRO** **CFR Link**

Knowledge of the operational implications of the following concepts as they apply to LOW REACTOR WATER LEVEL:
Recirculation pump net positive suction head: Plant specific.

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

A steam line break occurred in the Primary Containment of SSES Unit 2. The following conditions exist:

- Several control rods failed to insert.
- RPV Water Level is 167 inches and steady.
- RPV Pressure is 520 psig and steady.
- Drywell Pressure is 7.0 psig and steady.
- Drywell Temperature is 180 degrees Fahrenheit and steady.
- Suppression Chamber Pressure is 2.0 psig and rising slowly.
- Suppression Chamber Temperature is 86 degrees Fahrenheit and steady.

According to EO-200-103, PC CONTROL, which ONE of the following Residual Heat Removal (RHR) configurations is required?

- A** RHR Loop "A" in Suppression Pool Cooling and RHR Loop "B" in Suppression Chamber Spray
- B** RHR Loop "A" in Suppression Pool Cooling and RHR Loop "B" in Suppression Pool Cooling
- C** RHR Loop "A" in Drywell Spray and RHR Loop "B" in Suppression Chamber Spray
- D** RHR Loop "A" in Drywell Spray and RHR Loop "B" in Suppression Pool Cooling

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - YES

SP Cooling required per SP/T-1

SP Spray required per PC/P-4

CHOICE (B) - NO

WRONG: SP/T-2 does NOT require maximum SP cooling until SC temp can NOT be maintained below 90 deg F.

VALID DISTRACTOR: Some SP cooling will be required to maintain SP below 90 deg F

CHOICE (C) - NO

WRONG: Drywell Spray is NOT required until DW pressure exceeds 13 psig in the SC per PC/P-5

VALID DISTRACTOR: SC Spray required per PC/P-4

CHOICE (D) - NO

WRONG: Drywell Spray is NOT required until DW pressure exceeds 13 psig in the SC per PC/P-5

VALID DISTRACTOR: Some SP cooling will be required to maintain SP below 90 deg F

References

Comments and Question Modification History

1. Gil 09/26/05 - could not validate with enclosed references. Appears correct.

R: Self validated. Will ask Chief Examiner to validate.

NRC K/A System/E/A

System 2950 High Suppression Pool Temperature
13

Number AK2.01 **RO** 3.6 **SRO** 3.7 **CFR Link** (CFR: 41.7 / 45.8)

Knowledge of the interrelations between HIGH

SUPPRESSION POOL TEMPERATURE and the following: Suppression pool cooling

NRC K/A Generic

System

Number

RO

SRO

CFR Link

SSES Unit 1 was operating at full power when the Main Turbine tripped. However, the Reactor did NOT scram. You are inserting control rod 22-27 per EO-100-113, Control Rod Insertion.

The following plant conditions exist:

- all Average Power Range Monitors (APRMs) indicate approximately 24% Reactor Power.
- the RSCS ROD INS BLK BYPASS HS-55601 is in NORMAL (WHITE light illuminated)

On the Rod Sequence Control System (RSCS) Operator Display Unit (ODU), you observe the following:

- AMBER DISPLAY UNIT pushbutton lower light (FREE ROD) illuminated.
- Control Rod 22-27 AMBER light emitting diode (LED) is illuminated.
- RED DISPLAY UNIT pushbutton lower light (BYPASS) illuminated.
- Control Rod 22-27 RED light emitting diode (LED) is illuminated.

Which one of the following describes the status of control rod 22-27?

- A** Control Rod 22-27 can be INSERTED because power is above the Low Power Setpoint (LPSP).
- B** Control Rod 22-27 can be INSERTED because it is BYPASSED.
- C** Control Rod 22-27 can NOT be INSERTED because the RSCS ROD INS BLK BYPASS HS-55601 is in NORMAL.
- D** Control Rod 22-27 can NOT be INSERTED because power is below the Low Power Setpoint (LPSP).

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - NO

WRONG: RPS does not bypass RSCS blocks.

VALID DISTRACTOR: LPSP is 22%. APRMs > 22% may be mistaken for the actual LPSP parameter (1st stage pressure).

CHOICE (B) - YES

Turbine 1st stage pressure is the parameter measured to determine whether the plant is above or below LPSP and LPAP. The stem establishes that the Main Turbine is tripped. Therefore, 1st stage pressure is below the LPSP setpoint and is probably at a vacuum. In addition, the ODU conditions in the stem establish that the rod is bypassed (RED LED) and free to move (AMBER LED).

CHOICE (C) - NO

WRONG: The rod can be inserted because RSCS does not have a Rod Block on this rod

VALID DISTRACTOR: EO-100-113 directs the user to bypass RSCS. Applicant may believe the rod could be blocked if the switch is still in normal.

CHOICE (D) - NO

WRONG: The rod can be inserted because RSCS does not have a Rod Block on this rod.

VALID DISTRACTOR: Applicant may recognize that with no 1st stage pressure, RSCS receives a <LPSP signal and blocks rod motion.

References

Comments and Question Modification History

Gil 09/26/05 - OK

Todd 09/30/05 - replaced colon with question mark at end of stem.

NRC K/A System/E/A

System 2950 Incomplete SCRAM
15

Number AK2.06

RO 2.6

SRO 2.8

CFR Link (CFR: 41.7 / 45.8)

Both units are at full power. SSES Unit 1 has isolated and is draining Residual Heat Removal (RHR) loop "B" for planned maintenance. SSES Unit 1 RHR loop "B" is draining to the floor drain to the Reactor Building Sump via 161121 (RHR Pump B & D Room Drain Iso Vlv.).

SSES Unit 2 Receives the following alarms and indications:

- RHR LOOP B PUMP ROOM FLOODED (AR-213-001, H08).
- SUPPRESSION POOL DIV 1 LO LEVEL (AR-211-001, E02).
- SUPP POOL LEVEL LI-25755A indicates 22.4 feet and slowly lowering.
- SUPPRESSION POOL DIV 2 LO LEVEL (AR-212-001, E02).
- SUPP POOL LEVEL LI-25755B indicates 22.3 feet and slowly lowering.
- REACTOR BLDG SUMP LEVEL HI-HI (AR-225-001, B01)

(1) How will Suppression Pool level respond?

(2) What Emergency Operating Procedure (EOP) entry conditions are CURRENTLY met?

- A** (1) The Suppression Pool will continue to drain until 161121 (RHR Pump B & D Room Drain Iso Vlv.) is closed.
(2) EO-200-104, SECONDARY CONTAINMENT CONTROL.
- B** (1) The Suppression Pool will continue to drain until 161121 (RHR Pump B & D Room Drain Iso Vlv.) is closed.
(2) EO-200-103, PC CONTROL.
- C** (1) Suppression Pool level will lower to 17 feet and stabilize.
(2) EO-200-104, SECONDARY CONTAINMENT CONTROL.
- D** (1) Suppression Pool level will lower to 17 feet and stabilize.
(2) EO-200-103, PC CONTROL.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - NO

WRONG: SP will not continue to drain because the Unit 1 and 2 floor drains are not cross-connected.

VALID DISTRACTOR: Correct EOP and each unit's ECCS room floor drains are cross-connected to other ECCS room of the same unit.

CHOICE (B) - NO

WRONG: PC CONTROL requires SP level below 22 feet. However, the SP will not continue to drain because the Unit 1 and 2 floor drains are not cross-connected.

VALID DISTRACTOR: The stem conditions give sufficient information to correctly conclude that the Suppression Pool will stabilize at 17 feet (Table 18 of EO-100-103). Therefore, Applicant may reasonably select this.

CHOICE (C) - YES

Table 18 of EO-100-103 tells us that SP will stabilize at 17 feet.

EO-100-104 requires entry on RB Water Level above high alarm.

CHOICE (D) - NO

WRONG: PC CONTROL requires SP level below 22 feet.

VALID DISTRACTOR: Correct SP level. The stem conditions give sufficient information to correctly conclude that the Suppression Pool will stabilize at 17 feet (Table 18 of EO-100-103). Therefore, Applicant may reasonably select this.

References

Comments and Question Modification History

NM2 August 2002 (Question ID 22279)

1. Gil 09/26/05 - could not validate the 17 feet because EO-100-103 not included in workpapers
R: it is 17 feet. Ask Chief Examiner to independently validate.

2. Todd 09/30/05 - changed "(1) What level will SSES Unit 2 Suppression Pool stabilize at?" to "(1) How will Suppression Pool level respond?".
changed part (1) of distractors "C" and "D" from "(1) 17 feet" to "(1) Suppression Pool level will lower to 17 feet and stabilize."

NRC K/A System/E/A

System 2950 Secondary Containment High Sump/Area Water Level
36

Number EA1.01 **RO** 3.2 **SRO** 3.3 **CFR Link** (CFR 41.7, 45.6)

Ability to operate and/or monitor the Secondary containment equipment and floor drain systems as it applies to
SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

Following a loss of coolant accident, the Primary Containment Hydrogen and Oxygen (H₂O₂) Analyzers are placed in service per OP-173-001, Section 2.8, H₂O₂ ANALYZER OPERATION DURING EMERGENCY. The following conditions exist:

- Analyzer "A" is aligned to the SUPPRESSION POOL.
- Analyzer "A" O₂ reads 2%.
- Analyzer "A" H₂ reads 9%

- Analyzer "B" is aligned to the DRYWELL.
- Analyzer "B" O₂ reads 6%
- Analyzer "B" H₂ reads less than 1%

- Sample flow to both analyzers was restored 35 minutes ago.
- Both analyzers are on the 10% range.

Which ONE of the following statements is correct?

- A** All Hydrogen Recombiners, Drywell Fans and Drywell Coolers MUST be Operated to adequately mix the Primary Containment atmosphere.
- B** All Hydrogen Recombiners, Drywell Fans and Drywell Coolers MUST be Operated to adequately recombine Hydrogen in the Primary Containment atmosphere.
- C** All Hydrogen Recombiners, Drywell Fans and Drywell Coolers MUST be Shutdown because Hydrogen and Oxygen concentrations are above combustible limits.
- D** All Hydrogen Recombiners, Drywell Fans and Drywell Coolers MUST be Shutdown because Hydrogen and Oxygen concentrations can NOT be determined.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - NO

WRONG: EO-100-103 requires that Recombiners, Fans and Coolers be secured when H₂>6% AND O₂>5% whether the gases are in the same CTMT section or not because migration is possible.

VALID DISTRACTOR: EO-103-113 calls for mixing and recombining for the individual CTMT sections (SP or DW) given the individual conditions.

CHOICE (B) - NO

WRONG: EO-100-103 requires that Recombiners, Fans and Coolers be secured when H₂>6% AND O₂>5% whether the gases are in the same CTMT section or not because migration is possible.

VALID DISTRACTOR: EO-103-113 calls for mixing and recombining for the individual CTMT sections (SP or DW) given the individual conditions.

CHOICE (C) - YES

Analyzers have been in-service for >30 minutes.
H₂ and O₂ conditions exceed combustible limits.

CHOICE (D) - NO

WRONG: The Analyzers require 30 minutes to stabilize. They've had 35 minutes.

VALID DISTRACTOR: Applicant may consider the Analyzers inoperable due to the disparate SP and DW readings or because Analyzers have been in service for a short time period. (Note: 1 hour at PB)

References

Comments and Question Modification History

Gil 09/26/05 - OK

Todd 09/30/05 - OK

NRC K/A System/E/A

System 5000 High Containment Hydrogen Concentration
00

Number EA2.04

RO 3.3

SRO 3.3

CFR Link (CFR 41.10, 43.5, 45.13)

Ability to determine and / or interpret Combustible limits for wetwell as it applies to HIGH PRIMARY CONTAINMENT HYDROGEN CONCENTRATIONS

NRC K/A Generic

System Number	RO	SRO	CFR Link
--------------------------	-----------	------------	-----------------

Given that the following conditions occur in the specified sequence:

1. All required conditions for Automatic Depressurization System (ADS) actuation are met.
2. Automatic depressurization is in progress.
3. All low pressure ECCS pumps trip.
4. A single Core Spray (CS) pump is restarted.

Which ONE of the following describes how the Automatic Depressurization System (ADS) is affected?

- A** ADS depressurization STOPPED when low pressure ECCS pumps tripped; then AUTOMATICALLY reinitiated after the CS pump restarted.
- B** ADS depressurization CONTINUES until the LOGIC TIMER RESET pushbutton is depressed.
- C** ADS depressurization CONTINUES until both MANUAL INHIBIT (S34A & S34B) switches are rotated to INHIBIT.
- D** ADS depressurization STOPPED when low pressure ECCS pumps tripped; then can be MANUALLY reinitiated after the CS pump restarted.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: K4A seals in the actuation signal.

VALID DISTRACTOR: ADS will not actuate without low pressure ECCS pumps running

CHOICE (B) - YES

Signal seals in until broken by the ADS LOGIC/TIMER RESET PB

CHOICE (C) - No

WRONG: Manual Inhibit PBs are effective before ADS actuation only.

VALID DISTRACTOR: They are effective before actuation at stopping actuation.

CHOICE (D) - No

WRONG: K4A seals in the actuation signal and Manual Initiation does NOT bypass the LP ECCS Pumps relay K9A and K10A

VALID DISTRACTOR: Reasonable belief that Manual Initiation would bypass all interlocks.

References

Comments and Question Modification History

Drawn from Clinton 1 June 2000 exam (Question ID 18937)

Gil 09/26/05 - Add to first sentence in stem ". . . conditions occur in sequence". Can you shorten distractor "D" a bit?

R: accepted both comments.

Todd 09/30/05 - Revised "A" and "D" to be past tense and added auto restart to "A".

NRC K/A System/E/A

System 2030 RHR/LPCI: Injection Mode (Plant Specific)
00

Number K3.03 **RO** 4.2 **SRO** 4.3 **CFR Link** (CFR 41.7 / 45.4)

Knowledge of the effect that a loss or malfunction of the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) will have on Automatic depressurization logic

NRC K/A Generic

System

Number

RO

SRO

CFR Link

Both units are at full power. 480 VAC Bus 2B226 is deenergized for planned electrical maintenance. All systems were in their normal configuration when Operations de-energized 2B226.

Which ONE of the following correctly describes the status of SSES Unit 2 Residual Heat Removal (RHR) Loop "B" with NO Local/Manual component manipulation?

- A** Drywell Spray Mode - NOT Available
 Suppression Pool Spray - NOT Available
 Suppression Pool Cooling - NOT Available
 RHR Pump "B" and "D" Minimum Flow Isolation - Available
- B** Drywell Spray Mode - Available
 Suppression Pool Spray - Available
 Suppression Pool Cooling - Available
 RHR Pump "B" and "D" Minimum Flow Isolation - NOT Available
- C** Drywell Spray Mode - Available
 Suppression Pool Spray - NOT Available
 Suppression Pool Cooling - NOT Available
 RHR Pump "B" and "D" Minimum Flow Isolation - NOT Available
- D** Drywell Spray Mode - NOT Available
 Suppression Pool Spray - Available
 Suppression Pool Cooling - Available
 RHR Pump "B" and "D" Minimum Flow Isolation - Available

Answers:

A**B****C****D**

References Provided to Applicant:

**Justification**

De-energizing 2B226 removes power from the following:

- HV251F016B - Drywell Spray (Normally Shut)
- HV251F017B - Injection (Normally Open)
- HV251F028B - SP Spray & Cooling (Normally Shut)
- HV251F010B - Cross-connect to "A" loop (Normally Shut)
- HV251F004B - "B" Pump suction from SP (Normally Open)
- HV251F006B - "B" Pump suction from SDC dropline (Normally Open)
- HV251F003B - "B" HX Outlet (Normally Open)
- HV251F047B - "B" HX Inlet (Normally Open)

Therefore, the following applies"

- Low Pressure Coolant Injection (LPCI) - Operable because de-energized valves in the flowpath are normally open (HV251F015B is on swing buss 2B229)
- Drywell Spray Mode - NOT Available because normally closed valve F016B is de-energized
- Suppression Pool Spray - NOT Available because normally closed valve F028B is de-energized
- Suppression Pool Cooling - NOT Available because normally closed valve F028B is de-energized
- RHR Pump "B" and "D" Minimum Flow - Available because normally closed valve F007B is energized from 2B229

CHOICE (A) - YES

CHOICE (B) - No

WRONG: DW Spray NOT avail because F016B deenergized. SP Spray NOT avail because F028B deenergized.
 VALID DISTRACTOR: LPCI is Operable, Min Flow is available and SP Cooling NOT Avail.

CHOICE (C) - No

WRONG: LPCI is Operable. Remainder of distractor mirrors Distractor B
 VALID DISTRACTOR: Remainder of distractor mirrors Distractor B

CHOICE (D) - No

WRONG: LPCI is Operable. Remainder of distractor mirrors Distractor D
 VALID DISTRACTOR: Remainder of distractor mirrors Distractor B

References**Comments and Question Modification History**

Gil 09/26/05 - Suggest use "Available" (or not available) rather than "Operable". Not sure what impact the bus loss will have on Operability, however availability is assured in A.

R: accepted.

NRC K/A System/E/A

System 2050 Shutdown Cooling System (RHR Shutdown Cooling Mode
00

Number K2.02 **RO** 2.5 **SRO** 2.7 **CFR Link** (CFR 41.7)

Knowledge of electrical power supplies to Motor operated valves

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

SSES Unit 1 is at full power when 1 High Pressure Coolant Injection (HPCI) inadvertently initiates and injects to the Reactor Pressure Vessel (RPV). Assuming no Operator action, which ONE of the following correctly describes the INITIAL change from steady state?

- A** Thermal Power will RISE
RPV Water Level will LOWER
Total Steam Flow will LOWER
Total Indicated Feedwater Flow will LOWER
- B** Thermal Power will RISE
RPV Water Level will LOWER
Total Steam Flow will RISE
Total Indicated Feedwater Flow will LOWER
- C** Thermal Power will RISE
RPV Water Level will RISE
Total Steam Flow will LOWER
Total Indicated Feedwater Flow will RISE
- D** Thermal Power will RISE
RPV Water Level will RISE
Total Steam Flow will RISE
Total Indicated Feedwater Flow will LOWER

Answers:

 A B C DReferences Provided to Applicant: **Justification**

CHOICE (A) - No
WRONG: Wrong Level, ST & FW changes
VALID DISTRACTOR: correct power changes.

CHOICE (B) - No
WRONG: Wrong RPV Water Level Effect.
VALID DISTRACTOR: Correct Power, ST and FW changes

CHOICE (C) - No
WRONG: Reverses the actual FW and ST changes - both affect Level Error.
VALID DISTRACTOR: Correct Power and Level change

CHOICE (D) - YES
Steam Flow RISEs cause HPCI Turbine Operating. Therefore, RPV pressure drops cause ST rises and Power rises due to colder FW.
RPV Water Level will rise because FW now > ST. Stable when Level Error offsets Flow Error
Total Steam Flow will rise because now have additional steam flowpath
Indicated FW Flow lowers to create the Flow Error that offsets Level Error.

References**Comments and Question Modification History**

1. Gil 09/26/05 - could not validate with enclosed references. Note for justification "A" Power increases due to lowering feedwater temperature with HPCI injection.

R: Low risk of error because it is drawn from SSES Exam Bank and is theoretical rather than plant specific.

2. Todd 09/30/05 - changed "INITIAL to FINAL" to "INITIAL change from SS"

NRC K/A System/E/A

System 2060 High Pressure Coolant Injection System
00

Number A1.01 **RO** 4.3 **SRO** 4.4 **CFR Link** (CFR 41.5 / 45.5)

Ability to predict and/or monitor changes in parameters associated with operating the HIGH PRESSURE COOLANT INJECTION SYSTEM controls including Reactor water level (BWR-2,3,4)

NRC K/A Generic

**System
Number**

RO

SRO

CFR Link

During quarterly surveillance testing of the High Pressure Coolant Injection (HPCI) system per SO-152-002, the system is __ (1) __ and the liquid flowpath is __ (2) __.

- A** (1) NOT OPERABLE because injection valve HV155F006 is deenergized in the closed position.
(2) From the Suppression Pool to the Pumps and return to the Suppression Pool.
- B** (1) NOT OPERABLE because injection valve HV155F006 is deenergized in the closed position.
(2) From the Condensate Storage Tank to the Pumps and return to the Condensate Storage Tank.
- C** (1) OPERABLE because HPCI will automatically realign to the injection mode upon receipt of an initiation signal.
(2) From the Suppression Pool to the Pumps and return to the Suppression Pool.
- D** (1) OPERABLE because HPCI will automatically realign to the injection mode upon receipt of an initiation signal.
(2) From the Condensate Storage Tank to the Pumps and return to the Condensate Storage Tank.

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

CHOICE (A) - No
WRONG: Path is CST to Pps to CST
VALID DISTRACTOR: system is Inoperable.

CHOICE (A) - YES

CHOICE (C) - No
WRONG: Path is CST to Pps to CST. System is NOT operable (no auto realign)
VALID DISTRACTOR: mirror imaging distractors.

CHOICE (C) - No
WRONG: System is NOT operable (no auto realign)
VALID DISTRACTOR: correct flowpath

References**Comments and Question Modification History**

Get the correct surveillance (I've got the 24 month one)

Gil 09/26/05 - OK

Todd 09/30/05 - ask SSES if initial power level changes the answer.

NRC K/A System/E/A

System 2060
00

Number RO SRO CFR Link

NRC K/A Generic

System 2.2 Equipment Control

Number 2.2.12 RO 3.0 SRO 3.4 CFR Link (CFR: 41.10 / 45.13)

Knowledge of surveillance procedures.

Both SSES units were at full power and SSES Unit 1 was running Core Spray pumps 1P206A and 1P206C for surveillance testing when the site experienced a Loss of Offsite Power (LOOP).

- Both units are now maintaining Reactor Pressure Vessel (RPV) pressure and inventory with the Reactor Core Isolation Cooling (RCIC) system.
- All engineered safeguards (ES) buses are powered from their associated emergency diesel generators (EDG).

Subsequently, a transient affects SSES Unit 2 and results in the following conditions:

- SSES Unit 2 RPV Water Level is -60 inches.
- SSES Unit RPV Pressure is 350 psig.
- SSES Unit Drywell Pressure is 1.8 psig.

Which ONE of the following describes the AUTOMATIC actions of the SSES Unit 2 Core Spray system?

- A** Core Spray pumps 2P206A, 2P206B, 2P206C and 2P206D start after a 15 second time delay.
- B** Core Spray pumps 2P206A, 2P206B, 2P206C and 2P206D start after a 10.5 second time delay.
- C** Core Spray pumps 2P206B and 2P206D start after a 10.5 second time delay. Core Spray pumps 2P206A and 2P206C do NOT start.
- D** Core Spray pumps 2P206B and 2P206D start after a 15 second time delay. Core Spray pumps 2P206A and 2P206C do NOT start.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: the 15 sec TD occurs if ES busses are energized from normal/off-site power.

VALID DISTRACTOR: all four pumps do start after a TD

CHOICE (B) - YES

the 15 sec does time out. However, its start signal comes AFTER the 10.5 sec TD sends its signal.

LOOP: K3A opens, EDGs start and energize ES busses, K3A closes and the EDG breaker 52 contacts swap (a closes & b opens)

LOCA: K10A closes on DW Hi pressure and RPV Low pressure, K116A energizes 10.5 sec TD concurrently with K16A's 15 sec TD. K116A closes before K16A closes, K12A energizes.

CHOICE (C) - No

WRONG: CS pumps A & C will also start.

VALID DISTRACTOR: Correct TD and pumps B & D are "Preferred" unit 2 pumps for concurrent CS initiation signals (electrical load considerations).

CHOICE (D) - No

WRONG: Wrong TD and CS pumps A & C will also start.

VALID DISTRACTOR: CS pumps B & D are "Preferred" unit 2 pumps for concurrent CS initiation signals (electrical load considerations).

References

Comments and Question Modification History

Gil 09/26/05 - OK

Todd 09/30/05 - changed "plant" to "site" in the stem.

NRC K/A System/E/A

System 2090 Low Pressure Core Spray System
01

Number K4.08

RO 3.8

SRO 4.0

CFR Link (CFR 41.7)

Knowledge of LOW PRESSURE CORE SPRAY SYSTEM design feature(s) and/or interlocks which provide for the Automatic system initiation

NRC K/A Generic

System Number	RO	SRO	CFR Link
--------------------------	-----------	------------	-----------------

Both SSES units are at full power. During shift turnover, you notice that the:

- white indicating light for Standby Liquid Control (SBLC) squib valve 148F004A is EXTINGUISHED
- white indicating light for Standby Liquid Control (SBLC) squib valve 148F004B is ILLUMINATED

Before accepting the shift, you go to the Relay Room and determine that the Unit 1 SBLC squib valve CONTINUITY METERS read 5 milliamps (ma) for BOTH squib valves.

Which ONE of the following correctly describes the status of the SBLC squib valves?

- A** 148F004A is Operable
148F004B is Operable
- B** 148F004A is NOT Operable
148F004B is Operable
- C** 148F004A is Operable
148F004B is NOT Operable
- D** 148F004A is NOT Operable
148F004B is NOT Operable

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - YES

The stem establishes conditions indicative of a burned out light bulb.

CHOICE (B) - No

WRONG: Neither valve is inoperable.

VALID DISTRACTOR: White light out is the first indication of an inoperable squib valve.

CHOICE (C) - No

WRONG: Neither valve is inoperable

VALID DISTRACTOR: Tests Applicants' understanding of the normal/expected condition.

CHOICE (D) - No

WRONG: Neither valve is inoperable

VALID DISTRACTOR: Mirror imaging and tests Applicants' understanding of normal/expected condition.

References

Comments and Question Modification History

Gil 09/26/05 - suggest using 5 milliamps in stem if this is technically correct, albeit a little higher than normal. 4 milliamps is too easily recognizable.

R: accepted. Changed from 4 to 5 and deleted sentence saying "These are the NORMAL values". Recategorized to Higher Cognitive Level.

Todd 09/30/05 - added "Unit 1" before SBLC in the stem.

NRC K/A System/E/A

System 2110 Standby Liquid Control System
00

Number K4.04 **RO** 3.8 **SRO** 3.9 **CFR Link** (CFR 41.7)

Knowledge of STANDBY LIQUID CONTROL SYSTEM design feature(s) and/or interlocks which provide for Indication of fault in explosive valve firing circuits

NRC K/A Generic

System

Number

RO

SRO

CFR Link

SSES Unit 1 is operating at full power. The following Standby Liquid Control System (SBLC) conditions exist following SBLC tank filling:

- SLC tank temperature is 70 F
- AR 107 B03, STANDBY LIQUID TANK HI/LO TEMP is in alarm
- SLC tank level is 5100 gallons
- AR 107 C03, STANDBY LIQUID TANK HI/LO LEVEL is in alarm
- Chemistry sample results after filling indicate that the concentration of the sodium pentaborate solution in the SLC tank is 15.4% by weight

Which ONE of the following identifies the status of the SLC system according to Technical Specifications?

- A** The LCO is satisfied.
- B** Tank temperature does not meet the LCO conditions.
- C** Tank available volume does not meet the LCO conditions.
- D** Sodium pentaborate concentration does not meet the LCO conditions.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

!! THIS QUESTION APPEARED ON THE AUGUST 2002 SUSQUEHANNA EXAM !!

CHOICE (A) - No

WRONG: The temperature-concentration combination is in the UNACCEPTABLE range.

VALID DISTRACTOR: Applicant must determine this from Figure 3.1.7-2

CHOICE (B) - YES

CHOICE (C) - No

WRONG: Volume falls in the acceptable region of Figure 3.1.7-2

VALID DISTRACTOR: Applicant determine this from Figure 3.1.7-2

CHOICE (D) -

WRONG: Concentration falls in the acceptable region of Figure 3.1.7-2

VALID DISTRACTOR: Applicant determine this from Figure 3.1.7-2

References

Comments and Question Modification History

!! THIS QUESTION APPEARED ON THE AUGUST 2002 SUSQUEHANNA EXAM !!

Gil 09/26/05 - Not sure it is plausible for an operator to NOT acknowledge any annunciator. How about "acknowledge but do not reset" for "A".

R: accepted. Changed distractors "A" and "B"

?? Does SSES have the RESET function ??

*** REJECTED K/A CAUSE LOD UNREACHABLE ***

Reselected 2.1.33 and found this in an SSES old exam.

NRC K/A System/E/A

System 2110
00

Number

RO

SRO

CFR Link

NRC K/A Generic

System 2.1 Conduct of Operations

Number 2.1.2 **RO** 3.0 **SRO** 4.0 **CFR Link** (CFR: 41.10 / 45.13)

Knowledge of operator responsibilities during all modes of plant operation.

SSES Unit 2 scrams from full power. All systems, structures and components operated as expected EXCEPT the Scram Pilot Solenoid Valves for all twenty (20) Group 2 Hydraulic Control Units (HCU) on Reactor Side 2 failed to vent their associated HCUs.

Which ONE of the following is TRUE concerning the 20 associated control rods?

- A** All 20 Control Rods will insert in less than 10 seconds.
- B** All 20 Control Rods will NOT insert but can be inserted by venting the Scram Air Header.
- C** All 20 Control Rods will insert in greater than 10 seconds.
- D** All 20 Control Rods will NOT insert but can be inserted using Reactor Manual Control (RMC).

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: The rods will INSERT at a slower rate as ARI and Backup Scram valves act to depressurize the air header

VALID DISTRACTOR: The rod still inserts

CHOICE (B) - No

WRONG: The rods will insert without Operator action

VALID DISTRACTOR: valid method directed by EO-100-113, Control Rod Insertion

CHOICE (C) - YES

CHOICE (D) - No

WRONG: The rods will insert without Operator action

VALID DISTRACTOR: using RMC may be plausible once the Scram and ARI are reset.

References

Comments and Question Modification History

Gil 09/26/05 - Once a rod is scrammed (from any means) it will insert at the same rate (about 4 seconds).

Recommends:

A - All control rods will automatically insert in < 10 seconds.

C - All control rods will automatically insert in > 10 seconds.

R: no known basis for the 10 second threshold. Will request SSES input. Not sure I accept the proposition that all rods will insert at the same rate. Seems reasonable to believe that the rods for which the Scram Pilot Solenoid Valves did NOT open would move a bit slower because their air is vented through a smaller area.

09/27/05: Now understand the issue. All rods insert at the same rate once the scram valves open. However, for the affected 20 HCUs, the scram valves take longer to open. Must have SSES verify/evaluate the 10 second threshold.

Todd 09/30/05 - replaced "Both units are at full power when one unit scrams for unknown reasons." with "SSES Unit 2 scrams from full power."

NRC K/A System/E/A

System 2120 Reactor Protection System
00

Number K4.09 **RO** 3.8 **SRO** 3.9 **CFR Link** (CFR 41.7)

Knowledge of REACTOR PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the Control rod insertion following RPS system electrical failure

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

A reactor STARTUP is in progress. All Intermediate Range Neutron Monitors (IRM) are on Range 4. Which ONE of the following IRM readings will cause a HALF SCRAM?

Note: INOP = Inoperable and NOT bypassed.

	A	B	C	D	E	F	G	H
A	INOP	109	108	106	110	INOP	107	107
B	124	124	108	106	110	103	107	108
C	110	107	INOP	123	112	118	109	111
D	INOP	105	108	110	124	112	116	109

Answers:

A

B

C

D

References Provided to Applicant:

Justification

IRMs are assigned to RPS as follows:

RPS "A": IRM channels "A", "C", "E", "G"

RPS "A": IRM channels "B", "D", "F", "H"

To yield a half scram, one or more APRMs in a SINGLE and only a SINGLE RPS channel must either trip on high flux (>122 / 125 scale) or INOP

CHOICE (A) - No

WRONG: INOP IRM channels "A" and "F" yield a FULL scram.

VALID DISTRACTOR: Two inoperable channels.

CHOICE (B) - No

WRONG: IRM channels "A" and "B" yield a FULL scram.

VALID DISTRACTOR: Two channels > high flux setpoint

CHOICE (C) - No

WRONG: IRM channels "D" and "E" yield a FULL scram

VALID DISTRACTOR: Two channels above high flux setpoint.

CHOICE (D) - YES

IRM channel "A" trips RPS "A"

IRM channel "E" trips RPS "A"

References

Comments and Question Modification History

1. Gil 09/26/05 - explanation talks about APRMs rather than IRMs.

R: corrected explanation to IRMs.

NRC K/A System/E/A

System 2120 Reactor Protection System
00

Number A3.01 RO 4.4 SRO 4.4 CFR Link (CFR 41.7 / 45.7)

Ability to monitor automatic operations of the REACTOR PROTECTION SYSTEM including Reactor Power

NRC K/A Generic

System

Number RO SRO CFR Link

SSES Unit 1 shutdown in Mode 5 for a scheduled refueling outage. The Division I 24 VDC distribution system is in the following configuration:

- Battery 1D670 is DISCONNECTED from the 1D672 24-VDC Bus to support emergent corrective maintenance.
- BOTH Battery Chargers 1D673 and 1D674 are powered from the 1Y216 Instrument AC Distribution Panel to support planned maintenance on 1Y236.

For unknown reasons, the 1B216 ESS 480-VAC MCC is DEENERGIZED.

Which ONE of the following correctly describes the status of Intermediate Range Monitors (IRM)?

- A** IRMs "A", "C", "E", and "G" are deenergized and failed DOWNSCALE
IRMs "B", "D", "F", and "H" are energized and OPERABLE
IRMs "A", "C", "E", and "G" CAN be inserted or withdrawn
IRMs "B", "D", "F", and "H" CAN be inserted or withdrawn
- B** IRMs "A", "C", "E", and "G" are deenergized and failed DOWNSCALE
IRMs "B", "D", "F", and "H" are energized and OPERABLE
IRMs "A", "C", "E", and "G" CAN be inserted or withdrawn
IRMs "B", "D", "F", and "H" can NOT be inserted or withdrawn
- C** IRMs "A", "C", "E", and "G" are deenergized and failed UPSCALE
IRMs "B", "D", "F", and "H" are energized and OPERABLE
IRMs "A", "C", "E", and "G" can NOT be inserted or withdrawn
IRMs "B", "D", "F", and "H" CAN be inserted or withdrawn
- D** IRMs "A", "C", "E", and "G" are deenergized and failed DOWNSCALE
IRMs "B", "D", "F", and "H" are energized and OPERABLE
IRMs "A", "C", "E", and "G" can NOT be inserted or withdrawn
IRMs "B", "D", "F", and "H" can NOT be inserted or withdrawn

Answers:

A

B

C

D

References Provided to Applicant:

Justification

IRMs "A", "C", "E", and "G" are powered from 1D672. The stem establishes that the associated battery is not available to provide backup power to 1D672 and that both battery chargers are abnormally configured to be powered from the same buss (1Y216). 1Y216 is powered from 1B216 which, according to the stem, is lost. Therefore, 24-VDC to 1D672 is also lost.

The IRM Detector Drive motors for all 8 IRMs are powered from 1Y218. Although the normal power to 1Y218 is lost, the Non-class 1E Uninterruptible Power Supply (UPS) 1D240 keeps 1Y218 powered from a 250-VDC battery and ES Buss 1B236. Therefore all 8 detectors can be moved.

CHOICE (B) - No

WRONG: IRM Detectors "B", "D", "F", and "H" can be moved. IRMs "A", "C", "E", and "G" are deenergized and fail downscale

VALID DISTRACTOR: Applicant may erroneously associate drive motors with associated detectors. Applicant may believe detectors fail upscale.

CHOICE (C) - No

WRONG: All IRMs are movable.

VALID DISTRACTOR: Applicant may understand that 1Y218 is affected by the loss of 1B216 but forget that 1Y218 is protected by an UPS.

CHOICE (D) - No

WRONG: IRMs fail down, not up

VALID DISTRACTOR: everything else is correct.

References

Comments and Question Modification History

Gil 09/26/05 - Please confirm that there is at least one indicator in the plant (not necessarily IRMs) that will fail upscale on loss of power; otherwise C and D are not plausible. I can't think of any at the plants I worked.

R: will ask. Easy fix by also varying the status of Div II IRMs or Div I IRMs.

Changed Distractor "D" to fail DOWNSCALE and IRMs B, D, F, H can NOT be withdrawn. Request sent to SSES to determine if any meters fail high. If so, may return to UPSCALE.

09/28/05 Phone conversation with SSES: they agree it is implausible for an IRM to fail UPSCALE and indicated that this could happen on plants with DC powered IRMs. They did not consider an UPSCALE failure credible. Therefore, changes indicated above should alleviate this concern because now only one distractor contains the UPSCALE failure. Adjusted the ability to withdraw IRMs to make distractor "C" more enticing.

Todd 09/30/05 - changed "fail" to "failed" in all four choices.

NRC K/A System/E/A

System 2150 Intermediate Range Monitor (IRM) System
03

Number K2.01 **RO** 2.5 **SRO** 2.7 **CFR Link** (CFR 41.7)

Knowledge of electrical power supplies to the IRM channels/detectors

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

SSES Unit 2 is in Mode 2, conducting a normal reactor startup per GO-200-102, PLANT STARTUP, HEATUP AND POWER OPERATION. The following conditions exist:

- the reactor is CRITICAL.
- RPV Pressure is 0 psig.
- All Intermediate Range Monitors (IRM) are on Range 3
- Source Range Monitor (SRM) detectors are being withdrawn intermittently, TWO AT A TIME.
- SRM level is being maintained between 5E3 (5,000) and 5E4 (50,000) counts per second (CPS).
- SRM Channel "A" reads 6.1E3 (6,100) CPS and slowly rising.
- SRM Channel "B" reads 7.2E4 (72,000) CPS and slowly rising.
- SRM Channel "C" reads 6.0E3 (6,000) CPS and slowly rising.
- SRM Channel "D" reads 6.1E3 (6,100) CPS and slowly rising.

Which ONE of the following correctly describes:

- (1) a cause of these conditions and
- (2) actions, if any, necessary to permit the Reactor Startup?

- A** (1) SRM Detector "B" is stuck & located LOWER in the core than SRM Detectors "A", "C", & "D".
(2) None. The SRM Upscale Block is AUTOMATICALLY bypassed when all IRMs are on Range 3 or above.
- B** (1) SRM Detector "B" is stuck & located LOWER in the core than SRM Detectors "A", "C", & "D".
(2) MANUALLY bypass SRM "B" to prevent a Rod Withdrawal BLOCK at 2E5 (20,000) CPS.
- C** (1) SRM Detector "B" is stuck & located HIGHER in the core than SRM Detectors "A", "C", & "D".
(2) MANUALLY bypass SRM "B" to prevent a Rod Withdrawal BLOCK at 2E5 (20,000) CPS.
- D** (1) SRM Detector "B" is stuck & located HIGHER in the core than SRM Detectors "A", "C", & "D".
(2) None. The SRM Upscale Block is AUTOMATICALLY bypassed when all IRMs are on Range 3 or above.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: The detector is stuck HIGHER in the core and AUTO bypass occurs on Range 8 or higher.

VALID DISTRACTOR: Mirror imaging.

CHOICE (B) - No

WRONG: The detector is stuck HIGHER.

VALID DISTRACTOR: Manual bypass is required.

CHOICE (C) - YES

Detector is stuck HIGHER.

MANUAL bypass is required to continue.

CHOICE (D) - No

WRONG: Auto bypass occurs on Range 8 or higher.

VALID DISTRACTOR: SRM is stuck HIGHER.

References

Comments and Question Modification History

Gil 09/26/05 - OK

Todd 09/30/05 - grammatical corrections to stem.

System 2150 Source Range Monitor (SRM) System
04

Number K5.03 **RO** 2.8 **SRO** 2.8 **CFR Link** (CFR 41.5 / 45.3)

Knowledge of the operational implications of the following concepts as it applies to SOURCE RANGE MONITOR (SRM) SYSTEM : Changing detector position

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

SSES Unit 1 is at full power. You observe the following neutron monitoring system status:

- APRM "E" is BYPASSED
- APRM "F" is BYPASSED

- IRM "A" is BYPASSED
- IRM "H" is BYPASSED

Which ONE of the following correctly describes the Reactor Protection System (RPS) status?

- A** All scram functions of RPS "A" (Division I) are AVAILABLE
All scram functions of RPS "B" (Division II) are AVAILABLE
- B** All scram functions of RPS "A" (Division I) are NOT Available
All scram functions of RPS "B" (Division II) are AVAILABLE
- C** All scram functions of RPS "A" (Division I) are AVAILABLE
All scram functions of RPS "B" (Division II) are NOT Available
- D** All scram functions of RPS "A" (Division I) are NOT Available
All scram functions of RPS "B" (Division II) are NOT Available

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: Div I is not operable.

VALID DISTRACTOR: Div II is operable.

CHOICE (B) - YES

- T.S. 3.3.1.1 requires the RPS instrumentation for each Function in Table 3.3.1.1-1 to be OPERABLE.

- Table 3.3.1.1-1, Line 2.d, requires that the APRM INOP function be operable in Modes 1 & 2 with a minimum of 2 channels per trip system.

- The INOP function requires a RPS deenergization if the APRM is DNSCL while the IRM is UPSCL.

- According to SSES Training Materials and Plant Dwgs M1-C72-22 (Sheets 6, 7, 8, 9), the APRM-to-IRM association is:

- Division I: A-A, C-C, E-E, E-G and this Div is INOPERABLE because only one APRM INOP function is functional (A-A, E-E, E-G are bypassed)

- Division II: B-B, D-D, F-F, F-H and this Div is OPERABLE because two APRM INOP functions are functional (F-F, F-H are bypassed)

CHOICE (C) - No

WRONG: Div I and Div II are reversed.

VALID DISTRACTOR: Applicant may mistake two bypassed channels for taking two out of three functions away.

CHOICE (D) - No

WRONG: Div II is OPERABLE.

VALID DISTRACTOR: Mirror Image

References

Comments and Question Modification History

Gil 09/26/05 - OK but we should revalidate this one.

Todd 09/30/05 - designated a unit in the stem and deleted window dressing concerning shift turnover.

Rich 10/03/05 - replaced OPERABLE with AVAILABLE to get away from SRO level.

NRC K/A System/E/A

System 2150 Average Power Range Monitor/Local Power Range Moni
05

Number A1.02 **RO** 3.9 **SRO** 4.0 **CFR Link** (CFR 41.5 / 45.5)

Ability to predict and/or monitor changes in parameters associated with operating the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM controls including RPS status

NRC K/A Generic

**System
Number**

RO

SRO

CFR Link

How is the integrity of Primary Containment protected if one of the RCIC Turbine Steam Supply Instrument Sensing Lines break?

- A** The Instrument Sensing Lines are Normally Open and are AUTOMATICALLY isolated in response to a line break.
- B** The Instrument Sensing Lines are equipped with a Flow Orifice, a MANUALLY Operated Primary Containment Isolation Valve (PCIV) and an Excess Flow Check Valve.
- C** The Instrument Sensing Lines are equipped with a Flow Orifice, an AUTOMATICALLY Operated Primary Containment Isolation Valve (PCIV) and an Excess Flow Check Valve.
- D** The Instrument Sensing Lines are Normally Isolated and are AUTOMATICALLY placed in service when RCIC actuates.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No
WRONG: they do penetrate CTMT
VALID DISTRACTOR: Applicant may believe that the sensors are EQ.

CHOICE (B) - YES

CHOICE (A) - No
WRONG: The PCIV is Manual.
VALID DISTRACTOR: everything else is correct.

CHOICE (A) - No
WRONG:
VALID DISTRACTOR:

References

Comments and Question Modification History

***** N O T E: SSES rejected this K/A in 2002 because it was too difficult to write a LOD>1 question. *****

Gil 09/26/05 - . . . penetrate the RCIC Turbine these RCIC INSTRUMENT
R: issue is unclear.
Clarified by phone - revisions made by inserting "RCIC"

Todd 09/30/05 - deleted long winded explanation of the line from stem and replaced "A" with distractor better balanced with "D" and more enticing.

NRC K/A System/E/A

System 2170 Reactor Core Isolation Cooling System (RCIC)
00

Number K1.02 **RO** 3.5 **SRO** 3.5 **CFR Link** (CFR 41.2 to 41.9 / 45.7 to 45.8)

Knowledge of the physical connections and/or cause-effect relationships between REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) and the Nuclear boiler system

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

With SSES Unit 2 at full power, a Safety Relieve Valve (SRV) inadvertently opened and is now indicating CLOSED. What is the expected tailpipe temperature 45 minutes later if the SRV is leaking?

Assume Suppression Pool Pressure is 14.7 psig.

Select the closest answer.

- A** 551 degrees Farenheit.
- B** 545 degrees Farenheit.
- C** 296 degrees Farenheit.
- D** 252 degrees Farenheit.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No
WRONG: this is T_{sat} for normal RPV pressure of 1040 psig.
VALID DISTRACTOR: TMI lesson learned.

CHOICE (B) - No
WRONG: this is T_{sat} for normal MS Header pressure of 985 psig.
VALID DISTRACTOR: TMI lesson learned.

CHOICE (C): YES
At 1040 psig (1055 psia), the steam vapor enthalpy is 1190.8 BTU/lbm. Throttling is an isenthalpic process. From the Mollier diagram, we see that the expected tailpipe temprature is in the vicinity of 280 deg F. From the tables, we can interpolate to 296 deg F.

CHOICE (D) - No
WRONG: this is 2 deg F above the alarm setpoint.
VALID DISTRACTOR: the alarm setpoint is 250 deg F

References

Comments and Question Modification History

Gil 09/26/05 - K/A mismatch.

R: will reconsider. Agree that this does not DIRECTLY test automatic ADS valve operation. But Applicant should understand whether tailpipe temperatures are trending to ambient or not following an open SRV.

Todd 09/30/05 - verify with SSES that 45 minutes eliminates "D" as potentially correct.

NRC K/A System/E/A

System 2180 Automatic Depressurization System
00

Number A3.01 **RO** 4.2 **SRO** 4.3 **CFR Link** (CFR 41.7 / 45.7)

Ability to monitor automatic operations of the AUTOMATIC DEPRESSURIZATION SYSTEM including: ADS valve operation

NRC K/A Generic

System

Number

RO

SRO

CFR Link

A loss of 250-VDC Load Center 1D662 would affect the __ (1) __ system PUMP by preventing the __ (2) __ Primary Containment Isolation Valves (PCIV) from closing.

- A** (1) High Pressure Coolant Injection (HPCI)
(2) Outboard
- B** (1) Reactor Core Isolation Cooling (RCIC)
(2) Outboard
- C** (1) High Pressure Coolant Injection (HPCI)
(2) Inboard
- D** (1) Reactor Core Isolation Cooling (RCIC)
(2) Inboard

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

From TM-OP-088, the 1D264 and 1D274 busses are powered from 1D662. 1D662 is powered from the 1D663 Battery Charger or the 1D660 Battery. The stem specifies a loss of 1D662. Therefore, the cause of this loss is irrelevant. However, the successful Applicant must recognize that loss of 1D662 will also cause a loss of 1D274 and 1D264. Alternatively, the successful Applicant may know that RCIC DC-powered MOVs are powered from Div I and HPCI DC-powered MOVs are powered from Div II of the 250-VDC system.

CHOICE (A) - YES

1D264 and 1D274 provide power to the HPCI outboard PCIVs.

CHOICE (B) - No

WRONG: It's HPCI, not RCIC

VALID DISTRACTOR: correct valves.

CHOICE (C) - No

WRONG: Wrong Valves

VALID DISTRACTOR: Correct system

CHOICE (D) - No

WRONG: Wrong valves and system.

VALID DISTRACTOR: Mirror image.

References**Comments and Question Modification History**

1. Gil 09/26/05 - can't see connection between 1D662 and Outboard MOV.

R: INBD Vvs AC pwr'd to prevent sparking inside PC that could ignite H2 if present. OTBD Vvs are DC powered for reliability & diversity. Added text to justification section explaining 250-VDC distribution. Also added word "PUMP" to stem to preclude "B" from being a potentially correct second answer. HV-149F084, RCIC TURB EXH VAC BKR OB VLV, is powered from 1D264 and is an Outboard PCIV.

2. Todd 09/30/05 - OK.

NRC K/A System/E/A

System 2230 Primary Containment Isolation System/Nuclear Steam
02

Number K6.02**RO** 3.0**SRO** 3.2**CFR Link** (CFR 41.7 / 45.7)

Knowledge of the effect that a loss or malfunction of D.C. electrical distribution will have on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF

NRC K/A Generic**System****Number****RO****SRO****CFR Link**

SSES lost all offsite power (LOOP). During the transient, a Main Steam (MS) line on SSES Unit 2 broke and caused Main Steam Isolation Valves (MSIV) to CLOSE. Subsequently, the control room is EVACUATED and you go to the SSES Unit 2 Remote Shutdown Panel (1C201). The following conditions now exist:

- BOTH the Upper and Lower Relay rooms are inaccessible.
- Drywell Pressure is 1.9 psig.
- Reactor Pressure Vessel (RPV) Pressure is cycling between 1,180 psig and 1,150 psig.
- Safety Relief Valve (SRV) control has been transferred to the Remote Shutdown Panel.

What functional mode, if any, are the Safety Relief Valves (SRV) operating in?

- A** Overpressure SAFETY operation
- B** Overpressure RELIEF operation
- C** Low pressure ECCS (ADS)
- D** None, RCIC is controlling RPV Pressure.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

Complete rewrite of original question. Old question saved as Order 431.

CHOICE (A) - YES

There are 16 SRVs. In the SAFETY mode, two SRVs open at 1175, six SRVs open at 1195 and eight SRVs open at 1205 psig. In the SAFETY mode, the SRVs close at 97% of set pressure. 97% of 1175 is 1140. 97% of 1195 is 1160. Therefore, 1180 to 1150 is a reasonable expectation for RPV pressure in this condition.

CHOICE (B) - No

WRONG: RELIEF mode is incorrect - pressures too high
VALID DISTRACTOR: This is one mode of SRV operation

CHOICE (C) - No

WRONG: Pressure is not steadily lowering.
VALID DISTRACTOR: This is one mode of SRV operation.

CHOICE (D) - No

WRONG: RCIC would not cause pressure to cycle.
VALID DISTRACTOR: RCIC is one method of controlling RPV pressure if MSIVs close.

References

Comments and Question Modification History

NOTE: per ON-100-009, ADS valves can be operated from the Relay Rooms.

Revised correct answer to "A" after telephone discussion with SSES. Accumulators will provide some operation of SRVs A, B, C from the RSD in this condition. Operation in SAFETY mode will not deplete the accumulator.

????? QUESTION: would the accumulators have depeleted in RELIEF mode by now? ????????

1. Gil 09/26/05 - believes SRVs always operate in Overpressure Relief mode before safety relief mode. This will deplete the air supply. Question may have NO correct answer if this is true.

R: The stem conditions state that pressure is cycling between 1180 and 1150. At these higher values, the SRVs have to be in the Safety mode because RPV pressures would be lower in the Relief mode. Applicant should be sufficiently familiar with the setpoints to recognize this.

May need to delete second half of question regarding which SRVs have controls at the RSD to make the entire question plausible. Distractors c/b RELIEF, ADS, RCIC/HPCI.

Agree to toss second half out and make corrections to remaining distractors. Essentially rewrote the question. Saved old one as 431.

NOTE: from ON-100-009, learned that Automatic RELIEF mode operation is NOT possible when control transferred to RSD panel. May be able to use this if further revision required.

NRC K/A System/E/A

System 2390 Relief/Safety Valves
02

Number K5.02 **RO** 3.7 **SRO** 3.8 **CFR Link** (CFR 41.5 / 45.3)

Knowledge of the operational implications of the Safety function of SRV operation as it applies to RELIEF/SAFETY VALVES

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

Reactor power is 27% and rising pursuant to a normal reactor startup. Which ONE of the following would cause a ROD BLOCK?

- A** Intermediate Range Monitor Detector is FULLY INSERTED.
- B** Main Turbine FIRST-STAGE Pressure instrument fails HIGH.
- C** WIDE RANGE RPV Water Level REFERENCE leg ruptures.
- D** One Main Steam Flow instrument fails DOWNSCALE.

Answers:

A **B** **C** **D** References Provided to Applicant: **Justification**

CHOICE (A) - No

WRONG: At 50% power, the MODE switch is in RUN - that bypasses the IRM UPSCALE Scram and Block.
 VALID DISTRACTOR: Fully inserted would yield a Block if not bypassed because the IRM would read >108%

CHOICE (B) - No

WRONG: This would not cause a rod block

VALID DISTRACTOR: First Stage pressure is an input to RSCS which would cause a rod block if it failed low.

CHOICE (C) - No

WRONG: RPV Water Level has no Rod Block function and this failure would cause a HIGH condition.

VALID DISTRACTOR: The Narrow Range instrument is an input to FWLCS but is not sent onto to RWM from there.
 Moreover, the Ref leg rupture would cause a HIGH level indication that would NOT actuate any other protective features that could cause an RPS Scram which would block rods.

CHOICE (D) - YES

References**Comments and Question Modification History**

Gil 09/26/05 - K/A mismatch.

R: Disagree. MS flow does affect RWM. FWLCS uses Steam Flow as an input. FWLCS also sends TOTAL Steam Flow to the RWM to determine if the plant is above/below LPSP or LPAP. At 50%, each steam line is inputting 12.5%. If one goes to zero, the TOTAL steam flow goes to 37.5%. This is the ONLY relationship between the Reactor Water Level Control System and the Rod Worth Minimizer.

The following is copied from TM-OP-031D

Main Steam Line (MSL) flow is measured by the Feed Water Level Control (FWLC) System to determine when the plant is operating at 22 percent of Rated Thermal Power (RTP). This monitored parameter is inputted to the RDSCS and PICSY to activate the LPSP. The setpoint can be adjusted by varying the trip value in the MSL flow sensor.

Noted computational and typographical errors:

Changed 50% power to 27% to ensure loss of one MS flow instrument puts total steam flow below LPSP of 22%.

Corrected reference to TM-OP-031D from TM-OP-078K.

Gil is now OK.

NRC K/A System/E/A

System 2590 Reactor Water Level Control System
02

Number K3.03 **RO** 2.7 **SRO** 2.9 **CFR Link** (CFR 41.7 / 45.4)

Knowledge of the effect that a loss or malfunction of the REACTOR WATER LEVEL CONTROL SYSTEM will have on Rod worth minimizer (Plant-Specific)

NRC K/A Generic**System****Number****RO****SRO****CFR Link**

Following a Reactor Feed Pump Turbine (RFPT) trip, in addition to the automatic interlocks, what Operator actions must be MANUALLY satisfied before resetting the RFPT trip?

- A** RFP Suction (HV-10616) NOT Full Closed
RFP Disch (HV-10603) CLOSED
RFP Min Flow (FV-10604) in AUTO
Min Flow (FIC-10604) set for 2,000 gpm
- B** RFPT Stop Valves (SV) are RESET
Trip Conditions CLEARED or BYPASSED
RFPT Exhaust (HV-12731) 100% OPEN
RFP Disch (HV-10603) NOT 100% CLOSED
- C** RFPT Exhaust (HV-12731) 100% OPEN
RFPT Control Valves 100% CLOSED
RFPT LP Isol (HV-12709) 100% CLOSED
RFPT HP Isol (HV12710) 100% CLOSED
- D** RFP Min Flow (FV-10604) in MAN
Min Flow (FIC-10604) set for 2,000 gpm
RFP Disch (HV-10603) CLOSED
EAP Control (SIC-C32-1R601) at 0

Answers:

 A B C DReferences Provided to Applicant: **Justification**

CHOICE (A) - No

WRONG: Mix of Automatic and Manual requirements on the pump side. AUTO is incorrect.
VALID DISTRACTOR: Mix of AUTO and MAN requirements.

CHOICE (B) - No

WRONG: SVs s/b NOT RESET. Trip conditions is AUTO. Disch Vv s/b full closed
VALID DISTRACTOR: Mix of AUTO and Manua.

CHOICE (C) - No

WRONG: These are all automatic interlocks in their correct state - turbine side.
VALID DISTRACTOR: they are interlocks that would prevent RFPT Reset.

CHOICE (D) - YES

References**Comments and Question Modification History**

Modified from SSES Exam Bank essay question.

09/19/2005: Per SSES staff, MSC must be on LSS per simulator attempt to reset RFPT Trip during previous weekend.
Changed answer "D" to reflect MSC on LSS as an Automatic Interlock.

Gil 09/26/05 - Change justification for "D" (correct answer).

R: corrected justification.

Todd 09/30/05 - too busy. reduced to four Manual actions. original saved as 451.

NRC K/A System/E/A

System 2590 Reactor Water Level Control System
02

Number A4.09 **RO** 3.4 **SRO** 3.1 **CFR Link** (CFR 41.7 / 45.5 to 45.8)

Ability to manually operate and/or monitor TDRFP lockout reset: TDRFP in the control room

NRC K/A Generic**System****Number****RO****SRO****CFR Link**

The following conditions exist on SSES Unit1:

- Recently entered Mode 4 in preparation for a planned refueling outage.
- Primary Containment is PURGING.

SSES Unit 2 has a Loss of Coolant Accident (LOCA) and DRYWELL PRESSURE quickly rises above 1.72 psig.

Which ONE of the following describes the correct ventilation system response?

- A** All three Reactor Building Zones (1, 2 and 3) Isolate and automatically reconfigure to RECIRCULATION.

Standby Gas Treatment (SGTS) automatically takes suction on the Reactor Building Exhaust ventilation stack.

SSES Unit 1 PURGE automatically ISOLATES.

—

- B** Reactor Building Zones 2 and 3 Isolate and automatically reconfigure to RECIRCULATION.

Standby Gas Treatment (SGTS) automatically takes suction on the Reactor Building Exhaust ventilation stack.

SSES Unit 1 PURGE automatically ISOLATES.

—

- C** Reactor Building Zones 2 and 3 Isolate and automatically reconfigure to RECIRCULATION.

Standby Gas Treatment (SGTS) automatically takes suction on the Reactor Building Recirculation plenum.

SSES Unit 1 PURGE Continues.

—

- D** All three Reactor Building Zones (1, 2 and 3) Isolate and automatically reconfigure to RECIRCULATION.

Standby Gas Treatment (SGTS) automatically takes suction on the Reactor Building Recirculation plenum.

SSES Unit 1 PURGE Continues.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: Only Zones 2 and 3 Isolate. SGTS does not take suction on the Exhaust Vent

VALID DISTRACTOR:

CHOICE (B) - No

WRONG: SGTS does NOT take suction on the Exhaust Vent

VALID DISTRACTOR: reasonable misconception to believe SGTS would draw suction on the normal exhaust path.

CHOICE (C) - YES

Zones 2 (Unit 2) and 3 (Common) Isolate and reconfigure to Recirc

SGTS automatically takes suction on RB Recirc plenum

Unaffected unit does not isolate. Therefore, purge continues.

CHOICE (D) - No

WRONG: Only Zones 2 and 3 isolate

VALID DISTRACTOR: Purge continues and SGTS suction is correct.

References

Comments and Question Modification History

Confirm with SSES that unaffected unit's purge will continue.

Gil 09/26/05 - OK

Todd 09/30/05 - OK

NRC K/A System/E/A

System 2610 Standby Gas Treatment System
00

Number K1.01 **RO** 3.4 **SRO** 3.6 **CFR Link** (CFR 41.2 to 41.9 / 45.7 to 45.8)

Knowledge of the physical connections and/or cause-effect relationships between STANDBY GAS TREATMENT SYSTEM and the following: Reactor building ventilation system

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

SSES has a Loss of Offsite Power (LOOP). Emergency Diesel Generator (EDG) "A" fails to start. Within 10 minutes, Operators start EDG "E" and energize 1A201 and 2A201.

Both VITAL AC UPS (1D666 & 2D666) are energized from their __ (1) __ source.

All four NON-CLASS 1E INSTRUMENT AC UPS (1D240, 1D130, 2D240, 2D130) are energized from their __ (2) __ source.

Note: UPS = UNINTERRUPTIBLE POWER SUPPLIES

- A** 250-VDC ALTERNATE source (1D662, 2D142).
250-VDC ALTERNATE source (1D652, 1D662, 2D652, 2D662)
- B** 250-VDC PREFERRED source (1D662, 2D142).
480-VAC PREFERRED source (1B236, 1B246, 2B236, 2B246)
- C** 480-VAC PREFERRED source (1B246, 2B246).
480-VAC BACKUP source (1B216, 1B226, 2B216, 2B226)
- D** 480-VAC ALTERNATE source (1B246, 2B246).
250-VDC ALTERNATE source (1D243, 1D133, 2D243, 2D133).

Answers: A B C D References Provided to Applicant:

Justification

CHOICE (A) - No
WRONG: Vital: Pfd v. Alt. Inst: wrong source of 250-VDC & would not be on 250-VDC

CHOICE (B) - YES

CHOICE (C) - No
WRONG: Vital: 480-VAC is not Pfd. Inst: would not swing to B/U cause EDG "E" brought on in under 20 minutes.

CHOICE (D) - No
WRONG: Vital: no reason to shift to 480-VAC alt Inst: would have shifted back to Pfd 480-VAC source

HOD because Applicant must distinguish LOOP from Blackout. Here, following a LOOP, the EDGs respond to power the ES busses.

References

Comments and Question Modification History

Gil 09/26/05 - "A" and "C" not plausible with "all ...components operate as designed". That is, everyone should know 1E equipment will be energized. Use a different term (RPS MG Set or Instrument AC Distribution Panel 1Y216, etc) rather than "CLASS 1E".

Answer B does not appear correct. The way I read the references the preferred will be lost for about 10 seconds and the UPS will run on DC. Then when the EDG energizes the bus the UPS will automatically shift back to preferred.

R: will revisit this question.

Added "one minute after" to expressly show question is asking for conditions after the transient.

Suggestion: don't say "Class 1E" and just identify the buss itself.

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* COMPLETE REWRITE 27 SEPTEMBER 2005 *
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*****

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Todd 09/30/05 - same question with substantial revisions. Saved old one as 481.

NRC K/A System/E/A

System 2620 Uninterruptable Power Supply (A.C./D.C.)
02

Number K6.01 **RO** 2.7 **SRO** 2.9 **CFR Link** (CFR 41.7 / 45.7)

Knowledge of the effect that a loss or malfunction of A.C. electrical power will have on the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.)

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

250 VDC Battery Charger 2D663 has the following front panel indications:

- Battery Charger Float-Equalize switch is in FLOAT.
- Battery Charger Interval Timer set to FIVE HOURS.

Which ONE of the following is correct concerning charger operation?

- A** Output voltage will be between 279 and 287 VDC for five hours, then lower to between 265 and 271 VDC thereafter.
- B** Output voltage will be between 265 and 271 VDC for five hours, then lower to between 279 and 287 VDC thereafter.
- C** Output voltage will be between 279 and 287 VDC for five hours and will remain between 279 and 287 VDC thereafter.
- D** Output voltage will be between 265 and 271 VDC for five hours and will remain between 265 and 287 VDC thereafter.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - YES

Per TM-OP-088 and OP-1(2)88-001, this provides Equalizing Charge for five hours, then automatically reconfigures to the FLOAT mode.

CHOICE (B) - No

WRONG: Reverse of correct answer

VALID DISTRACTOR: First FLOAT, then EQUALIZE

CHOICE (C) - No

WRONG: Stay on EQUALIZE

VALID DISTRACTOR: Correct if Float-Equalize switch in EQUALIZE

CHOICE (D) - No

WRONG: Stay on Float

VALID DISTRACTOR: Applicant my believe that the Float-Equalize switch must be in EQUALIZE to conduct charge.

References

Comments and Question Modification History

Gil 09/26/05 - add to stem: ...switch has just been placed in FLOAT. This ensures the full five hours at 279-287 will occur; making "A" correct

R: added "up to" in each answer choice. Pfd concept of Operator on tour discovering these conditions.

deleted "up to" and added "is" to the stem.

Todd 09/30/05 - OK

NRC K/A System/E/A

System 2630 D.C. Electrical Distribution
00

Number K1.02

RO 3.2

SRO 3.3

CFR Link (CFR 41.2 to 41.9 / 45.7 to 45.8)

Knowledge of the physical connections and/or cause-effect relationships between D.C. ELECTRICAL DISTRIBUTION and Battery charger and battery

NRC K/A Generic

System

Number

RO

SRO

CFR Link

Why and how does the Operator reduce and stabilize Diesel Generator load at 300 - 500 KW before opening the EDG-to-Bus breaker?

- A** To prevent an ENGINE Trip on Reverse Power, by adjusting the Diesel Generator Voltage Adjust (HS-00053).
- B** To prevent a STARTUP TRANSFORMER TAP Change which can cause a Diesel Generator Trip, by adjusting the Diesel Generator Voltage Adjust (HS-00053).
- C** To prevent an ENGINE Trip on Reverse Power, by adjusting the Diesel Generator Speed Governor (HS-00054).
- D** To prevent a STARTUP TRANSFORMER TAP Change which can cause a Diesel Generator Trip, by adjusting the Diesel Generator Speed Governor (HS-00054).

Answers:

 A B C DReferences Provided to Applicant: **Justification**

CHOICE (A) - No

WRONG: adjusting voltage changes reactive load (KVAR not KW).

VALID DISTRACTOR: Correct Engine trip

CHOICE (B) - No

WRONG: adjusting voltage changes reactive load (KVAR not KW).

VALID DISTRACTOR: S/U XFMR TAP Changer adjustments can cause EDG trips but this is not why REAL load is reduced. Reactive load is minimized (kept close to zero) to prevent TAP changes.

CHOICE (C) - YES

CHOICE (D) - No

WRONG: S/U XFMR TAP Changer adjustments can cause EDG trips but this is not why REAL load is reduced.

Reactive load is minimized (kept close to zero) to prevent TAP changes.

VALID DISTRACTOR: Correct DG control scheme.

References**Comments and Question Modification History**

Gil 09/26/05 - OK

Todd 09/30/05 - revised from (1) (2) format to simple sentence structure.

NRC K/A System/E/A**System** 2640 Emergency Generators (Diesel/Jet)
00**Number** A1.09**RO** 3.0**SRO** 3.1**CFR Link** (CFR 41.5 / 45.5)

Ability to predict and/or monitor changes in parameters associated with operating the EMERGENCY GENERATORS (DIESEL/JET) controls including Maintaining minimum load on emergency generator (to prevent reverse power)

NRC K/A Generic**System****Number****RO****SRO****CFR Link**

From 100% power and 100% flow, what individual jet pump flow indications would you see on flow transmitters FT-B21-1N034A through W (at Panel 1C619902-38 in the Upper Relay Room) if the "B" reactor recirculation pump (RRP) inadvertently trips?

- A Flow indications for the "A" loop jet pumps will initially increase, then return to their original values. Flow indication for the "B" jet pumps will decrease to zero as the pump coasts down, then increase to a positive value as flow reverses in the "B" loop jet pumps.
- B Flow indications for the "A" loop jet pumps decrease, then increase to their original values as flow through the "B" loop jet pumps slows, then reverses. Flow indication for the "B" jet pumps will immediately read zero.
- C Flow indications for the "A" loop jet pumps will increase during the transient. Flow indication for the "B" loop jet pumps will decrease to zero as the "B" RRP coasts down, then remain at zero.
- D Flow indications for the "A" loop jet pumps will increase during the transient. Flow indications for the "B" loop jet pumps will decrease to zero as the "B" RRP coasts down, then increase to a positive value as flow reverses in the "B" loop jet pumps.

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG:

VALID DISTRACTOR: Plausible if the Applicant does not understand that the operating loop system characteristic changes when in single RRP operation. The operating RRP will have a lower flow resistance because it can now discharge into the ten idle jet pumps in addition to the core inlet plenum.

CHOICE (B) - NO

WRONG:

VALID DISTRACTOR: Plausible if the Applicant does not fully understand how the core flow signal is developed. The individual jet pump flow transmitters produce signals before they are summed to determine total core flow. FY-1K807 is substituted for FY-1K808 if a RRP generator exciter breaker is open or discharge valve is less than 90% open. FY-1K807 subtracts the idle loop jet pump flow from operating loop jet pump flow to determine actual core flow (operating loop flow less backflow through the idle loop).

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible if the Applicant does not understand that the idle loop jet pumps have no method of backflow prevention or if the Applicant misunderstands signal development.

CHOICE (D) - Yes

now will indicated jet pump flow respond to this event?

References

Comments and Question Modification History

1. (HB 09/08/05) Mod from (NPO Bank QuestionID 20448 (Quad Cities exam in August 2001)
 2. (THF 09/08/05) - no comment
 3. GII 09/09/05 - no comment.
 4. GII 09/26/05 - Should be HCL
R: o.k. - classified Higher Cognitive Level.
- Todd 09/30/05 - OK.

MINOR FIX

NRC K/A System/E/A

System 29500 Partial or Complete Loss of Forced Core Flow Circ
1

Number AK2.07

RO 3.4 SRO 3.4 CFR Link (CFR: 41.7 / 45.8)

AK2. Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW

CIRCULATION and the following:

AK2.07 Core flow indication

Given the following conditions:

- SSES Unit 1 recently entered Mode 4 to start a refueling outage following a 500 day run.
- SSES Unit 2 is in mode 1 at full power and flow.
- The station experiences a loss of Startup Transformer T-20.
- the Shift Manager has just declared an UNUSUAL EVENT.

Why has Shift Manager declared an UNUSUAL EVENT?

- A** CU1: Loss of All Offsite Power to Essential Busses for Greater than 15 Minutes.
- B** CU2: UNPLANNED Loss of Required DC Power for Greater than 15 Minutes.
- C** CU3: UNPLANNED Loss of Decay Heat Removal Capability with Irradiated Fuel in the RPV.
- D** MU1: Loss of all Offsite Power to Essential Busses for Greater than 15 Minutes.

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - NO
 WRONG: requires loss of both T-10 AND T-20.
 VALID DISTRACTOR: Loss of power c/b reasonable cause for entering the EAL.

CHOICE (B) - NO
 WRONG: requires loss of ALL vital DC power for >15 minutes.
 VALID DISTRACTOR: Applicant may believe loss of T-20 causes loss of DC power.

CHOICE (C) - YES
 Applicant must recognize that loss of T-20 causes RPS Bus "B" to deenergize on SSES Unit 1. This causes PCIS initiation which, subsequently, isolates the RHR SDC drop line. Finally, Applicant should recognize that decay heat load is high and an uncontrolled heat up could cause RCS temperature to rise above 200 degrees Fahrenheit. This is the entry condition for EAL CU3 per EP-TP-001

CHOICE (D) - NO
 WRONG: requires loss of both T-10 AND T-20.
 VALID DISTRACTOR: Loss of power c/b reasonable cause for entering the EAL.

① NOT RO Level

② K/A miss

Reason for isol. under loss of A.C.

③ Technically NOT correct

TOSS

References

Comments and Question Modification History

- (HB 09/08/05) Modified from SSES Bank.
24 month 700 days or 18 month 500 days for SQ to answer
- THF 09/08/05 - clarified stem.
- GII 09/09/05 - concerned about K/A match.
- GII 09/26/05 - K/A mismatch. Relationship between containment isolation and EAL?
R: on a loss of T-20, RPS buss "B" is deenergized. This causes Primary CTMT isolation including isolation of RHR in SDC mode. The successful Applicant must recognize the reason PCIS isolated is the loss of RPS buss "B" and that the isolation interrupted SDC which must be restored to prevent entry into an EAL. If SDC not restored, the threshold for an EAL will be crossed.
- Todd 09/30/05 - OK.
- Rich 10/03/05 - odd way to ask response question?
R: change to "why did the SM declare the event". Saved original question as number 21.

NRC K/A System/E/A

System 29500 Partial or Complete Loss of A.C. Power
3

Number AK3.06

RO 3.7 SRO

CFR Link

While operating at full power on Unit 2, control power to the operating control rod drive (CRD) pump is lost. What effect will this have on the CRD pumps?

- A The operating CRD pump will continue to run. Automatic protective trips for both pumps are functional.
- B The operating CRD pump will trip. Automatic protective trips for both pumps are disabled.
- C The operating CRD pump will continue to run. Automatic protective trips for both pumps are disabled.
- D The operating CRD pump will trip. Automatic protective trips for both pumps are functional.

Answers: A B C D

References Provided to Applicant:

Justification

Stick to one pump

CHOICE (A) - NO

WRONG: Automatic protective trips are disabled

VALID DISTRACTOR: Plausible because the pump will continue to run.

CHOICE (B) - NO

WRONG: the operating pump will not trip

VALID DISTRACTOR: Plausible because RRP's will automatically trip on loss of 125 VDC control power, not CRDs. Auto trips are disabled.

CHOICE (C) - YES

CHOICE (D) - NO

WRONG: Operating CRD Pump will not trip and auto trips are not functional.

VALID DISTRACTOR: Plausible if Applicant considers this a fail safe mechanism.

References

Comments and Question Modification History

1. (HB 09/08/05) Modified from INPO Bank 23832 which was used on SSES August 2002 exam.
 2. THF 09/08/05 - changed format to T-T / T-F / F-T / F-F with reasons.
 3. Gil 09/09/05 - question ok but - in ATWS and directed to start both CRD pumps. Concurrent loss of DC power. Now what?
 4. Gil 09/26/05 - could not validate with enclosed references.
R: need SSES to validate answer and distractors. Low risk of error because this is a bank question. Gil thinks it's reasonable from memory.
- Todd 09/30/05 - OK.

NRC K/A System/E/A

System 29500 Partial or Complete Loss of D.C. Power
4

Number AK1.05 RO 3.4 SRO 3.3 CFR Link (CFR: 41.8 to 41.10)

Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: Loss of breaker protection

MINOR

NRC K/A Generic

System

Number RO SRO CFR Link

4

RO

SRO

Question ID:

28348 Origin: New

Memory Level

APP

SSES Unit 1 is refueling. Source Range Monitor (SRM) "A" is inoperable because its detector is being replaced. Fuel shuffles are in progress and a bundle is ready to be lowered into the reactor vessel when the Control Room receives the following indications:

W.D.

- IRM CHAN B/D/F/H UPSCALE TRIP OR INOP (AR-104-001/A06)
- SRM UPSCALE OR INOP (AR-104-001/B06)
- 24V DC PANEL 1L680 SYSTEM TROUBLE (AR-106-001/B13)
- REMOTE SHUTDOWN PANEL 1C201 INSTR PWR FAILURE (AR-106-001/H16)
- *ILMS ↓ SRM B ID ↓*

Which of the following is the correct response for the Control Room operating crew?

- A** Stop all fuel movement and enter ON-175-001, LOSS OF 24 VDC BUS. *PLACE IN SAFE LOCATION*
- B** Continue fuel movement and enter ON-175-001, LOSS OF 24 VDC BUS.
- C** Stop all fuel movement and enter ON-081-002, REFUELING PLATFORM OPERATION ANOMALY.
- D** Continue fuel movement and enter ON-081-002, REFUELING PLATFORM OPERATION ANOMALY.

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - YES

TS 3.3.1.2 refers to Table 3.3.1.2-1 for minimum SRM operability. Two SRMs are required when in mode 5. However, the loss of Division II 24 VDC power disables both SRM channels "B" and "C". Given that SRM channel "A" is already inoperable, the TS requirement can not be met because three out of four SRMs are now disabled. Note that this is NOT a spiral offload or reload because the stem specifies that a core "shuffle" is in progress and because SSES Training Dept indicates that spiral off/on-loads are not typical for SSES.

CHOICE (B) - NO

WRONG:

VALID DISTRACTOR: Plausible if the Applicant fails to recognize that TS 3.3.1.2 can not be met following loss of one Division of 24 VDC power because the affected SRMs are in opposite quadrants.

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible if the applicant believes that stopping fuel movement is an entry condition for the Off-Normal procedure.

CHOICE (D) - NO

WRONG:

VALID DISTRACTOR: Plausible if the applicant believes that stopping fuel movement is an entry condition for the Off-Normal procedure and fails to recognize that TS 3.3.1.2 can not be met following loss of one Division of 24 VDC power because the affected SRMs are in opposite quadrants.

References

Comments and Question Modification History

1. (HB 09/08/05) New question. Question for SSES: will SRM UPSCALE OR INOP (AR-104-001/B06) reflash? Can we delete that initial condition? Should others be added?
 2. THF 09/08/05 - changes to stem and answers to simplify and clarify
 3. Gil 09/09/05 - no comment
 4. Gil 09/26/05 - could not validate with enclosed references. Shortest answer is correct. Should balance with other distractors.
R: Revised distractors "B" and "D" to address length of choices.
- Todd 09/30/05 - OK.

MAJOR

look at OPO20 for replacement

System 29500
4

Number **RO** **SRO** **CFR Link**

NRC K/A Generic

System 2.2 Equipment Control

Number 2.2.30 **RO** 3.5 **SRO** 3.3 **CFR Link** (CFR: 45.12)

"Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area, communication with fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation."

Given the following Control Room indications,

- AR-106-001 (A08) GEN LOCKOUT RELAYS TRIP
- AR-106-001 (C04) STATOR COOLING WATER PUMP 1A-1B TRIP
- Generator Stator Cooling Water Pumps 1A and 1B are NOT running (both AMBER lights energized)
- Generator Stator Cooling Water control switch is selected to "1A-START 1B-RESERVE"

What AUTOMATIC action will occur and why?

- A Main TURBINE trip due to Generator negative phase sequence.
- B Main TURBINE trip due to Generator Stator Cooling Water high conductivity.
- C Main GENERATOR trip due to Generator Stator Cooling Water low pressure.
- D Main GENERATOR trip due to Generator Neutral Overvoltage (59GN) fault.

Sequence

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - NO

WRONG: This will cause Generator trip but not the Stator Cooling water pump trips.

VALID DISTRACTOR: Plausible because a Negative Phase Sequence will cause GENERATOR trip.

CHOICE (B) - NO

WRONG: No automatic turbine trip on high conductivity.

VALID DISTRACTOR: Plausible because Operators are expected to perform reactor scram / turbine trip if conductivity can not be maintained below 9.9. However, there is no automatic stator cooling or turbine trip on stator water conductivity. Moreover, the question calls for what would cause a GENERATOR trip v. TURBINE trip.

CHOICE (C) - NO

WRONG: This is a TURBINE, not GENERATOR trip.

VALID DISTRACTOR: Plausible because low stator cooling water pressure (< 44 psig) will cause a TURBINE trip after a 70 second time delay (normal pressure is 50 to 65 psig). However, a simple pump trip is not expected to cause this condition because the reserve pump should start if low discharge pressure (first signal at < 102 psig, second signal at < 92 psig) is sensed at the discharge of the running pump. The stem indicates that the reserve pump would have started. Moreover, the question calls for what would cause a GENERATOR trip v. TURBINE trip.

CHOICE (D) - YES

States: Gen. Neutral Overvoltage occurs. What is the sequence

References

Comments and Question Modification History

1. (HB 09/08/05) Question for SSES: how to describe Pp 1B status?
2. Gil 09/09/05 - no comments
3. Gil 09/28/05 - OK
4. Todd 09/30/05 - OK.
5. Rich 10/03/05 - Backward logic at memory level. Can we increase cognitive level?
R: revised question and answer choice to be forward looking. Saved original question as number 51. Still considered on the high side of memory level.

*A
B
C
D*

NRC K/A System/E/A

System 29500 Main Turbine Generator Trip
5

Number AK2.04 RO 3.3 SRO 3.3 CFR Link (CFR: 41.7 / 45.8)

Knowledge of the interrelations between MAIN TURBINE GENERATOR TRIP and the following: Main generator protection

NRC K/A Generic

MAJOR

**System
Number**

RO

SRO

CFR Link

6

RO

SRO

Question ID:

29587 Origin: New

Memory Level

Ten minutes after a reactor scram late in core life, the Shift Technical Advisor reports that steady state Reactor Pressure has risen from about 955 psig to almost 960 psig.

Which of the following caused this?

- A A Reactor Feed Pump (RFP) tripped.
- B Steam Pressure Transmitter PT10101A failed low.
- C Steam Pressure Transmitter PT10101A failed high.
- D Steam Pressure Transmitter PT10101B failed high.

W.D.

Description of transmitters

Scram setpoint

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible because a high failure will cause a plant depressurization because the HVG will pass the full OPEN signal to the TBVs.

CHOICE (B) - YES

This failure will cause EHC to maintain a new steady state pressure 3 psig GREATER THAN the pre-failure steady state pressure.

CHOICE (A) - NO

WRONG:

VALID DISTRACTOR: Plausible if the Applicant believes that reactor coolant throughput is reduced; thereby causing a slight pressure drop. Alternatively, the Applicant may conclude that the tripped RFP reduces steam flow such that pressure goes down. In fact, should a RFP trip, the EHC system will respond to maintain steady state pressure per program.

CHOICE (D) - NO

WRONG:

VALID DISTRACTOR: Plausible because this is redundant to PT10101A and an Applicant may incorrectly conclude that the signal will bias the output of the HVG somehow. However, this failure will cause a plant depressurization because the HVG will pass the full OPEN signal to the TBVs.

References

Comments and Question Modification History

1. (HB 09/08/05) New.

Need reasonable pressure drop from SQ

2. THF 09/08/05 - changes to stem and answer.

3. Gil 09/08/05 - not realistic. Suggests scram condition but Rx Press stays at full power value - then ask what procedure to enter.

4. Gil 09/26/05 - Distractor "A" not plausible with electric feed pumps.

R: SSES has steam driven feed pumps. This is the result of comments to date. We need to reconsider "A" in light of making it mirror image of B-C-D.

Todd 09/30/05 - OK.

MINOR

NRC K/A System/E/A

System 29500 SCRAM
6

Number AA2.04

RO 4.1

SRO 4.1

CFR Link (CFR: 41.10 / 43.5 / 45.13)

Ability to determine and/or interpret the following as they apply to SCRAM : Reactor Pressure

NRC K/A Generic

Changed Distractor "D" to fail DOWNSCALE and IRMs B, D, F, H can NOT be withdrawn. Request sent to SSES to determine if any meters fail high. If so, may return to UPSCALE.

09/28/05 Phone conversation with SSES: they agree it is implausible for an IRM to fail UPSCALE and indicated that this could happen on plants with DC powered IRMs. They did not consider an UPSCALE failure credible. Therefore, changes indicated above should alleviate this concern because now only one distractor contains the UPSCALE failure. Adjusted the ability to withdraw IRMs to make distractor "C" more enticing.

Todd 09/30/05 - changed "fail" to "failed" in all four choices.

NRC K/A System/E/A

System 21500 Intermediate Range Monitor (IRM) System

3

Number K2.01 **RO** 2.5 **SRO** 2.7 **CFR Link** (CFR 41.7)

Knowledge of electrical power supplies to the IRM channels/detectors

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

7

RO

SRO

Question ID: 28352 Origin: Bank

Memory Level

What is the DESIGN BASIS for disabling control room controls when control is transferred from the Control Room to the Remote Shutdown Panel per ON-100-009, PLANT SHUTDOWN FROM OUTSIDE THE CONTROL ROOM?

- A To prevent unauthorized component operation from the Control Room.
- B To prevent spurious component operation caused by hot shorts.
- C To simplify design and construction of the Remote Shutdown system.
- D To minimize time to evacuate the Control Room once deciding to evacuate.

P.D.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (B) - YES

CHOICE (A) - NO

WRONG:

VALID DISTRACTOR: Plausible because it does fulfill the purpose proposed by this distracter. However, the design reason is to prevent spurious hot short operation.

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible because it may simplify design and construction of the RSD system. However, the design reason is to prevent hot short operation.

P.D.

CHOICE (D) - NO

WRONG:

VALID DISTRACTOR: Plausible because it may minimize evacuation time. However, the design reason is to prevent hot short operation.

References

Comments and Question Modification History

1. (HB 09/08/05) Bank - minor revisions
 2. THF 09/08/05 - editorial and deleted window dressing in stem.
 3. PAP 9/9/05 - too easy, consider asking what the CR indication would be when the instrument were swapped to RSD.
 4. GII 09/26/05 - Revise first sentence of stem: "What is design basis for disabling control room controls . . ." R: done.
- Todd 09/30/05 - OK.

NRC K/A System/E/A

System 29501 Control Room Abandonment
6

Number AK3.03 RO 3.5 SRO 3.7 CFR Link (CFR: 41.5 / 45.6)

Knowledge of the reasons for the following responses as they apply to CONTROL ROOM ABANDONMENT : Disabling control room controls

MINOR

NRC K/A Generic

System

Number RO SRO CFR Link

The plant is at 100% power when a loss of Reactor Building Closed Cooling Water (RBCCW) occurs. With NO Operator action, which of ONE of the following will occur and why?

- A Inboard MSIVs will close because Containment Instrument Gas is lost when RBCCW is lost.
- B Outboard MSIVs will close because Instrument Air is lost when RBCCW is lost.
- C Inboard MSIVs will close due to Main Steam Tunnel High Temperature when RBCCW is lost.
- D Outboard MSIVs will close due to Main Steam Tunnel High Differential Temperature when RBCCW is lost.

Answers: A B C D References Provided to Applicant:

Justification

CHOICE (A) - YES
CTMT Inst Gas compressors cooled by RBCCW.

CHOICE (B) - NO
WRONG: IA compressors are cooled by TBCCW.
VALID DISTRACTOR:

CHOICE (C) - NO
WRONG: Tunnel coolers cooled by SW (Secondary CTMT). Moreover, HI Tunn Temp closes ALL MSIVs.
VALID DISTRACTOR:

CHOICE (D) - NO
WRONG: Tunnel coolers cooled by SW (Secondary CTMT). Moreover, HI Tunn Diff Temp closes ALL MSIVs.
VALID DISTRACTOR:

References

Comments and Question Modification History

1. (HB 09/06/05) Bank question.
2. THF 09/08/05 - editorial changes. changed choics to just INBD/OUTBD
3. Gil 09/09/05 - added stem conditions to improve operational orientation.
4. Gil 09/26/05 - could not validate with enclosed references.
R: Risk of error is low because this is a BANK question. Also noted that RBCCW cools the steam tunnel HVAC during exam development.
5. Rich 10/03/05 - Backward logic at memory level. Can we increase cognitive level?
R: revised wording to forward looking. Still lower level cause BANK and it is memory.

OK

NRC K/A System/E/A

System 29501 Partial or Complete Loss of Component Cooling Wtr
8

Number AK1.01 RO 3.5 SRO 3.8 CFR Link (CFR: 41.8 to 41.10)

Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : Effects on component/system operations

NRC K/A Generic

System

Number RO SRO CFR Link

SSES Units 1 and 2 are operating at full power. For both units:

- "A" Containment Instrument Gas compressors (1K205A and 2K205A) are in LEAD
- "B" Containment Instrument Gas compressors (1K205B and 2K205B) are in STANDBY
- "A" Instrument Air compressors (1K107A and 2K107A) are in LEAD
- "B" Instrument Air compressors (1K107B and 2K107B) are in STANDBY
- "A" Service Air compressors (1K108A and 2K108A) are in LEAD
- "B" Service Air compressors (1K108B and 2K108B) are in STANDBY

Minutia P.S. from - minutes
24216 Trips
Control power
stick with one unit or other

The plant suffers a loss of Bus 2A201. Which of the following correctly describes the plant response:

- A** PCV-22560 will open, allowing the Service Air system to supply Instrument Air system loads.
- B** Service Air compressor 2K108B will start and cycle between 118 psig and 127 psig.
- C** Instrument Air compressor 2K107B will start and cycle between 87 psig and 102 psig.
- D** Containment Instrument Gas compressor 2K205B will start and cycle between 152 psig and 170 psig.

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (D) - YES

CHOICE (C) - NO

WRONG:

VALID DISTRACTOR: Plausible because a unit 2 bus was lost and the STBY IA compressor does cycle between 87 and 102. Incorrect because the power supply to lead IA compressor 2K107A (2A204) remains energized.

CHOICE (B) - NO

WRONG:

VALID DISTRACTOR: Plausible because a unit 2 bus was lost and the STBY SA compressor does cycle between 118 and 127. Incorrect because the power supply to lead SA compressor 2K108A (1B130) remains energized.

CHOICE (A) - NO

WRONG:

VALID DISTRACTOR: Plausible because PCV-12560 will open as described on a loss of IA. However, no loss of IA occurred as described in Distractor 1.

References

Comments and Question Modification History

1. (HB 08/08/05) New. Check cycle pressures with SSES.
2. THF 09/08/05 - formatting
3. Gil 09/09/05 - no comment
4. Gil 09/26/05 - could not validate with enclosed references.
R: will reverify if time permits. Did reverify once during development of subsequent question and am confident in question.
5. Todd 09/30/05 - OK.
6. Rich 10/03/05 - are we sure it is Memory Level?
R: yes - really only need to know the power supplies for each of the compressors. Once loss of power to 2K205A is recognized, the question is straightforward memory.

MAJOR

NRC K/A System/E/A

System 28501 Partial or Complete Loss of Instrument Air
9

Number AA1.03

RO 3.0 SRO 3.0 CFR Link (CFR: 41.7 / 45.8)

Ability to operate and/or monitor the following as
they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT
AIR : Instrument air compressor power supplies

NRC K/A Generic

System

Number

RO

SRO

CFR Link

Reactor Vessel Water Level must be above a MINIMUM water level before starting Residual Heat Removal (RHR) in Shutdown Cooling (SDC) mode.

The minimum water level is ___(1)___ and the reason(s) for this minimum level are ___(2)___.

- A** (1) 45 inches.
(2) to ensure natural circulation flow for core cooling and to prevent thermal stratification if Shutdown Cooling is lost.
- B** (1) 90 inches.
(2) to ensure natural circulation flow for core cooling and to provide adequate NPSH to the Fuel Pool Cooling (FPC) pumps.
- C** (1) 45 inches
(2) to prevent thermal stratification and to provide adequate NPSH to the Fuel Pool Cooling (FPC) pumps.
- D** (1) 90 inches.
(2) to provide adequate NPSH to the Fuel Pool Cooling (FPC) pumps and to the RHR pumps.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - YES

CHOICE (B) - NO

WRONG: NPSH to FPC pumps is NOT the reason.

VALID DISTRACTOR: Plausible because 90 inches is the administrative limit per OP-149-002 and because NC flow is partially correct. Static head is a common issue wrt NPSH.

CHOICE (C) - NO

WRONG: NPSH to FPC pumps is NOT the reason.

VALID DISTRACTOR: Plausible because 45 inches is correct and thermal stratification is part of the reason. Static head is a common issue wrt NPSH.

CHOICE (D) - NO

WRONG: NPSH to pumps is NOT the reason.

VALID DISTRACTOR: Plausible because 90 inches is the administrative limit per OP-149-002. Static head is a common issue wrt NPSH.

As written 90" is correct

References

Comments and Question Modification History

1. (HB 09/08/05) New.
2. Gil 09/09/05 - no changes.
3. PAP 9/9/05 comment - Applicant could argue that "C" is a second correct answer. Changed RFR to Fuel Pool Cleanup pumps.

!!! ASK SSES IF "C" IS POTENTIALLY CORRECT !!!!

4. Gil 09/26/05 - K/A mismatch.

R: possibly but on a loss of SDC, unlikely to see any recirc flow changes.

Todd - unable to agree. SSES input seems to support my view but I asked for further clarification.

09/28/05 Phone Conversation with SSES - they agree that the original question as written did not appear to match the K/A. However, they recommended changes to the entire question to better align it to the K/A. These changes were incorporated into the question.

Todd 09/30/05 - OK.

MAJOR

NRC K/A System/E/A

System 29502 Loss of Shutdown Cooling

1

Number AA2.07

RO 2.9

SRO 3.1

CFR Link (CFR: 41.10 / 43.5 / 45.13)

Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING: Reactor recirculation flow

NRC K/A Generic

System

Number

RO

SRO

CFR Link

mode #3

SDC ~~was~~ in service

SDC loss due to low-level isolation

What is minimum Required RPO that must be maintained and the basis for this level.

ON-149-001 sect. 3.3.3

~~0.45~~

.45

Possible extend time to lowling!

Which one of the following is the Safety Related Basis for maintaining Fuel Pool level 22 feet above the top of fuel?

- A To provide a floodable volume for RHR/FPC following a postulated seismic event.
- B To limit Iodine release during a fuel handling accident to 25% or less of 10 CFR 100 limits.
- C To minimize localized boiling within individual fuel assemblies following a loss of fuel pool cooling.
- D To properly seat the Fuel Pool Gate Inflatable Seals with a static head of water in the fuel pool.

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (B) - YES

CHOICE (A) - NO
WRONG:

VALID DISTRACTOR: SQ has committed to providing RHR/FPC to maintain temperatures below 125 degrees fahrenheit following a seismic event. However, this is not the safety related basis.

CHOICE (C) - NO
WRONG:

VALID DISTRACTOR: This is the basis for maintaining fuel pool temperature below 125 degrees fahrenheit. However, it is not the safety related basis for maintaining 22 feet of water above the fuel.

CHOICE (D) - NO
WRONG: This is not the stated reason.

VALID DISTRACTOR: Higher head of water could be expected to better seat the gates..

References

Comments and Question Modification History

1. (HB 09/08/05) Bank - INPO 24483 (River Bend ILO in 2003)

Need to verify BASIS against SQ TS

2. THF 09/08/05

3. Gil 09/09/05: added operational orientational and raised LOD by adding conditions to the stem.

4. Gil 09/26/05: Distractor "D" not plausible if FPC pumps are non-safety related.

R: Replaced "To ensure net positive suction head to the Fuel Pool Cooling Cleanup Pumps during routine operation." with new distractor.

Todd 09/30/05 - deleted "Refueling operations are about to start. There are no known fuel failures in the core. The Shift Manager directs you to ensure the level in the Fuel Pool and Reactor Cavity are greater than 22 feet." from the stem.

NRC K/A System/E/A

System 29502 Refueling Accidents
3

Number AK1.01 RO 3.6 SRO 4.1 CFR Link (CFR: 41.8 to 41.10)

Knowledge of the operational implications of the following concepts as they apply to REFUELING ACCIDENTS : Radiation exposure hazards

NRC K/A Generic

System

Number RO SRO CFR Link

SSES Unit 2 Operators are responding to a High Drywell Pressure condition by venting the drywell per OP-273-003, Primary Containment Nitrogen Makeup and Venting. There is no failed fuel and the Containment atmosphere is below minimum detectable activity (MDA). How does the method of Drywell venting per Section 2.3 of OP-273-003, Venting Drywell, prevent an UNMONITORED and UNCONTROLLED release to assure radiation exposures remain as low as reasonably achievable (ALARA)?

- A The Drywell is vented to the Standby Gas Treatment Exhaust Vent via the Standby Gas Treatment system.
- B The Drywell is vented back through the Air Purge lines because the potential release is below MDA.
- C The Drywell is vented to the Nitrogen Makeup system via the Containment Instrument Gas system.
- D The Drywell is vented to the Turbine Building Ventilation Exhaust Stack via the Ambient Offgas Charcoal system.

Answers: A B C D References Provided to Applicant:

Justification

CHOICE (A) - YES

CHOICE (B) - NO
 WRONG: This is not the vent path
 VALID DISTRACTOR: From the Training diagram, this appears to be a possible flow path.

CHOICE (C) - NO
 WRONG:
 VALID DISTRACTOR: Plausible to believe that the Nitrogen gas could be compressed and reused. However, it's not done this way.

CHOICE (D) - NO
 WRONG:
 VALID DISTRACTOR: Plausible method of venting the Drywell. However, it's not done this way.

References

Comments and Question Modification History

1. (HB 09/08/05) New by GII. Check TRM 3.6.1.
2. THF 09/08/05 - no comment
3. GII 09/09/05 - no comment
4. GII 09/26/05 - Is the flowpath in distractor "B" possible?
 R: No. none of the distractor flowpaths are possible. Replaced "The Drywell is vented to the Offgas Recombiner via the Main Condenser." with new distractor.

NRC K/A System/E/A

System 28502
4

Number	RO	SRO	CFR Link
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NRC K/A Generic

System 2.3 Radiation Control

Number 2.3.2	RO 2.5	SRO 2.9	CFR Link (CFR: 41.12 / 43.4. 45.9 / 45.10)
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Knowledge of facility ALARA program.

RO EXAM

Fit

12

SSES Unit 2 Operators are responding to a High Drywell Pressure condition by venting the drywell per OP-273-003, Primary Containment Nitrogen Makeup and Venting. There is no failed fuel and the Containment atmosphere is below minimum detectable activity (MDA). How does the method of Drywell venting per Section 2.3 of OP-273-003, Venting Drywell prevent an UNMONITORED and UNCONTROLLED release to assure radiation exposures remain as low as reasonably achievable (ALARA)?

- A The Drywell is vented to the Standby Gas Treatment Exhaust Vent via the Standby Gas Treatment system. -
- B The Drywell is vented back through the Air Purge lines because the potential release is below MDA. *Zone 3 Filtered Exhaust via the Recirc Plenum* X
- C The Drywell is vented to the Nitrogen Makeup system via the Containment Instrument Gas system. *u2 Reactor Building Filtered Exhaust via the Recirc Plenum* X
- D The Drywell is vented to the Turbine Building *u2 Filtered Exhaust* Ventilation Exhaust Stack via the Ambient Offgas Charcoal system. *A* X

① IN ORDER TO

dominant: KA match? ~~is~~ (ALARA PROGRAM)

- Reactor Pressure Vessel (RPV) pressure is steady at 1,050 psig
- One Main Turbine Bypass Valve is approximately 50% open
- The Pressure Regulator setpoints are set per GO-100-002 (GO-200-002), PLANT STARTUP, HEATUP AND POWER OPERATION
- Leading Edge Flow Meters (LEFM) are NOT in service.

Based on these conditions, what procedure MUST the Control Room Operators enter?

- A ON-100-004, Reactor Power Greater than License Limit.
- B ON-158-001, Loss of RPS.
- C ON-213-001, Main Condenser Vacuum and Off Gas System Off Normal Operation.
- D ON-217-002, Loss of Feedwater Heater String.

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - YES

CHOICE (B) - NO
WRONG:

VALID DISTRACTOR: Plausible if the Applicant believes that an automatic reactor scram should have occurred for these conditions.

CHOICE (C) - NO
WRONG:

VALID DISTRACTOR: Plausible if the Applicant believes that Main Condenser backpressure is causing the high RPV pressure.

CHOICE (D) - NO
WRONG:

VALID DISTRACTOR: Plausible if the Applicant believes that reduced FW heating (more FW subcooling) is causing a high reactor power condition.

Proposed reg. failure

References

Comments and Question Modification History

- 09/08/05 New. Check numbers with SQ staff.
- 09/08/05 THF: added "Based on these conditions . . ."
- Gil 09/09/05 - add Pressure Regulator setpoint to the stem
- Gil 09/26/05 - could not validate with enclosed references.
R: we need to run this past SSES and, if possible, on the simulator to determine credibility of the question.
Can we add first stage turbine pressure to the list of conditions? 100% first stage pressure.

*Backwards logic
w/o looking at APRMs
what proc are we in?*

NRC K/A System/E/A

System 29502 High Reactor Pressure
5

Number EA2.02 RO 4.2 SRO 4.2 CFR Link (CFR 41.10, 43.5, 45.13)

Ability to determine and/or interpret the Reactor power as it applies to HIGH REACTOR PRESSURE

NRC K/A Generic

System

Number RO SRO CFR Link

MAJOR/TOSS

14

RO

SRO

Question ID:

29584 Origin: New

Memory Level

Residual Heat Removal (RHR) loop "B" is running in the Suppression Pool Cooling mode of operation per EO-100-103, PC CONTROL. The Reactor Operator notices significant fluctuations in flowrate and motor amps on both RHR Pumps "B" and "D".

do not operate together in SP

Which ONE of the following caused this?

- A Minimum flow valve HV-151F0007B failed open.
- B Safety Relief Valve (SRV) "S" stuck open.
- C RHR Pump "B" discharge flow orifice FO-15100B is blocked.
- D Clogged RHR Loop "B" suction strainer..

*NPSH Hi Temp
Problem At SSES Not a*

Answers: A B C D

References Provided to Applicant:

Justification

Surveillance Requirement SR 3.6.1.7
Need to verify the procedure - done 09/07/05 by email

DISTRACTOR (A):
Plausible because a failed open min flow valve will affect the pump by increasing flowrate and NPSH requirements. The pumps are rated at 3175 gpm @ 290 psig. The min flow line is designed to pass the full rated flow of two pumps (6350 gpm). Therefore, opening the min flow line during a test could cause pump RUNOUT. However, the stem conditions describe CAVITATION.

DISTRACTOR (C):
Plausible because blocking the discharge path will affect the pump by increasing discharge pressure and reducing flowrate. However, this effect is inconsistent with indications of cavitation.

DISTRACTOR (D):
Plausible because this was a recent industry event. However, each pump has its own suction strainer. Therefore, two clogged strainers are required to make this true.

References

Comments and Question Modification History

Gil 09/09/05 - need to amend distractors and determine best SRV to finish revision.

09/09/05: amended distractors.

09/12/05: amended distractor D

09/15/05: amended answer to "S" SRV because OP-183-001, Attachment A, shows this to be the closest to the RHR Pp suction.

Gil 09/26/05 - Revise last sentence of stem "Which one of the following is the most likely cause of this?"

R: Per Chief Examiner's direction, avoiding use of phrases like "most likely", "most probable", "could have". Revised stem to read "Which ONE of the following caused this?"

Todd 09/30/05 - added "significant" to stem and amended grammar accordingly.

NRC K/A System/E/A

System 29502 Suppression Pool High Water Temperature
8

Number EK1.01 RO 3.0 SRO 3.4 CFR Link (CFR 41.8 to 41.10)

Knowledge of the operational implications of the Pump NPSH as it applies to SUPPRESSION POOL HIGH WATER TEMPERATURE

NRC K/A Generic

System

Number RO SRO CFR Link

MAJor/TOSS

SSES Unit 2 has a Loss of Coolant Accident (LOCA) and the following plant conditions exist:

Suppression Pool

- RPV Pressure 25 psig
- RPV Level +40 inches and rising slowly
- Torus Level +1.5 inches 23.5'
- Torus Temperature 102 degrees Farenheit
- Drywell Pressure 21 psig
- Drywell Temperature 296 degrees Farenheit
- Division I RHR Injecting into the RPV
- Division II RHR Operating in Suppression Pool Cooling/Spray mode
- Both Divisions of Core Spray Injecting into the RPV
- Instrument Run Temperature (UR 25701A&B) .. 276 degrees Farenheit

Given the above conditions, which of the following actions is required by the operating crew per EO-200-103, PC CONTROL?

- A Go To EO-200-112, Rapid Depressurization.
- B Initiate Drywell Spray per OP-249-004, RHR Containment Cooling.
- C Go To EO-200-114, RPV Flooding.
- D Shutdown All Drywell Coolers and Fans per OP-273-001, Containment Atmosphere Control System.

Answers: A B C D References Provided to Applicant:

Justification

Bank - Fermi 2 2 exam of March 2003 (Question ID = 23721)

Applicants may want the EOPs to refer to Figure 1 of EO-100-103, PC Control. However, they should be able to determine that RPV level instruments are unreliable due to reference leg flashing by using ordinary steam tables. The given RPV Pressure of 25 psig or 40 psia yields a saturation Temperature of 267.25 deg F. The given Instrument Run Temperature is almost 9 deg F above saturation.

DISTRACTOR (A):
Plausible because the Drywell Temperature Control procedure requires Rapid Depressurization if DW temps can not be restored/maintained below 340 deg F at step DW/T-8. However, in this question, the operator should have gone to RPV flooding earlier at step DW/T-3.

DISTRACTOR (B):
Plausible because Drywell Spray is required when Drywell Temps exceed 340 deg F.

DISTRACTOR (D):
Shutdown All Drywell Coolers and Fans per OP-273-001, Containment Atmosphere Control System.

References

Comments and Question Modification History

- GII 09/09/05 - editorial change to stem
- GII 09/26/05 - OK

NRC K/A System/E/A

System 29502 High Drywell Temperature
 Number EK3.02 RO 3.5 SRO 3.8 CFR Link (CFR 41.5, 45.6)
 Knowledge of the reasons for the RPV flooding as it applies to HIGH DRYWELL TEMPERATURE

NRC K/A Generic

System
 Number RO SRO CFR Link

Which of the following describes the method that provides the highest flowrate of makeup to the Suppression Pool per OP-159-001, Suppression Pool Cleanup System?

- A Pump the Condensate Storage Tank with the Core Spray Line Fill Pump to the CORE SPRAY CONDENSATE TRANSFER ISOLATION TO LOOP "B" MINIMUM FLOW LINE 152028.
- B Gravity drain the Condensate Storage Tank through the Reactor Core Isolation Cooling (RCIC) Pump Casing to the RCIC MIN FLOW TEST LINE 149F019.
- C Pump the Condensate Storage Tank with the High Pressure Coolant Injection (HPCI) Pump to the HPCI MIN FLOW LINE 155F012.
- D Gravity drain the Condensate Storage Tank through CORE SPRAY CST SUPPLY ISOLATION 152021 and CORE SPRAY PUMP B&D CST SUCTION SUPPLY 152F002B to the Core Spray suction strainers.

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - NO
WRONG: lower flowrate than the correct response.
VALID DISTRACTOR: normal method of makeup.

CHOICE (B) - NO
WRONG: Not procedurally authorized.
VALID DISTRACTOR: would work.

CHOICE (C) - NO
WRONG: Not procedurally authorized.
VALID DISTRACTOR: Would work

CHOICE (D) - YES

OK

References

Comments and Question Modification History

Inspired by Peach Bottom 2 September 2002 exam (Question ID 24782)

Gil 09/09/05 - editorial change to stem

CONSIDER CHANGING ALL DISTRACTORS TO: Gravity drain CST through RHR, HPCI, RCIC suction strainers.
?????????

Gil 09/26/05 - Correct answer is longest. Should balance with other distractors.
R: added full noun name descriptions to "B" and "C" for HPCI and RCIC. However, unable to perfect length of selections without degrading operational validity of the distractors or creating new psychometric clues.

Todd 09/30/05 - deleted "SSES Unit 1 is operating at full power. A failure of PSV152-F032B, the "B" Core Spray loop pump suction relief valve has lowered Suppression Pool water level. PSV152-F032B has been gagged shut. However, Suppression Pool water level has been below 22 feet for one hour. Per Emergency Operating Procedure EO-100-103, step SP/L-1, the Unit Supervisor has directed you to raise Suppression Pool water level to 23 feet." from stem.

NRC K/A System/E/A

System 29503 Low Suppression Pool Water Level
0

Number EA1.08 RO 3.4 SRO 3.4 CFR Link (CFR 41.7, 45.8)

Ability to operate and/or monitor the Condensate storage and transfer (make up to the suppression pool) (Plant-Specific) as it applies to LOW SUPPRESSION POOL WATER LEVEL

NRC K/A Generic

System

Number RO SRO CFR Link

17

RO SRO

Question ID: 29578 Origin: New

Memory Level

Model

tripped

SSES Unit 1 lost all Feedwater flow. Reactor Pressure Vessel level quickly lowered to approximately -40 inches at which point all control rods inserted and both Reactor Recirculation Pumps (RRP) tripped. What FSAR described event occurred and what caused the plant response?

initiated the transient

A Feedwater Line Break - Outside Containment Backup Scram Valve (SV 147110 A & B) actuation

ARIS **B** Feedwater Controller Failure - Maximum Demand ATWS-RPT actuation

ARIS **C** Feedwater Line Break - Outside Containment ATWS-RPT actuation

D Feedwater Controller Failure - Maximum Demand Backup Scram Valve (SV 147110 A & B) actuation

Answers: A B C D

References Provided to Applicant:

Justification

New

Note: The ATWS-ARI and ATWS-RPT use the same circuitry per TM-OP-058, page 46. RPS should have scrammed the plant at L3 (+13 inches). In this case, the rods inserted and RPT occurred just below L2 (-38 inches).

DISTRACTOR (A):

Plausible because FW Line Break is correct and the Backup Scram Valves are a redundant means of inserting control rods. However, per OP-TM-058, page 35, the Backup Scram Valves will not actuate unless both both RPS A and B Trip Systems trip (de-energize) to energize the Backup Scram Valve Solenoid on each valve. In this case, the RPS system failed to operate at L3.

DISTRACTOR (B):

Plausible because the FW failure to max demand would eventually cause a loss of both FW-Ps on high RPV level. However, the question stem does not support this conclusion because there is no statement indicating a rise in RPV level and the RPV level decrease to below L2 requires the main turbine to be in operation.

DISTRACTOR (D):

Plausible because Backup Scram valves are a redundant means of inserting control rods. However, per OP-TM-058, page 35, the Backup Scram Valves will not actuate unless both both RPS A and B Trip Systems trip (de-energize) to energize the Backup Scram Valve Solenoid on each valve. In this case, the RPS system failed to operate at L3.

References

Comments and Question Modification History

G# 09/09/05 - No comment

G# 09/26/05 - OK

Todd 09/30/05 - change insert and trip to inserted and tripped.

NRC K/A System/E/A

System 29503 Reactor Low Water Level

1

Number EK2.13

RO 4.1 SRO 4.2 CFR Link (CFR 41.7, 45.8)

Knowledge of the interrelations between REACTOR LOW WATER LEVEL and AR/RPT/ATWS (Plant-Specific)

NRC K/A Generic

System

Number

RO

SRO

CFR Link

SSES Unit 1 has an Anticipated Transient Without Scram (ATWS). The control room operating crew initiate Standby Liquid Control (SBLC) per LQ/Q-3. You observe the following:

- 1P208A SBLC Pump RED indicating light ILLUMINATES,
- 1P208B SBLC Pump RED indicating light does NOT illuminate,
- ONE SBLC SQUIB READY A-B White indicating light extinguishes,
- ONE SBLC SQUIB READY A-B White indicating light remains energized,
- SBLC SQUIB VALVES LOSS OF CKT CONTINUITY (A03) Energizes.

What OPERATOR action, if any, is necessary to establish REQUIRED flow (86 gpm)?

- A OPEN the second SBLC SQUIB Valve to establish sufficient flow path for full flow.
- B START the second SBLC Pump (1P208B) to establish full pumping capacity.
- C INJECT Boron with RCIC IAW ES-150-002 to establish full flow.
- D No action is necessary because a single pump and valve will provide rated flow.

Answers:

A B C D

References Provided to Applicant:

Justification

New - Inspired by Browns Ferry 2 exam of September 2001 (Question ID 21039)

SSES requires both SBLC pumps to start to ensure reactor safety following an ATWS. The expected flowrate is approximately 86 gpm. In this case, the flowrate is one-half of expected (43 gpm) because one SBLC pump failed to start. The alarm will energize when 4742 less 4587 (155) gallons have been injected. This will occur in 155 divided by 43 or 3.6 minutes.

The failure of one SQUIB Valve to fire has no effect on the solution because the pumps discharge to a common header. The common header then flows through two parallel SQUIB valves.

A - Only one valve opened. Plausible if the Applicant believes that the failed SQUIB valve blocks SBLC flow to the RPV and that opening the valve will restore full flow.

C - LQ/Q-4 requires this if Boron can NOT be injected with SBLC. Here, SBLC is injecting, albeit at half the required rate.

D - SSES requires both SBLC pumps to start to ensure reactor safety following an ATWS

References

Comments and Question Modification History

Gil 09/09/05 - editorial change to stem

Gil 09/26/05 - Distractor "A" not plausible with one pump running and one squib fired; should have some flow.

R: revised "Never" to "16 minutes". Applicant may misapply pump laws.

Todd 09/30/05 - why give setpoint?

R: w/o setpoint, it may become LOD=5 because not expected to know this.

Rich 10/03/05 - K/A mismatch. CE view?

R: agreed. Changed stem and distractors to require Applicant to demonstrate ability to manipulate controls. Saved original question as 181.

*** Ask SSES to evaluate distractor "C" as a potentially second correct answer.

NRC K/A System/E/A

System 29503
7

Number RO SRO CFR Link

NRC K/A Generic

System 2.2 Equipment Control

Number 222 RO 4.0 SRO 3.5 CFR Link (CFR: 45.0)

Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.

Chlorine

Following an accident at the Chlorine Building, a significant release of Chlorine gas occurs. How will the Control Structure HVAC system protect control room operators from toxic gas?

- A The system will automatically shift to the RECIRCULATION MODE. Correct configuration and operation is then verified per ON-159-001 (ON-259-002), Containment Isolation.
- B The system can be manually started in the RECIRCULATION MODE per OP-030-002, Control Structure HVAC, by placing Control Structure Manual Isolation switches HS-07802A1 and HS-07802B1 to "ISO" and then starting CREOASS Fan OV101A or OV101B.
- C The system can be manually started in the PRESSURIZATION/FILTRATION MODE per OP-030-002, Control Structure HVAC, by placing Emergency Outside Air Intake Radiation Monitor mode switches RISHH-D12-0K618A and RISHH-D12-0K618B to "TRIP TEST".
- D The system will automatically shift to the PRESSURIZATION/FILTRATION MODE. Correct configuration and operation is then verified per ON-159-001 (ON-259-002), Containment Isolation.

Answers: A B C D

References Provided to Applicant:

Justification

New

Per TM-OP-079E, the system originally built to automatically do this on high Chlorine.

DISTRACTOR (A):

Plausible because ON-1/2 59-002 does verify configuration and operation in response to a CTMT ISO. Automatic initiation of RECIRCULATION was part of the original design basis.

DISTRACTOR (C):

Plausible because this is one of three distinct operating modes for the system. However, per the TM-OP-079E, the correct response is RECIRC mode.

DISTRACTOR (D):

Plausible because this is one of three distinct operating modes for the system. However, the system will not automatically align itself to this mode and ON-1/2 59-002 does not address this mode.

References

Comments and Question Modification History

Gil 09/09/05 - No comment

Gil 09/26/05 - K/A mismatch. Suggests throwing the K/A out.

R: disagree. While the question does not directly ask what happens on a RADIOACTIVE release, the successful Applicant must understand operation of the Control Structure ventilation system to answer this question. The applicant must know the difference between the two suggested operating modes (Recirc and Press/Filt) and what situations cause automatic reconfigurations. Therefore, the question does discriminate between Applicants who understand the Control Structure HVAC from those who do not.

Gil: suggests new stem: "Following a significant release of Chlorine from the Chlorine building". Accepted.

NRC K/A System/E/A

System 29503 High Off Site Release Rate
8

Number EA1.07 RO 3.6 SRO 3.8 CFR Link (CFR 41.7, 45.6)

Ability to operate and/or monitor the Control room ventilation (Plant-Specific) as it applies to HIGH OFF SITE RELEASE RATE

MINOR

NRC K/A Generic

System

Number RO SRO CFR Link

RO EXAM

19

Following an accident at the Chlorine Building, a significant release of Chlorine gas occurs. How will the Control Structure HVAC system protect control room operators from ~~toxic gas?~~ ^{RADIATION} ~~toxic gas?~~ ^{NO MORE Chlorine? AT 92E3}

- A The system will automatically shift to the RECIRCULATION MODE. Correct configuration and operation is then verified per ON-159-001 (ON-259-002), Containment Isolation.
- B The system can be manually started in the RECIRCULATION MODE per OP-030-002, Control Structure HVAC, by placing Control Structure Manual Isolation switches HS-07802A1 and HS-07802B1 to "ISO" and then starting CREOASS Fan OV101A or OV101B. ✓
- C The system can be manually started in the PRESSURIZATION/FILTRATION MODE per OP-030-002, Control Structure HVAC, by placing Emergency Outside Air Intake Radiation Monitor mode switches RISHH D12-0K618A and RISHH-D12-0K618B to "TRIP TEST". ✗
- D The system will automatically shift to the PRESSURIZATION/FILTRATION MODE. Correct configuration and operation is then verified per ON-159-001 (ON-259-002), Containment Isolation. ✗

MAKE IT RAD Related or :

A ^{TRUCK} ~~TRUCK~~ carrying chlorine is involved in an accident on R411 outside the main access road to the site.

The BACKUP DIESEL FIRE PUMP starts in response to a fire in the ACCESS PROCESSING FACILITY. Which one of the following locations will receive an alarm indicating actuation of the BACKUP FIRE SUPPRESSION system?

- A PP&L Energy Dispatch
- B SSES Central Alarm Station
- C PP&L Corporate Security
- D SSES Control Room

Trivial/minutia

Answers: A B C D References Provided to Applicant:

Justification

New

GET CORRECT TITLE FOR DISTRACTOR - for all of them.

Per TM-OP-013-ST, page 20, the Backup Fire Suppression system does not energize an alarm in the control room.

Plausible because the actual alarm goes to Security

Plausible because the actual alarm goes to Security

Plausible because generally all alarms alert the control room staff of off-normal conditions either directly or through a satellite alarm. Per TM-OP-013-ST, page 20, this is not true for the Backup Fire Suppression system.

References

Comments and Question Modification History

GII 09/09/05 - No comment

GII 09/26/05 - Does "C" have the correct title.
R: Yes but will confirm with SSES.

NRC K/A System/E/A

System 60000 Plant fire on site
0

Number AA1.06 RO 3.0 SRO 3.0 CFR Link

Ability to operate and / or monitor the following as they apply to the Plant Fire on Site: Fire alarm

NRC K/A Generic

System
Number RO SRO CFR Link

*Validity?
If I don't get an alarm, where will it
alarm?*

TOS)

SSES Unit 1 is at full power when a Feedwater Level Control System malfunction causes RPV Water Level to stabilize at approximately 47.5 inches. Per ON-145-001, RPV LEVEL CONTROL SYSTEM MALFUNCTION, the Operating Crew is able to restore Feedwater Level Control to Automatic, 3-element control on LEVEL A. The Operating Crew then completes ON-145-004, RPV WATER LEVEL ANOMALY and has NOT determined the cause of the malfunction.

- (1) What malfunction caused RPV Water Level to stabilize at approximately 47.5 inches?
- (2) What procedure must the Operating Crew enter next?

- A** (1) A single feed flow instrument failed downscale while in THREE ELEMENT
(2) GO-000-001, REACTOR VESSEL LEVEL CONTROL DURING MAINTENANCE
- B** (1) A single feed flow instrument failed upscale while in THREE ELEMENT
(2) OI-AD-509, TROUBLESHOOTING
- C** (1) A single level instrument input failed upscale while in AVERAGE.
(2) GO-000-001, REACTOR VESSEL LEVEL CONTROL DURING MAINTENANCE
- D** (1) A single level instrument input failed downscale while in AVERAGE.
(2) OI-AD-509, TROUBLESHOOTING

Answers: **A** **B** **C** **D**

References Provided to Applicant:

Justification

CHOICE (A) - NO

WRONG: This procedure only applies when the mode switch is in SHUTDOWN or REFUEL.

VALID DISTRACTOR: The failure causes stable level at -48 inches.

CHOICE (B) - NO

WRONG: Need to determine what this causes.

VALID DISTRACTOR: This is the correct procedure.

CHOICE (C) - NO

WRONG: This procedure only applies when the mode switch is in SHUTDOWN or REFUEL.

VALID DISTRACTOR: This is the correct mode but the failure will give stable level of -22.5 inches.

CHOICE (D) - YES

Stable level of -47.5 inches

Correct Procedure.

*Toss -> Does not match K/it
Not realistic single failure,
OI-AD-509 is for "Complex"
evolutional*

References

Comments and Question Modification History

Ask SSES what Distractor B will cause.

Tough one - 6 hours to develop.

1. PAP 9/9/05 comments to balance choices.

2. Gil 09/28/05 - does not see connection of OI-AD-509 in references.

R: added OI-AD-509 to list of references. Applicants expected to answer this question without use of references.

Suggestion if Question rejected: put Applicant in T/S activity and ask how is problem prevented.

NRC K/A System/E/A

System 29500
B

Number RO SRO CFR Link

NRC K/A Generic

System 2.2 Equipment Control

Number 2.2.20 RO 2.2 SRO 3.3 CFR Link (CFR: 43.5 / 45.13)

Knowledge of the process for managing troubleshooting activities.

SSES Unit 1 is at full power when a Feedwater Level Control System malfunction causes RPV Water Level to stabilize at approximately 47.5 inches. Per ON-145-001, RPV LEVEL CONTROL SYSTEM MALFUNCTION, the Operating Crew is able to restore Feedwater Level Control to Automatic, 3-element control on LEVEL A. The Operating Crew then completes ON-145-004, RPV WATER LEVEL ANOMALY and has NOT determined the cause of the malfunction.

- (1) What malfunction caused RPV Water Level to stabilize at approximately 47.5 inches?
- (2) What procedure must the Operating Crew enter next?

- A** (1) A single feed flow instrument failed downscale while in THREE ELEMENT
(2) GO-000-001, REACTOR VESSEL LEVEL CONTROL DURING MAINTENANCE
- B** (1) A single feed flow instrument failed upscale while in THREE ELEMENT
(2) OI-AD-509, TROUBLESHOOTING
- C** (1) A single level instrument input failed upscale while in AVERAGE.
(2) GO-000-001, REACTOR VESSEL LEVEL CONTROL DURING MAINTENANCE
- D** (1) A single level instrument input failed downscale while in AVERAGE.
(2) OI-AD-509, TROUBLESHOOTING

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - NO

WRONG: This procedure only applies when the mode switch is in SHUTDOWN or REFUEL.

VALID DISTRACTOR: The failure causes stable level at -48 inches.

CHOICE (B) - NO

WRONG: Need to determine what this causes.

VALID DISTRACTOR: This is the correct procedure.

CHOICE (C) - NO

WRONG: This procedure only applies when the mode switch is in SHUTDOWN or REFUEL.

VALID DISTRACTOR: This is the correct mode but the failure will give stable level of -22.5 inches.

CHOICE (D) - YES

Stable level of -47.5 inches

Correct Procedure.

References

Comments and Question Modification History

Ask SSES what Distractor B will cause.

Tough one - 8 hours to develop.

1. PAP 9/9/05 comments to balance choices.

2. GI 09/26/05 - does not see connection of OI-AD-509 in references.

R: added OI-AD-509 to list of references. Applicants expected to answer this question without use of references.

Suggestion if Question rejected: put Applicant in T/S activity and ask how is problem prevented.

NRC K/A System/E/A

System 29500
8

Number RO SRO CFR Link

NRC K/A Generic

System 2.2 Equipment Control

Number 2.2.20 RO 2.2 SRO 3.3 CFR Link (CFR: 43.6 / 45.13)

Knowledge of the process for managing troubleshooting activities.

Which of the following conditions will prevent CAVITATION?

- A Reactor Lower Water at +11 inches and Reactor Feedwater Pump "A" flow of 26% and Reactor Feedwater Pump "B" flow of 27%.
- B Reactor Lower Water at +32 inches and Reactor Feedwater Pump "A" flow of 18% and Reactor Feedwater Pump "B" flow of 18%.
- C Reactor Lower Water at +28 inches and Reactor Feedwater Pump "A" flow of 20% and Reactor Feedwater Pump "B" flow of 18%.
- D Reactor Lower Water at +12 inches and Reactor Feedwater Pump "A" flow of 16% and Reactor Feedwater Pump "B" flow of 17%.

- ① CAVITATION where
- ② lower water level
- ③ All answers are correct or none correct
- ④ Did runback work?
- ⑤ status of "C" feed pump
- ⑥ Power level?

Answers: A B C D

References Provided to Applicant:

Justification

30% limiter if below L3 and TOTAL FW less than 20%

CHOICE (A) - NO
WRONG: greater than 20% FW
VALID DISTRACTOR: below L3 is correct

CHOICE (B) - NO
WRONG: above L3
VALID DISTRACTOR: Total FW < 20% is correct

CHOICE (C) - NO
WRONG: Below L4 but above L3
VALID DISTRACTOR: This combination will actuate the 45% limit (Speed Limiter #2)

CHOICE (D) - YES

References

Comments and Question Modification History

Gil 09/26/05 - No K/A statement with question. Did validate correct answer.
R: added K/A to K/A table. Gil is OK.

Todd 09/30/05 - removed references to L3, L4 and Total v. RFP flows.

which of the following will actuate to prevent cavitation at Reactor.

NRC K/A System/E/A

System 29500 Low Reactor Water Level
9

Number AK1.02 RO 3.0 SRO CFR Link

Knowledge of the operational implications of the following concepts as they apply to LOW REACTOR WATER LEVEL:
Recirculation pump net positive suction head: Plant specific.

NRC K/A Generic

System

Number RO SRO CFR Link

23

RO

SRO

Question ID:

29593 Origin: Mod

Memory Level

A steam line break occurred in the Primary Containment of SSES Unit 2. The following conditions exist:

- *initial power 10%* - Several control rods failed to insert.
- RPV Water Level is *167* inches and steady. *- 30 inches*
- RPV Pressure is *1520* psig and steady.
- Drywell Pressure is 7.0 psig and steady.
- Drywell Temperature is 180 degrees Fahrenheit and steady.
- Suppression Chamber Pressure is 2.0 psig and rising slowly. *rising*
- Suppression Chamber Temperature is *88* degrees Fahrenheit and steady.

According to EO-200-103, PC CONTROL, which ONE of the following Residual Heat Removal (RHR) configurations is required?

- A** RHR Loop "A" in Suppression Pool Cooling and RHR Loop "B" in Suppression Chamber Spray *ONE loop*
- B** RHR Loop "A" in Suppression Pool Cooling and RHR Loop "B" in Suppression Pool Cooling
- C** RHR Loop "A" in Drywell Spray and RHR Loop "B" in Suppression Chamber Spray
- D** RHR Loop "A" in Drywell Spray and RHR Loop "B" in Suppression Pool Cooling

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - YES

SP Cooling required per SP/T-1

SP Spray required per PC/P-4

CHOICE (B) - NO

WRONG: SP/T-2 does NOT require maximum SP cooling until SC temp can NOT be maintained below 90 deg F.

VALID DISTRACTOR: Some SP cooling will be required to maintain SP below 90 deg F

CHOICE (C) - NO

WRONG: Drywell Spray is NOT required until DW pressure exceeds 13 psig in the SC per PC/P-5

VALID DISTRACTOR: SC Spray required per PC/P-4

CHOICE (D) - NO

WRONG: Drywell Spray is NOT required until DW pressure exceeds 13 psig in the SC per PC/P-5

VALID DISTRACTOR: Some SP cooling will be required to maintain SP below 90 deg F

References

Comments and Question Modification History

1. Gil 09/26/05 - could not validate with enclosed references. Appears correct.

R: Self validated. Will ask Chief Examiner to validate.

NRC K/A System/E/A

System 29501 High Suppression Pool Temperature

3

Number AK2.01

RO 3.6

SRO 3.7

CFR Link (CFR: 41.7 / 46.8)

Knowledge of the interrelations between HIGH

SUPPRESSION POOL TEMPERATURE and the following: Suppression pool cooling

NRC K/A Generic

System

Number

RO

SRO

CFR Link

24

RO SRO

Question ID: 29584 Origin: New

Memory Level

SSES Unit 1 was operating at full power when the Main Turbine tripped. However, the Reactor did NOT scram. You are inserting control rod 22-27 per EO-100-113, Control Rod Insertion.

The following plant conditions exist:

- all Average Power Range Monitors (APRMs) indicate approximately 24% Reactor Power.
- the RSCS ROD INS BLK BYPASS HS-55601 is in NORMAL (WHITE light illuminated)

On the Rod Sequence Control System (RSCS) Operator Display Unit (ODU), you observe the following:

- AMBER DISPLAY UNIT pushbutton lower light (FREE ROD) illuminated.
- Control Rod 22-27 AMBER light emitting diode (LED) is illuminated.
- RED DISPLAY UNIT pushbutton lower light (BYPASS) illuminated.
- Control Rod 22-27 RED light emitting diode (LED) is illuminated.

Which one of the following describes the status of control rod 22-27?

- A** Control Rod 22-27 can be INSERTED because power is above the Low Power Setpoint (LPSP).
- B** Control Rod 22-27 can be INSERTED because it is BYPASSED.
- C** Control Rod 22-27 can NOT be INSERTED because the RSCS ROD INS BLK BYPASS HS-55601 is in NORMAL.
- D** Control Rod 22-27 can NOT be INSERTED because power is below the Low Power Setpoint (LPSP).

Answers:

A B C D

References Provided to Applicant:

Justification

CHOICE (A) - NO

WRONG: RPS does not bypass RSCS blocks.

VALID DISTRACTOR: LPSP is 22%. APRMs > 22% may be mistaken for the actual LPSP parameter (1st stage pressure).

CHOICE (B) - YES

Turbine 1st stage pressure is the parameter measured to determine whether the plant is above or below LPSP and LPAP. The stem establishes that the Main Turbine is tripped. Therefore, 1st stage pressure is below the LPSP setpoint and is probably at a vacuum. In addition, the ODU conditions in the stem establish that the rod is bypassed (RED LED) and free to move (AMBER LED).

CHOICE (C) - NO

WRONG: The rod can be inserted because RSCS does not have a Rod Block on this rod

VALID DISTRACTOR: EO-100-113 directs the user to bypass RSCS. Applicant may believe the rod could be blocked if the switch is still in normal.

CHOICE (D) - NO

WRONG: The rod can be inserted because RSCS does not have a Rod Block on this rod.

VALID DISTRACTOR: Applicant may recognize that with no 1st stage pressure, RSCS receives a <LPSP signal and blocks rod motion.

References

Comments and Question Modification History

Gil 09/28/05 - OK

Todd 09/30/05 - replaced colon with question mark at end of stem.

NRC K/A System/E/A

System 29501 Incomplete SCRAM

5

Number AK2.06

RO 2.8 SRO 2.8 CFR Link (CFR: 41.7 / 45.8)

Knowledge of the interrelations between INCOMPLETE
SCRAM and the following: RSCS: Plant-Specific

NRC K/A Generic

System

Number

RO

SRO

CFR Link

Both units are at full power. SSES Unit 1 has isolated and is draining Residual Heat Removal (RHR) loop "B" for planned maintenance. SSES Unit 1 RHR loop "B" is draining to the floor drain to the Reactor Building Sump via 161121 (RHR Pump B & D Room Drain Iso Vlv.).

SSES Unit 2 Receives the following alarms and indications:

- RHR LOOP B PUMP ROOM FLOODED (AR-213-001, H08).
- SUPPRESSION POOL DIV 1 LO LEVEL (AR-211-001, E02).
- SUPP POOL LEVEL LI-25755A indicates 22.4 feet and slowly lowering.
- SUPPRESSION POOL DIV 2 LO LEVEL (AR-212-001, E02).
- SUPP POOL LEVEL LI-25755B indicates 22.3 feet and slowly lowering.
- REACTOR BLDG SUMP LEVEL HI-HI (AR-225-001, B01)

*all unit 1
2 correct answers*

- (1) How will Suppression Pool level respond?
- (2) What Emergency Operating Procedure (EOP) entry conditions are CURRENTLY met?

Correct A

- A** (1) The Suppression Pool will continue to drain until 161121 (RHR Pump B & D Room Drain Iso Vlv.) is closed.
(2) EO-200-104, SECONDARY CONTAINMENT CONTROL.
- B** (1) The Suppression Pool will continue to drain until 161121 (RHR Pump B & D Room Drain Iso Vlv.) is closed.
(2) EO-200-103, PC CONTROL.
- C** (1) Suppression Pool level will lower to 17 feet and stabilize.
(2) EO-200-104, SECONDARY CONTAINMENT CONTROL.
- D** (1) Suppression Pool level will lower to 17 feet and stabilize.
(2) EO-200-103, PC CONTROL.

Answers: A B C D References Provided to Applicant:

Justification

CHOICE (A) - NO
 WRONG: SP will not continue to drain because the Unit 1 and 2 floor drains are not cross-connected.
 VALID DISTRACTOR: Correct EOP and each unit's ECCS room floor drains are cross-connected to other ECCS room of the same unit.

CHOICE (B) - NO
 WRONG: PC CONTROL requires SP level below 22 feet. However, the SP will not continue to drain because the Unit 1 and 2 floor drains are not cross-connected.
 VALID DISTRACTOR: The stem conditions give sufficient information to correctly conclude that the Suppression Pool will stabilize at 17 feet (Table 18 of EO-100-103). Therefore, Applicant may reasonably select this.

CHOICE (C) - YES
 Table 18 of EO-100-103 tells us that SP will stabilize at 17 feet.
 EO-100-104 requires entry on RB Water Level above high alarm.

CHOICE (D) - NO
 WRONG: PC CONTROL requires SP level below 22 feet.
 VALID DISTRACTOR: Correct SP level. The stem conditions give sufficient information to correctly conclude that the Suppression Pool will stabilize at 17 feet (Table 18 of EO-100-103). Therefore, Applicant may reasonably select this.

References

Comments and Question Modification History

- NM2 August 2002 (Question ID 22279)
- 1. Gill 09/28/05 - could not validate the 17 feet because EO-100-103 not included in workpapers
R: it is 17 feet. Ask Chief Examiner to independently validate.
- 2. Todd 09/30/05 - changed "(1) What level will SSES Unit 2 Suppression Pool stabilize at?" to "(1) How will Suppression Pool level respond?"
changed part (1) of distractors "C" and "D" from "(1) 17 feet" to "(1) Suppression Pool level will lower to 17 feet and stabilize."

MAJOR

NRC K/A System/E/A

System 29503 Secondary Containment High Sump/Area Water Level
6

Number EA1.01 **RO** 3.2 **SRO** 3.3 **CFR Link** (CFR 41.7, 45.6)

Ability to operate and/or monitor the Secondary containment equipment and floor drain systems as it applies to
SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

Following a loss of coolant accident, the Primary Containment Hydrogen and Oxygen (H2O2) Analyzers are placed in service per OP-173-001, Section 2.8, H2O2 ANALYZER OPERATION DURING EMERGENCY. The following conditions exist:

- Analyzer "A" is aligned to the SUPPRESSION POOL.
- Analyzer "A" O2 reads 2%.
- Analyzer "A" H2 reads 9%

- Analyzer "B" is aligned to the DRYWELL.
- Analyzer "B" O2 reads 6%
- Analyzer "B" H2 reads less than 1%

- Sample flow to both analyzers was restored 35 minutes ago.
- Both analyzers are on the 10% range.

Which ONE of the following statements is correct?

- A** All Hydrogen Recombiners, Drywell Fans and Drywell Coolers MUST be Operated to adequately mix the Primary Containment atmosphere.
- B** All Hydrogen Recombiners, Drywell Fans and Drywell Coolers MUST be Operated to adequately recombine Hydrogen in the Primary Containment atmosphere.
- C** All Hydrogen Recombiners, Drywell Fans and Drywell Coolers MUST be Shutdown because Hydrogen and Oxygen concentrations are above combustible limits.
- D** All Hydrogen Recombiners, Drywell Fans and Drywell Coolers MUST be Shutdown because Hydrogen and Oxygen concentrations can NOT be determined.

Answers:

- A** **B** **C** **D**

References Provided to Applicant:

Justification

CHOICE (A) - NO

WRONG: EO-100-103 requires that Recombiners, Fans and Coolers be secured when H2>8% AND O2>5% whether the gases are in the same CTMT section or not because migration is possible.

VALID DISTRACTOR: EO-103-113 calls for mixing and recombining for the individual CTMT sections (SP or DW) given the individual conditions.

CHOICE (B) - NO

WRONG: EO-100-103 requires that Recombiners, Fans and Coolers be secured when H2>6% AND O2>5% whether the gases are in the same CTMT section or not because migration is possible.

VALID DISTRACTOR: EO-103-113 calls for mixing and recombining for the individual CTMT sections (SP or DW) given the individual conditions.

CHOICE (C) - YES

Analyzers have been in-service for >30 minutes.
H2 and O2 conditions exceed combustible limits.

CHOICE (D) - NO

WRONG: The Analyzers require 30 minutes to stabilize. They've had 35 minutes.

VALID DISTRACTOR: Applicant may consider the Analyzers inoperable due to the disparate SP and DW readings or because Analyzers have been in service for a short time period. (Note: 1 hour at PB)

References

Comments and Question Modification History

- Gil 08/26/05 - OK
- Todd 08/30/05 - OK

NRC K/A System/E/A

System 50000 High Containment Hydrogen Concentration
0

Number EA2.04

RO 3.3 SRO 3.3 CFR Link (CFR 41.10, 43.5, 45.13)

Ability to determine and / or interpret Combustible limits for wetwell as it applies to HIGH PRIMARY CONTAINMENT
HYDROGEN CONCENTRATIONS

NRC K/A Generic

System

Number

RO

SRO

CFR Link

Given that the following conditions occur in the specified sequence:

1. All required conditions for Automatic Depressurization System (ADS) actuation ^{were} met.
2. Automatic depressurization is in progress.
3. All low pressure ECCS pumps trip.
4. A single Core Spray (CS) pump is restarted.

Fix TENSES

Which ONE of the following describes how the Automatic Depressurization System (ADS) is affected?

- Automatic stops*
- A** ~~ADS~~ depressurization STOPPED when low pressure ECCS pumps tripped; then AUTOMATICALLY reinitiated after the CS pump restarted.
 - B** ADS depressurization CONTINUES until the LOGIC TIMER RESET pushbutton is depressed.
 - C** ADS depressurization CONTINUES until both MANUAL INHIBIT (S34A & S34B) switches are rotated to INHIBIT.
 - D** ADS depressurization STOPPED when low pressure ECCS pumps tripped; then can be MANUALLY reinitiated after the CS pump restarted.

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - No
WRONG: K4A seals in the actuation signal.
VALID DISTRACTOR: ADS will not actuate without low pressure ECCS pumps running

CHOICE (B) - YES
Signal seals in until broken by the ADS LOGIC/TIMER RESET PB

CHOICE (C) - No
WRONG: Manual inhibit PBs are effective before ADS actuation only.
VALID DISTRACTOR: They are effective before actuation at stopping actuation.

CHOICE (D) - No
WRONG: K4A seals in the actuation signal and Manual initiation does NOT bypass the LP ECCS Pumps relay K9A and K10A
VALID DISTRACTOR: Reasonable belief that Manual Initiation would bypass all interlocks.

References

Comments and Question Modification History

Drawn from Clinton 1 June 2000 exam (Question ID 18937)

Gil 09/28/05 - Add to first sentence in stem "... conditions occur in sequence". Can you shorten distractor "D" a bit?
R: accepted both comments.

Todd 09/30/05 - Revised "A" and "D" to be past tense and added auto restart to "A".

NRC K/A System/E/A

System 20300 RHR/LPCI: Injection Mode (Plant Specific)
0

Number K3.03 RO 4.2 SRO 4.3 CFR Link (CFR 41.7 / 45.4)

Knowledge of the effect that a loss or malfunction of the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) will have on Automatic depressurization logic

NRC K/A Generic

System

Number RO SRO CFR Link

Both units are at full power. 480 VAC Bus 2B226 is deenergized for planned electrical maintenance. All systems were in their normal configuration when Operations de-energized 2B226. *NO WAY*

Which ONE of the following correctly describes the status of SSES Unit 2 Residual Heat Removal (RHR) Loop "B" with NO Local/Manual component manipulation?

Memorize 2 LOAD LIST

- A** Drywell Spray Mode - NOT Available
 Suppression Pool Spray - NOT Available
 Suppression Pool Cooling - NOT Available
 RHR Pump "B" and "D" Minimum Flow Isolation - Available
- B** Drywell Spray Mode - Available
 Suppression Pool Spray - Available
 Suppression Pool Cooling - Available
 RHR Pump "B" and "D" Minimum Flow Isolation - NOT Available
- C** Drywell Spray Mode - Available
 Suppression Pool Spray - NOT Available
 Suppression Pool Cooling - NOT Available
 RHR Pump "B" and "D" Minimum Flow Isolation - NOT Available
- D** Drywell Spray Mode - NOT Available
 Suppression Pool Spray - Available
 Suppression Pool Cooling - Available
 RHR Pump "B" and "D" Minimum Flow Isolation - Available

Answers: A B C D

References Provided to Applicant:

Justification

De-energizing 2B226 removes power from the following:

- HV251F016B - Drywell Spray (Normally Shut)
- HV251F017B - Injection (Normally Open)
- HV251F028B - SP Spray & Cooling (Normally Shut)
- HV251F010B - Cross-connect to "A" loop (Normally Shut)
- HV251F004B - "B" Pump suction from SP (Normally Open)
- HV251F006B - "B" Pump suction from SDC dropline (Normally Open)
- HV251F003B - "B" HX Outlet (Normally Open)
- HV251F047B - "B" HX Inlet (Normally Open)

Therefore, the following applies*

- Low Pressure Coolant Injection (LPCI) - Operable because de-energized valves in the flowpath are normally open (HV251F015B is on swing buss 2B229)
- Drywell Spray Mode - NOT Available because normally closed valve F016B is de-energized
- Suppression Pool Spray - NOT Available because normally closed valve F028B is de-energized
- Suppression Pool Cooling - NOT Available because normally closed valve F028B is de-energized
- RHR Pump "B" and "D" Minimum Flow - Available because normally closed valve F007B is energized from 2B229

CHOICE (A) - YES

CHOICE (B) - No

WRONG: DW Spray NOT avail because F016B deenergized. SP Spray NOT avail because F028B deenergized.
VALID DISTRACTOR: LPCI is Operable, Min Flow is available and SP Cooling NOT Avail.

CHOICE (C) - No

WRONG: LPCI is Operable. Remainder of distractor mirrors Distractor B
VALID DISTRACTOR: Remainder of distractor mirrors Distractor B

CHOICE (D) - No

WRONG: LPCI is Operable. Remainder of distractor mirrors Distractor D
VALID DISTRACTOR: Remainder of distractor mirrors Distractor B

TOSS

References

Comments and Question Modification History

Gil 09/28/05 - Suggest use "Available" (or not available) rather than "Operable". Not sure what impact the bus loss will have on Operability, however availability is assured in A.

R: accepted.

NRC K/A System/E/A

System 20500 Shutdown Cooling System (RHR Shutdown Cooling Mode
0

Number K2.02 **RO** 2.5 **SRO** 2.7 **CFR Link** (CFR 41.7)

Knowledge of electrical power supplies to Motor operated valves

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

30

RO

SRO

Question ID:

29600 Origin: Bank

Memory Level

UNIT
SSES Unit 1 is at full power when 1 High Pressure Coolant Injection (HPCI) inadvertently initiates and injects to the Reactor Pressure Vessel (RPV). Assuming no Operator action, which ONE of the following correctly describes the INITIAL change from steady state?

- A Thermal Power will RISE
RPV Water Level will LOWER
Total Steam Flow will LOWER
Total Indicated Feedwater Flow will LOWER
- B Thermal Power will RISE
RPV Water Level will LOWER
Total Steam Flow will RISE
Total Indicated Feedwater Flow will LOWER
- C Thermal Power will RISE
RPV Water Level will RISE
Total Steam Flow will LOWER
Total Indicated Feedwater Flow will RISE
- D Thermal Power will RISE
RPV Water Level will RISE
Total Steam Flow will RISE
Total Indicated Feedwater Flow will LOWER

causing thermal power to rise

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No
WRONG: Wrong Level, ST & FW changes
VALID DISTRACTOR: correct power changes.

CHOICE (B) - No
WRONG: Wrong RPV Water Level Effect.
VALID DISTRACTOR: Correct Power, ST and FW changes

CHOICE (C) - No
WRONG: Reverses the actual FW and ST changes - both affect Level Error.
VALID DISTRACTOR: Correct Power and Level change

CHOICE (D) - YES
Steam Flow RISES cause HPCI Turbine Operating. Therefore, RPV pressure drops cause ST rises and Power rises due to colder FW.
RPV Water Level will rise because FW now > ST. Stable when Level Error offsets Flow Error
Total Steam Flow will rise because now have additional steam flowpath
Indicated FW Flow lowers to create the Flow Error that offsets Level Error.

References

Comments and Question Modification History

1. Gill 09/28/05 - could not validate with enclosed references. Note for justification "A" Power increases due to lowering feedwater temperature with HPCI Injection.

R: Low risk of error because it is drawn from SSES Exam Bank and is theoretical rather than plant specific.

2. Todd 09/30/05 - changed "INITIAL to FINAL" to "INITIAL change from SS"

NRC K/A System/E/A

System 20600 High Pressure Coolant Injection System
0

Number A1.01 RO 4.3 SRO 4.4 CFR Link (CFR 41.5 / 45.5)

Ability to predict and/or monitor changes in parameters associated with operating the HIGH PRESSURE COOLANT INJECTION SYSTEM controls including Reactor water level (BWR-2,3,4)

NRC K/A Generic

**System
Number**

RO

SRO

CFR Link

During quarterly surveillance testing of the High Pressure Coolant Injection (HPCI) system per SO-152-002, the system is (1) and the liquid flowpath is (2).

- A** (1) NOT OPERABLE because injection valve HV155F006 is deenergized in the closed position.
(2) From the Suppression Pool to the Pumps and return to the Suppression Pool.
- B** (1) NOT OPERABLE because injection valve HV155F006 is deenergized in the closed position.
(2) From the Condensate Storage Tank to the Pumps and return to the Condensate Storage Tank.
- C** (1) OPERABLE because HPCI will automatically realign to the injection mode upon receipt of an initiation signal.
(2) From the Suppression Pool to the Pumps and return to the Suppression Pool.
- D** (1) OPERABLE because HPCI will automatically realign to the injection mode upon receipt of an initiation signal.
(2) From the Condensate Storage Tank to the Pumps and return to the Condensate Storage Tank.

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - No
WRONG: Path is CST to Pps to CST
VALID DISTRACTOR: system is inoperable.

CHOICE (A) - YES

CHOICE (C) - No
WRONG: Path is CST to Pps to CST. System is NOT operable (no auto realign)
VALID DISTRACTOR: mirror imaging distractors.

CHOICE (C) - No
WRONG: System is NOT operable (no auto realign)
VALID DISTRACTOR: correct flowpath

References

Comments and Question Modification History

Get the correct surveillance (I've got the 24 month one)

Gil 09/26/05 - OK

Todd 09/30/05 - ask SSES if initial power level changes the answer.

NRC K/A System/E/A

System 20600
0

Number RO SRO CFR Link

NRC K/A Generic

System 2.2 Equipment Control

Number 2.2.12 RO 3.0 SRO 3.4 CFR Link (CFR: 41.10 / 45.13)

Knowledge of surveillance procedures.

Both SSES units were at full power and SSES Unit 1 was running Core Spray pumps 1P206A and 1P206C for surveillance testing when the site experienced a Loss of Offsite Power (LOOP).

- Both units are now maintaining Reactor Pressure Vessel (RPV) pressure and inventory with the Reactor Core Isolation Cooling (RCIC) system.
- All engineered safeguards (ES) buses are powered from their associated emergency diesel generators (EDG).

Subsequently, a transient affects SSES Unit 2 and results in the following conditions:

- SSES Unit 2 RPV Water Level is -60 inches.
- SSES Unit RPV Pressure is 350 psig.
- SSES Unit Drywell Pressure is 1.8 psig.

Which ONE of the following describes the AUTOMATIC actions of the SSES Unit 2 Core Spray system?

pumps

- A** Core Spray pumps 2P206A, 2P206B, 2P206C and 2P206D start after a 15 second time delay.
- B** Core Spray pumps 2P206A, 2P206B, 2P206C and 2P206D start after a 10.5 second time delay.
- C** Core Spray pumps 2P206B and 2P206D start after a 10.5 second time delay. Core Spray pumps 2P206A and 2P206C do NOT start.
- D** Core Spray pumps 2P206B and 2P206D start after a 15 second time delay. Core Spray pumps 2P206A and 2P206C do NOT start.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: the 15 sec TD occurs if ES busses are energized from normal/off-site power.

VALID DISTRACTOR: all four pumps do start after a TD

CHOICE (B) - YES

the 15 sec does time out. However, its start signal comes AFTER the 10.5 sec TD sends its signal.

LOOP: K3A opens, EDGs start and energize ES busses, K3A closes and the EDG breaker 52 contacts swap (a closes & b opens)

LOCA: K10A closes on DW Hi pressure and RPV Low pressure, K116A energizes 10.5 sec TD concurrently with K16A's 15 sec TD. K116A closes before K16A closes, K12A energizes.

CHOICE (C) - No

WRONG: CS pumps A & C will also start.

VALID DISTRACTOR: Correct TD and pumps B & D are "Preferred" unit 2 pumps for concurrent CS initiation signals (electrical load considerations).

CHOICE (D) - No

WRONG: Wrong TD and CS pumps A & C will also start.

VALID DISTRACTOR: CS pumps B & D are "Preferred" unit 2 pumps for concurrent CS initiation signals (electrical load considerations).

References

Comments and Question Modification History

Gil 09/28/05 - OK

Todd 09/30/05 - changed "plant" to "site" in the stem.

NRC K/A System/E/A

System 20900 Low Pressure Core Spray System

1

Number K4.08

RO 3.8 SRO 4.0 CFR Link (CFR 41.7)

Knowledge of LOW PRESSURE CORE SPRAY SYSTEM design feature(s) and/or interlocks which provide for the Automatic system initiation

NRC K/A Generic

System

Number

RO

SRO

CFR Link

Both SSES units are at full power. During shift turnover, you notice that the:

- white indicating light for Standby Liquid Control (SBLC) squib valve 148F004A is EXTINGUISHED
- white indicating light for Standby Liquid Control (SBLC) squib valve 148F004B is ILLUMINATED

Before accepting the shift, you go to the Relay Room and determine that the Unit 1 SBLC squib valve CONTINUITY METERS read 5 milliamps (ma) for BOTH squib valves.

Which ONE of the following correctly describes the status of the SBLC squib valves?

- A 148F004A is Operable
148F004B is Operable
- B 148F004A is NOT Operable
148F004B is Operable
- C 148F004A is Operable
148F004B is NOT Operable
- D 148F004A is NOT Operable
148F004B is NOT Operable

*modify If light is out
had pressed to say "operable"
make contin ↓ concept.*

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - YES

The stem establishes conditions indicative of a burned out light bulb.

CHOICE (B) - No

WRONG: Neither valve is inoperable.

VALID DISTRACTOR: White light out is the first indication of an inoperable squib valve.

CHOICE (C) - No

WRONG: Neither valve is inoperable

VALID DISTRACTOR: Tests Applicants' understanding of the normal/expected condition.

CHOICE (D) - No

WRONG: Neither valve is inoperable

VALID DISTRACTOR: Mirror imaging and tests Applicants' understanding of normal/expected condition.

References

Comments and Question Modification History

Gill 08/26/05 - suggest using 5 milliamps in stem if this is technically correct, albeit a little higher than normal. 4 milliamps is too easily recognizable.

R: accepted. Changed from 4 to 5 and deleted sentence saying "These are the NORMAL values". Recategorized to Higher Cognitive Level.

Todd 09/30/05 - added "Unit 1" before SBLC in the stem.

NRC K/A System/E/A

System 21100 Standby Liquid Control System
0

Number K4.04 RO 3.8 SRO 3.9 CFR Link (CFR 41.7)

Knowledge of STANDBY LIQUID CONTROL SYSTEM design feature(s) and/or interlocks which provide for Indication of fault in explosive valve firing circuits

NRC K/A Generic

System

Number RO SRO CFR Link

MAJOR

SSES Unit 1 is operating at full power. The following Standby Liquid Control System (SBLC) conditions exist following SBLC tank filling:

- SLC tank temperature is 70 F
- AR 107 B03, STANDBY LIQUID TANK HI/LO TEMP is in alarm
- SLC tank level is 5100 gallons
- AR 107 C03, STANDBY LIQUID TANK HI/LO LEVEL is in alarm
- Chemistry sample results after filling indicate that the concentration of the sodium pentaborate solution in the SLC tank is 15.4% by weight

Which ONE of the following identifies the status of the SLC system according to Technical Specifications? *LCO*

- A** The LCO is satisfied. *No Action Required*
- B** Tank temperature does not meet the LCO conditions. *RAISE TANK TEMP*
- C** Tank available volume does not meet the LCO conditions. *Reduce TANK Volume*
- D** Sodium pentaborate concentration does not meet the LCO conditions. *Raise Concentration*

Answers: A B C D References Provided to Applicant:

Justification

!! THIS QUESTION APPEARED ON THE AUGUST 2002 SUSQUEHANNA EXAM !!

CHOICE (A) - No
WRONG: The temperature-concentration combination is in the UNACCEPTABLE range.
VALID DISTRACTOR: Applicant must determine this from Figure 3.1.7-2

CHOICE (B) - YES

CHOICE (C) - No
WRONG: Volume falls in the acceptable region of Figure 3.1.7-2
VALID DISTRACTOR: Applicant determine this from Figure 3.1.7-2

CHOICE (D) -
WRONG: Concentration falls in the acceptable region of Figure 3.1.7-2
VALID DISTRACTOR: Applicant determine this from Figure 3.1.7-2

References

Comments and Question Modification History

!! THIS QUESTION APPEARED ON THE AUGUST 2002 SUSQUEHANNA EXAM !!

Gil 09/26/05 - Not sure it is plausible for an operator to NOT acknowledge any annunciator. How about "acknowledge but do not reset" for "A".
R: accepted. Changed distractors "A" and "B"

?? Does SSES have the RESET function ??

*** REJECTED K/A CAUSE LOD UNREACHABLE ***

Reselected 2.1.33 and found this in an SSES old exam.

NRC K/A System/E/A

System 21100
0

Number RO SRO CFR Link

NRC K/A Generic

System 2.1 Conduct of Operations

Number 2.1.2 **RO** 3.0 **SRO** 4.0 **CFR Link** (CFR: 41.10 / 45.13)

Knowledge of operator responsibilities during all modes of plant operation.

35

RO

SRO

Question ID:

29605 Origin: Bank

Memory Level

SSES Unit 2 scrams from full power. All systems, structures and components operated as expected EXCEPT the Scram Pilot Solenoid Valves for all twenty (20) Group 2 Hydraulic Control Units (HCU) on Reactor Side 2 failed to vent their associated HCUs.

Which ONE of the following is TRUE concerning the 20 associated control rods?

- A All 20 Control Rods will insert in less than 10 seconds.
- B All 20 Control Rods will NOT insert but can be inserted by venting the Scram Air Header.
- C All 20 Control Rods will insert in greater than 10 seconds.
- D All 20 Control Rods will NOT insert but can be inserted using Reactor Manual Control (RMC).

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: The rods will INSERT at a slower rate as ARI and Backup Scram valves act to depressurize the air header
VALID DISTRACTOR: The rod still inserts

CHOICE (B) - No

WRONG: The rods will insert without Operator action
VALID DISTRACTOR: valid method directed by EO-100-113, Control Rod Insertion

CHOICE (C) - YES

CHOICE (D) - No

WRONG: The rods will insert without Operator action
VALID DISTRACTOR: using RMC may be plausible once the Scram and ARI are reset.

References

Comments and Question Modification History

Gil 09/26/05 - Once a rod is scrammed (from any means) it will insert at the same rate (about 4 seconds). Recommends:

A - All control rods will automatically insert in < 10 seconds.

C - All control rods will automatically insert in > 10 seconds.

R: no known basis for the 10 second threshold. Will request SSES input. Not sure I accept the proposition that all rods will insert at the same rate. Seems reasonable to believe that the rods for which the Scram Pilot Solenoid Valves did NOT open would move a bit slower because their air is vented through a smaller area.

09/27/05: Now understand the issue. All rods insert at the same rate once the scram valves open. However, for the affected 20 HCUs, the scram valves take longer to open. Must have SSES verify/evaluate the 10 second threshold.

Todd 09/30/05 - replaced "Both units are at full power when one unit scrams for unknown reasons." with "SSES Unit 2 scrams from full power."

NRC K/A System/E/A

System 21200 Reactor Protection System
0

Number K4.09 RO 3.8 SRO 3.9 CFR Link (CFR 41.7)

Knowledge of REACTOR PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the Control rod insertion following RPS system electrical failure

NRC K/A Generic

System

Number RO SRO CFR Link

MAJOR

RO EXAM

36

SSES Unit 2 scrams from full power. All systems, structures and components operated as expected EXCEPT the Scram Pilot Solenoid Valves for all twenty (20) Group 2 Hydraulic Control Units (HCU) on Reactor Side 2 failed to vent their associated HCUs.

Which ONE of the following is TRUE concerning the 20 associated control rods?

- A All 20 Control Rods will insert in less than 10 seconds.
- B All 20 Control Rods will NOT insert but can be inserted by venting the Scram Air Header.
- C All 20 Control Rods will insert in greater than 10 seconds.
- D All 20 Control Rods will NOT insert but can be inserted using Reactor Manual Control (RMC).

Which of the following describes the current status of the 20...

Bases for 10 sec
Comparison with other rods

A reactor STARTUP is in progress. All Intermediate Range Neutron Monitors (IRM) are on Range 4. Which ONE of the following IRM readings will cause a HALF SCRAM? *ONLY!*

Note: INOP = Inoperable and NOT bypassed.

	A	B	C	D	E	F	G	H
A	INOP	109	108	106	110	INOP	107	107
B	124	124	108	106	110	103	107	108
C	110	107	INOP	123	112	118	109	111
D	INOP	105	108	110	124	112	116	109

Answers:

A

B

C

D

References Provided to Applicant:

Justification

IRMs are assigned to RPS as follows:

RPS "A": IRM channels "A", "C", "E", "G"

RPS "B": IRM channels "B", "D", "F", "H"

To yield a half scram, one or more APRMs in a SINGLE and only a SINGLE RPS channel must either trip on high flux (>122 / 125 scale) or INOP

CHOICE (A) - No

WRONG: INOP IRM channels "A" and "F" yield a FULL scram.

VALID DISTRACTOR: Two inoperable channels.

CHOICE (B) - No

WRONG: IRM channels "A" and "B" yield a FULL scram.

VALID DISTRACTOR: Two channels > high flux setpoint

CHOICE (C) - No

WRONG: IRM channels "D" and "E" yield a FULL scram

VALID DISTRACTOR: Two channels above high flux setpoint.

CHOICE (D) - YES

IRM channel "A" trips RPS "A"

IRM channel "E" trips RPS "A"

References

Comments and Question Modification History

1. Gil 08/26/05 - explanation talks about APRMs rather than IRMs.

R: corrected explanation to IRMs.

NRC K/A System/E/A

System 21200 Reactor Protection System
0

Number A3.01

RO 4.4 SRO 4.4 CFR Link (CFR 41.7 / 45.7)

Ability to monitor automatic operations of the REACTOR PROTECTION SYSTEM including Reactor Power

NRC K/A Generic

System

Number

RO

SRO

CFR Link

Manual

SSES Unit 2 is in Mode 2, conducting a normal reactor startup per GO-200-102, PLANT STARTUP, HEATUP AND POWER OPERATION. The following conditions exist:

- the reactor is CRITICAL.
- RPV Pressure is 0 psig.
- All Intermediate Range Monitors (IRM) are on Range 3
- Source Range Monitor (SRM) detectors are being withdrawn intermittently, TWO AT A TIME.
- SRM level is being maintained between 5E3 (5,000) and 5E4 (50,000) counts per second (CPS).
- SRM Channel "A" reads 6.1E3 (6,100) CPS and slowly rising.
- SRM Channel "B" reads 7.2E4 (72,000) CPS and slowly rising.
- SRM Channel "C" reads 6.0E3 (6,000) CPS and slowly rising.
- SRM Channel "D" reads 6.1E3 (6,100) CPS and slowly rising.

Which ONE of the following correctly describes:

- (1) a cause of these conditions and
- (2) actions, if any, necessary to permit the Reactor Startup?

- A** (1) SRM Detector "B" is stuck & located LOWER in the core than SRM Detectors "A", "C", & "D".
(2) None. The SRM Upscale Block is AUTOMATICALLY bypassed when all IRMs are on Range 3 or above.
- B** (1) SRM Detector "B" is stuck & located LOWER in the core than SRM Detectors "A", "C", & "D".
(2) MANUALLY bypass SRM "B" to prevent a Rod Withdrawal BLOCK at 2E5 (20,000) CPS.
- C** (1) SRM Detector "B" is stuck & located HIGHER in the core than SRM Detectors "A", "C", & "D".
(2) MANUALLY bypass SRM "B" to prevent a Rod Withdrawal BLOCK at 2E5 (20,000) CPS.
- D** (1) SRM Detector "B" is stuck & located HIGHER in the core than SRM Detectors "A", "C", & "D".
(2) None. The SRM Upscale Block is AUTOMATICALLY bypassed when all IRMs are on Range 3 or above.

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: The detector is stuck HIGHER in the core and AUTO bypass occurs on Range 3 or higher.

VALID DISTRACTOR: Mirror Imaging.

CHOICE (B) - No

WRONG: The detector is stuck HIGHER.

VALID DISTRACTOR: Manual bypass is required.

CHOICE (C) - YES

Detector is stuck HIGHER.

MANUAL bypass is required to continue.

CHOICE (D) - No

WRONG: Auto bypass occurs on Range 3 or higher.

VALID DISTRACTOR: SRM is stuck HIGHER.

References

Comments and Question Modification History

Gil 09/26/05 - OK

Todd 09/30/05 - grammatical corrections to stem.

MINOR

RO EXAM

OK w/fit

39

SSES Unit 2 is in Mode 2, conducting a normal reactor startup per GO-200-102, PLANT STARTUP, HEATUP AND POWER OPERATION. The following conditions exist:

- the reactor is CRITICAL.
- RPV Pressure is 0 psig.
- All Intermediate Range Monitors (IRM) are on Range 3
- Source Range Monitor (SRM) detectors are being withdrawn intermittently, TWO AT A TIME.
- SRM level is being maintained between $5E3$ (5,000) and $5E4$ (50,000) counts per second (CPS).
- SRM Channel "A" reads $6.1E3$ (6,100) CPS and slowly rising.
- SRM Channel "B" reads $7.2E4$ (72,000) CPS and slowly rising.
- SRM Channel "C" reads $6.0E3$ (6,000) CPS and slowly rising.
- SRM Channel "D" reads $6.1E3$ (6,100) CPS and slowly rising.

Which ONE of the following correctly describes:

- (1) a cause of these conditions and
- (2) actions, if any, necessary to permit the Reactor Startup?

- A** (1) ~~SRM Detector "B" is stuck & located LOWER~~ in the core than SRM Detectors "A", "C", & "D".
(2) None. The SRM Upscale Block is AUTOMATICALLY bypassed when all IRMs are on Range 3 or above X
- B** (1) ~~SRM Detector "B" is stuck & located LOWER~~ in the core than SRM Detectors "A", "C", & "D".
(2) MANUALLY bypass SRM "B" to prevent a Rod Withdrawal BLOCK at $2E5$ (20,000) CPS.
- C** (1) ~~SRM Detector "B" is stuck & located HIGHER~~ in the core than SRM Detectors "A", "C", & "D" ✓
(2) MANUALLY bypass SRM "B" to prevent a Rod Withdrawal BLOCK at $2E5$ (20,000) CPS.
- D** (1) ~~SRM Detector "B" is stuck & located HIGHER~~ in the core than SRM Detectors "A", "C", & "D".
(2) None. The SRM Upscale Block is AUTOMATICALLY bypassed when all IRMs are on Range 3 or above

System 21500 Source Range Monitor (SRM) System
4

Number K5.03 **RO** 2.8 **SRO** 2.8 **CFR Link** (CFR 41.5 / 45.3)

Knowledge of the operational implications of the following concepts as it applies to SOURCE RANGE MONITOR (SRM) SYSTEM : Changing detector position

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

SSES Unit 1 shutdown in Mode 5 for a scheduled refueling outage. The Division I 24 VDC distribution system is in the following configuration:

- Battery 1D670 is DISCONNECTED from the 1D672 24-VDC Bus to support emergent corrective maintenance.
- BOTH Battery Chargers 1D673 and 1D674 are powered from the 1Y216 Instrument AC Distribution Panel to support planned maintenance on 1Y236.

For unknown reasons, the 1B216 ESS 480-VAC MCC is DEENERGIZED.

p.s. from memory

Which ONE of the following correctly describes the status of Intermediate Range Monitors (IRM)?

- A** IRMs "A", "C", "E", and "G" are deenergized and failed DOWNSCALE
IRMs "B", "D", "F", and "H" are energized and OPERABLE
IRMs "A", "C", "E", and "G" CAN be inserted or withdrawn
IRMs "B", "D", "F", and "H" CAN be inserted or withdrawn
- B** IRMs "A", "C", "E", and "G" are deenergized and failed DOWNSCALE
IRMs "B", "D", "F", and "H" are energized and OPERABLE
IRMs "A", "C", "E", and "G" CAN be inserted or withdrawn
IRMs "B", "D", "F", and "H" can NOT be inserted or withdrawn
- C** IRMs "A", "C", "E", and "G" are deenergized and failed UPSCALE
IRMs "B", "D", "F", and "H" are energized and OPERABLE
IRMs "A", "C", "E", and "G" can NOT be inserted or withdrawn
IRMs "B", "D", "F", and "H" CAN be inserted or withdrawn
- D** IRMs "A", "C", "E", and "G" are deenergized and failed DOWNSCALE
IRMs "B", "D", "F", and "H" are energized and OPERABLE
IRMs "A", "C", "E", and "G" can NOT be inserted or withdrawn
IRMs "B", "D", "F", and "H" can NOT be inserted or withdrawn

nearly same as

Q A

Full power

loss 1 bus

where is power now

coming from the

Idon's

Answers:

A

B

C

D

References Provided to Applicant:

Justification

IRMs "A", "C", "E", and "G" are powered from 1D672. The stem establishes that the associated battery is not available to provide backup power to 1D672 and that both battery chargers are abnormally configured to be powered from the same buss (1Y216). 1Y216 is powered from 1B216 which, according to the stem, is lost. Therefore, 24-VDC to 1D672 is also lost.

The IRM Detector Drive motors for all 8 IRMs are powered from 1Y218. Although the normal power to 1Y218 is lost, the Non-class 1E Uninterruptible Power Supply (UPS) 1D240 keeps 1Y218 powered from a 250-VDC battery and ES Buss 1B236. Therefore all 8 detectors can be moved.

CHOICE (B) - No

WRONG: IRM Detectors "B", "D", "F", and "H" can be moved. IRMs "A", "C", "E", and "G" are deenergized and fall downscale

VALID DISTRACTOR: Applicant may erroneously associate drive motors with associated detectors. Applicant may believe detectors fall upscale.

CHOICE (C) - No

WRONG: All IRMs are movable.

VALID DISTRACTOR: Applicant may understand that 1Y218 is affected by the loss of 1B216 but forget that 1Y218 is protected by an UPS.

CHOICE (D) - No

WRONG: IRMs fall down, not up

VALID DISTRACTOR: everything else is correct.

TOSS

References

Comments and Question Modification History

GII 09/26/05 - Please confirm that there is at least one indicator in the plant (not necessarily IRMs) that will fall upscale on loss of power; otherwise C and D are not plausible. I can't think of any at the plants I worked.

R: will ask. Easy fix by also varying the status of Div II IRMs or Div I IRMs.

SSES Unit 1 is at full power. You observe the following neutron monitoring system status:

- APRM "E" is BYPASSED
- APRM "F" is BYPASSED
- IRM "A" is BYPASSED
- IRM "H" is BYPASSED

*F APRM to bypass
what impact on RPS*

*functions vs
Required # of channels*

*used
knowledge*

Which ONE of the following correctly describes the Reactor Protection System (RPS) status?

- A** All scram functions of RPS "A" (Division I) are AVAILABLE
All scram functions of RPS "B" (Division II) are AVAILABLE
APRM INOP
- B** All scram functions of RPS "A" (Division I) are NOT Available
All scram functions of RPS "B" (Division II) are AVAILABLE
- C** All scram functions of RPS "A" (Division I) are AVAILABLE
All scram functions of RPS "B" (Division II) are NOT Available
- D** All scram functions of RPS "A" (Division I) are NOT Available
All scram functions of RPS "B" (Division II) are NOT Available

SRO only

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - No
WRONG: Div I is not operable.
VALID DISTRACTOR: Div II is operable.

*not in the
book
where does it say this
???*

CHOICE (B) - YES
- T.S. 3.3.1.1 requires the RPS instrumentation for each Function in Table 3.3.1.1-1 to be OPERABLE.
- Table 3.3.1.1-1, Line 2.d, requires that the APRM INOP function be operable in Modes 1 & 2 with a minimum of 2 channels per trip system.
- The INOP function requires a RPS deenergization if the APRM is DNSCL while the IRM is UPSCL.
- According to SSES Training Materials and Plant Dwgs M1-C72-22 (Sheets 6, 7, 8, 9), the APRM-to-IRM association is:
- Division I: A-A, C-C, E-E, E-G and this Div is INOPERABLE because only one APRM INOP function is functional (A-A, E-E, E-G are bypassed)
- Division II: B-B, D-D, F-F, F-H and this Div is OPERABLE because two APRM INOP functions are functional (F-F, F-H are bypassed)

CHOICE (C) - No
WRONG: Div I and Div II are reversed.
VALID DISTRACTOR: Applicant may mistake two bypassed channels for taking two out of three functions away.

CHOICE (D) - No
WRONG: Div II is OPERABLE.
VALID DISTRACTOR: Mirror Image

References

Comments and Question Modification History

Gil 09/26/05 - OK but we should revalidate this one.

Toss

Todd 09/30/05 - designated a unit in the stem and deleted window dressing concerning shift turnover.

Rich 10/03/05 - replaced OPERABLE with AVAILABLE to get away from SRO level.

NRC K/A System/E/A

System 21500 Average Power Range Monitor/Local Power Range Moni
5

Number A1.02 RO 3.9 SRO 4.0 CFR Link (CFR 41.5 / 45.5)

Ability to predict and/or monitor changes in parameters associated with operating the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM controls including RPS status

NRC K/A Generic

**System
Number**

RO

SRO

CFR Link

How is the integrity of Primary Containment protected if one of the RCIC Turbine Steam Supply Instrument Sensing Lines break?

- A The Instrument Sensing Lines are Normally Open and are AUTOMATICALLY isolated in response to a line break.
- B The Instrument Sensing Lines are equipped with a Flow Orifice, a MANUALLY Operated Primary Containment Isolation Valve (PCIV) and an Excess Flow Check Valve.
- C The Instrument Sensing Lines are equipped with a Flow Orifice, an AUTOMATICALLY Operated Primary Containment Isolation Valve (PCIV) and an Excess Flow Check Valve.
- D The Instrument Sensing Lines are Normally Isolated and are AUTOMATICALLY placed in service when RCIC actuates.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No
WRONG: they do penetrate CTMT
VALID DISTRACTOR: Applicant may believe that the sensors are EQ.

CHOICE (B) - YES

CHOICE (A) - No
WRONG: The PCIV is Manual.
VALID DISTRACTOR: everything else is correct.

CHOICE (A) - No
WRONG:
VALID DISTRACTOR:

References

Comments and Question Modification History

***** N O T E: SSES rejected this K/A in 2002 because it was too difficult to write a LOD>1 question. *****

Gil 09/26/05 - ... penetrate the RCIC Turbine ... these RCIC INSTRUMENT ...
R: issue is unclear.
Clarified by phone - revisions made by inserting "RCIC"

Todd 09/30/05 - deleted long winded explanation of the line from stem and replaced "A" with distractor better balanced with "D" and more enticing.

NRC K/A System/E/A

System 21700 Reactor Core Isolation Cooling System (RCIC)
0

Number K1.02 RO 3.5 SRO 3.5 CFR Link (CFR 41.2 to 41.9 / 45.7 to 45.8)

Knowledge of the physical connections and/or cause-effect relationships between REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) and the Nuclear boiler system

NRC K/A Generic

System

Number

RO

SRO

CFR Link

41

RO

SRO

Question ID:

29611 Origin: New

Memory Level

With SSES Unit 2 at full power, a Safety Relieve Valve (SRV) inadvertently opened and is now indicating CLOSED. What is the expected tailpipe temperature 45 minutes later if the SRV is leaking?

Assume Suppression Pool Pressure is ~~14.7 psig~~ **0.2 psig**

Select the closest answer.

- A 551 degrees Fahrenheit.
- B 545 degrees Fahrenheit.
- C 296 degrees Fahrenheit.
- D 252 degrees Fahrenheit.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: this is Tsat for normal RPV pressure of 1040 psig.
VALID DISTRACTOR: TMI lesson learned.

CHOICE (B) - No

WRONG: this is Tsat for normal MS Header pressure of 985 psig.
VALID DISTRACTOR: TMI lesson learned.

CHOICE (C): YES

At 1040 psig (1055 psia), the steam vapor enthalpy is 1190.8 BTU/lbm. Throttling is an isenthalpic process. From the Mollier diagram, we see that the expected tailpipe temperature is in the vicinity of 280 deg F. From the tables, we can interpolate to 296 deg F.

CHOICE (D) - No

WRONG: this is 2 deg F above the alarm setpoint.
VALID DISTRACTOR: the alarm setpoint is 250 deg F

References

Comments and Question Modification History

Gil 09/26/05 - K/A mismatch.

R: will reconsider. Agree that this does not DIRECTLY test automatic ADS valve operation. But Applicant should understand whether tailpipe temperatures are trending to ambient or not following an open SRV.

Todd 09/30/05 - verify with SSES that 45 minutes eliminates "D" as potentially correct.

NRC K/A System/E/A

System 21800 Automatic Depressurization System
0

Number A3.01 RO 4.2 SRO 4.3 CFR Link (CFR 41.7 / 45.7)

Ability to monitor automatic operations of the AUTOMATIC DEPRESSURIZATION SYSTEM including: ADS valve operation

NRC K/A Generic

System

Number RO SRO CFR Link

A loss of 250-VDC Load Center 1D662 would affect the (1) system PUMP by preventing the (2) Primary Containment Isolation Valves (PCIV) from closing.

- A (1) High Pressure Coolant Injection (HPCI)
(2) Outboard *Discharge*
- B (1) Reactor Core Isolation Cooling (RCIC)
(2) Outboard
- C (1) High Pressure Coolant Injection (HPCI)
(2) Inboard *Suction*
- D (1) Reactor Core Isolation Cooling (RCIC)
(2) Inboard

steam supply
2 correct answers

Answers: A B C D

References Provided to Applicant:

Justification

From TM-OP-088, the 1D264 and 1D274 busses are powered from 1D662. 1D662 is powered from the 1D663 Battery Charger or the 1D660 Battery. The stem specifies a loss of 1D662. Therefore, the cause of this loss is irrelevant. However, the successful Applicant must recognize that loss of 1D662 will also cause a loss of 1D274 and 1D264. Alternatively, the successful Applicant may know that RCIC DC-powered MOVs are powered from Div I and HPCI DC-powered MOVs are powered from Div II of the 250-VDC system.

CHOICE (A) - YES
1D264 and 1D274 provide power to the HPCI outboard PCIVs.

CHOICE (B) - No
WRONG: It's HPCI, not RCIC
VALID DISTRACTOR: correct valves.

CHOICE (C) - No
WRONG: Wrong Valves
VALID DISTRACTOR: Correct system

CHOICE (D) - No
WRONG: Wrong valves and system.
VALID DISTRACTOR: Mirror image.

References

Comments and Question Modification History

1. Gil 09/26/05 - can't see connection between 1D662 and Outboard MOV.
R: INBD Vvs AC pwr'd to prevent sparking inside PC that could ignite H2 if present. OTBD Vvs are DC powered for reliability & diversity. Added text to justification section explaining 250-VDC distribution. Also added word "PUMP" to stem to preclude "B" from being a potentially correct second answer. HV-149F084, RCIC TURB EXH VAC BKR OB VLV, is powered from 1D264 and is an Outboard PCIV.
2. Todd 09/30/05 - OK.

NRC K/A System/E/A

System 22300 Primary Containment Isolation System/Nuclear Steam
2

Number K6.02 RO 3.0 SRO 3.2 CFR Link (CFR 41.7 / 45.7)

Knowledge of the effect that a loss or malfunction of D.C. electrical distribution will have on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF

NRC K/A Generic

System

Number RO SRO CFR Link

SSES lost all offsite power (LOOP). During the transient, a Main Steam (MS) line on SSES Unit 2 broke and caused Main Steam Isolation Valves (MSIV) to CLOSE. Subsequently, the control room is EVACUATED and you go to the SSES Unit 2 Remote Shutdown Panel (1C201). The following conditions now exist:

- BOTH the Upper and Lower Relay rooms are inaccessible.
- Drywell Pressure is 1.9 psig.
- Reactor Pressure Vessel (RPV) Pressure is cycling between 1,180 psig and 1,150 psig.
- Safety Relief Valve (SRV) control has been transferred to the Remote Shutdown Panel.

What functional mode, if any, are the Safety Relief Valves (SRV) operating in?

- A Overpressure SAFETY operation
- B Overpressure RELIEF operation
- C Low pressure ECCS (ADS)
- D None, RCIC is controlling RPV Pressure.

① Which SRVs RSD control or all SRVs
 ② normally do not call. Blowdown of valves
 ③ RSD design is fine no accident

Answers: A B C D

References Provided to Applicant:

Justification

Complete rewrite of original question. Old question saved as Order 431.

CHOICE (A) - YES

There are 18 SRVs. In the SAFETY mode, two SRVs open at 1175, six SRVs open at 1195 and eight SRVs open at 1205 psig. In the SAFETY mode, the SRVs close at 97% of set pressure. 97% of 1175 is 1140. 97% of 1195 is 1160. Therefore, 1180 to 1150 is a reasonable expectation for RPV pressure in this condition.

CHOICE (B) - No

WRONG: RELIEF mode is incorrect - pressures too high
VALID DISTRACTOR: This is one mode of SRV operation

CHOICE (C) - No

WRONG: Pressure is not steadily lowering.
VALID DISTRACTOR: This is one mode of SRV operation.

CHOICE (D) - No

WRONG: RCIC would not cause pressure to cycle.
VALID DISTRACTOR: RCIC is one method of controlling RPV pressure if MSIVs close.

References

Comments and Question Modification History

NOTE: per ON-100-009, ADS valves can be operated from the Relay Rooms.

Revised correct answer to "A" after telephone discussion with SSES. Accumulators will provide some operation of SRVs A, B, C from the RSD in this condition. Operation in SAFETY mode will not deplete the accumulator.

????? QUESTION: would the accumulators have depleted in RELIEF mode by now? ????????

1. Gil 09/28/05 - believes SRVs always operate in Overpressure Relief mode before safety relief mode. This will deplete the air supply. Question may have NO correct answer if this is true.
R: The stem conditions state that pressure is cycling between 1180 and 1150. At these higher values, the SRVs have to be in the Safety mode because RPV pressures would be lower in the Relief mode. Applicant should be sufficiently familiar with the setpoints to recognize this.

May need to delete second half of question regarding which SRVs have controls at the RSD to make the entire question plausible. Distractors c/b RELIEF, ADS, RCIC/HPCI.

Agree to toss second half out and make corrections to remaining distractors. Essentially rewrote the question. Saved old one as 431.

NOTE: from ON-100-009, learned that Automatic RELIEF mode operation is NOT possible when control transferred to RSD panel. May be able to use this if further revision required.

NRC K/A System/E/A

System 23900 Relief/Safety Valves
2

Number K5.02 **RO** 3.7 **SRO** 3.8 **CFR Link** (CFR 41.5 / 45.3)

Knowledge of the operational implications of the Safety function of SRV operation as it applies to RELIEF/SAFETY VALVES

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

Reactor power is 27% and rising pursuant to a normal reactor startup. Which ONE of the following would cause a ROD BLOCK?

- A Intermediate Range Monitor Detector is FULLY INSERTED.
- B Main Turbine FIRST-STAGE Pressure instrument fails HIGH.
- C WIDE RANGE RPV Water Level REFERENCE leg ruptures.
- D One Main Steam Flow instrument fails DOWNSCALE.

① Rod pattern must be outside normal
 ② No correct answer
 ③ K/A mismatch

Answers: A B C D

Reference Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: At 50% power, the MODE switch is in RUN - that bypasses the IRM UPSCALE Scram and Block.
VALID DISTRACTOR: Fully inserted would yield a Block if not bypassed because the IRM would read >108%

CHOICE (B) - No

WRONG: This would not cause a rod block
VALID DISTRACTOR: First Stage pressure is an input to RSCS which would cause a rod block if it failed low.

CHOICE (C) - No

WRONG: RPV Water Level has no Rod Block function and this failure would cause a HIGH condition.
VALID DISTRACTOR: The Narrow Range Instrument is an input to FWLCS but is not sent onto to RWM from there. Moreover, the Ref leg rupture would cause a HIGH level indication that would NOT actuate any other protective features that could cause an RPS Scram which would block rods.

CHOICE (D) - YES

References

Comments and Question Modification History

Gil 08/26/05 - K/A mismatch.
R: Disagree. MS flow does affect RWM. FWLCS uses Steam Flow as an input. FWLCS also sends TOTAL Steam Flow to the RWM to determine if the plant is above/below LPSP or LPAP. At 50%, each steam line is inputting 12.5%. If one goes to zero, the TOTAL steam flow goes to 37.5%. This is the ONLY relationship between the Reactor Water Level Control System and the Rod Worth Minimizer.

The following is copied from TM-OP-031D
Main Steam Line (MSL) flow is measured by the Feed Water Level Control (FWLC) System to determine when the plant is operating at 22 percent of Rated Thermal Power (RTP). This monitored parameter is inputted to the RDCS and PICSY to activate the LPSP. The setpoint can be adjusted by varying the trip value in the MSL flow sensor.

Noted computational and typographical errors:
Changed 50% power to 27% to ensure loss of one MS flow instrument puts total steam flow below LPSP of 22%.
Corrected reference to TM-OP-031D from TM-OP-078K.

Gil is now OK.

NRC K/A System/E/A

System 25900 Reactor Water Level Control System
2

Number K3.03 RO 2.7 SRO 2.9 CFR Link (CFR 41.7 / 45.4)

Knowledge of the effect that a loss or malfunction of the REACTOR WATER LEVEL CONTROL SYSTEM will have on Rod worth minimizer (Plant-Specific)

NRC K/A Generic

System

Number RO SRO CFR Link

MAJOR or TOST

Following a Reactor Feed Pump Turbine (RFPT) trip, in addition to the automatic interlocks, what Operator actions must be MANUALLY satisfied before resetting the RFPT trip?

- A RFP Suction (HV-10616) NOT Full Closed
RFP Disch (HV-10603) CLOSED
RFP Min Flow (FV-10604) In AUTO
Min Flow (FIC-10604) set for 2,000 gpm
- B RFPT Stop Valves (SV) are RESET
Trip Conditions CLEARED or BYPASSED
RFPT Exhaust (HV-12731) 100% OPEN
RFP Disch (HV-10603) NOT 100% CLOSED
- C RFPT Exhaust (HV-12731) 100% OPEN
RFPT Control Valves 100% CLOSED
RFPT LP Isol (HV-12709) 100% CLOSED
RFPT HP Isol (HV12710) 100% CLOSED
- D RFP Min Flow (FV-10604) in MAN
Min Flow (FIC-10604) set for 2,000 gpm
RFP Disch (HV-10603) CLOSED
EAP Control (SIC-C32-1R601) at 0

① Permissible to reset vs proc. requirement

② From memory

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - No
WRONG: Mix of Automatic and Manual requirements on the pump side. AUTO is incorrect.
VALID DISTRACTOR: Mix of AUTO and MAN requirements.

CHOICE (B) - No
WRONG: SVs s/b NOT RESET. Trip conditions is AUTO. Disch Vv s/b full closed
VALID DISTRACTOR: Mix of AUTO and Manua.

CHOICE (C) - No
WRONG: These are all automatic interlocks in their correct state - turbine side.
VALID DISTRACTOR: they are interlocks that would prevent RFPT Reset.

CHOICE (D) - YES

References

Comments and Question Modification History

Modified from SSES Exam Bank essay question.
09/19/2005: Per SSES staff, MSC must be on LSS per simulator attempt to reset RFPT Trip during previous weekend.
Changed answer "D" to reflect MSC on LSS as an Automatic Interlock.

Gil 09/26/05 - Change justification for "D" (correct answer).
R: corrected justification.

Todd 09/30/05 - too busy. reduced to four Manual actions. original saved as 451.

NRC K/A System/E/A

System 25900 Reactor Water Level Control System
2

Number A4.09 RO 3.4 SRO 3.1 CFR Link (CFR 41.7 / 45.5 to 45.8)
Ability to manually operate and/or monitor TDRFP lockout reset: TDRFP in the control room

10605

NRC K/A Generic

System
Number RO SRO CFR Link

The following conditions exist on SSES Unit1:

- Recently entered Mode 4 in preparation for a planned refueling outage.
- Primary Containment is PURGING.

SSES Unit 2 has a Loss of Coolant Accident (LOCA) and DRYWELL PRESSURE quickly rises above 1.72 psig.

Which ONE of the following describes the correct ventilation system response?

- A** All three Reactor Building Zones (1, 2 and 3) Isolate and automatically reconfigure to RECIRCULATION.

Standby Gas Treatment (SGTS) automatically takes suction on the Reactor Building Exhaust ventilation stack.

SSES Unit 1 PURGE automatically ISOLATES.

- B** Reactor Building Zones 2 and 3 Isolate and automatically reconfigure to RECIRCULATION.

Standby Gas Treatment (SGTS) automatically takes suction on the Reactor Building Exhaust ventilation stack.

SSES Unit 1 PURGE automatically ISOLATES.

- C** Reactor Building Zones 2 and 3 Isolate and automatically reconfigure to RECIRCULATION.

Standby Gas Treatment (SGTS) automatically takes suction on the Reactor Building Recirculation plenum.

SSES Unit 1 PURGE Continues.

- D** All three Reactor Building Zones (1, 2 and 3) Isolate and automatically reconfigure to RECIRCULATION.

Standby Gas Treatment (SGTS) automatically takes suction on the Reactor Building Recirculation plenum.

SSES Unit 1 PURGE Continues.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - No

WRONG: Only Zones 2 and 3 Isolate. SGTS does not take suction on the Exhaust Vent

VALID DISTRACTOR:

CHOICE (B) - No

WRONG: SGTS does NOT take suction on the Exhaust Vent

VALID DISTRACTOR: reasonable misconception to believe SGTS would draw suction on the normal exhaust path.

CHOICE (C) - YES

Zones 2 (Unit 2) and 3 (Common) Isolate and reconfigure to Recirc

SGTS automatically takes suction on RB Recirc plenum

Unaffected unit does not isolate. Therefore, purge continues.

CHOICE (D) - No

WRONG: Only Zones 2 and 3 isolate

VALID DISTRACTOR: Purge continues and SGTS suction is correct.

References

Comments and Question Modification History

Confirm with SSES that unaffected unit's purge will continue.

Gil 09/26/05 - OK

Todd 09/30/05 - OK

NRC K/A System/E/A

System 26100 Standby Gas Treatment System
0

Number K1.01 **RO** 3.4 **SRO** 3.6 **CFR Link** (CFR 41.2 to 41.9 / 45.7 to 45.8)

Knowledge of the physical connections and/or cause-effect relationships between STANDBY GAS TREATMENT SYSTEM and the following: Reactor building ventilation system

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

RO EXAM

48

SSES experienced a seismic event. Consequently, a loss of offsite power (LOOP) occurred. Both units have established Reactor Pressure and Inventory control using Reactor Core Isolation Cooling (RCIC). All 4.16 kVAC and 480 VAC ESS buses are energized.

One hour later, the Control Room Operators are investigating a slow rise in Drywell Pressure on SSES Unit 1. Conditions rapidly deteriorate and the following conditions develop:

On SSES Unit 1:

- Drywell Pressure is 2.1 psig.
- Reactor Pressure Vessel pressure is 395 psig.
- Residual Heat Removal (RHR) pumps 1P202 B, C, D are running.
- Core Spray (CS) pumps 1P206 B, C, D are running.
- Emergency Service Water (ESW) pumps 0P504 B, C, D are running.

On SSES Unit 2:

- Control Rod Drive (CRD) pump 2P132A is running.
- Reactor Building Chiller 2K206A is running.

Which ONE of the following describes the cause of these conditions and the required actions?

- A** Emergency Diesel Generator (EDG) "A" failed to start.
Perform ON-104-201, LOSS OF 4KV BUS 1A (1A201) or ON-204-201, LOSS OF 4KV BUS 2A (2A201) to start the EDG.
- B** Emergency Diesel Generator (EDG) "A" is running but not powering 1A201 or 2A201.
Perform ON-104-201, LOSS OF 4KV BUS 1A (1A201) and ON-204-201, LOSS OF 4KV BUS 2A (2A201).
- C** ESS bus 1A201 & 2A201 deenergized because Emergency Diesel Generator (EDG) "A" TRIPPED.
Perform ON-104-201, LOSS OF 4KV BUS 1A (1A201) or ON-204-201, LOSS OF 4KV BUS 2A (2A201) to restart the EDG.
- D** ESS bus 1A201 deenergized because breaker 1A20104 (EDG Supply) tripped OPEN.
Perform ON-104-201, LOSS OF 4KV BUS 1A (1A201).

① Reverse logic. I can see the cause - Bus de-energized
② Correct answer is "D"

MAJOR

SSES has a Loss of Offsite Power (LOOP). Emergency Diesel Generator (EDG) "A" fails to start. Within 10 minutes, Operators start EDG "E" and energize 1A201 and 2A201.

45 takes

Both VITAL AC UPS (1D666 & 2D666) are energized from their (1) source.

All four NON-CLASS 1E INSTRUMENT AC UPS (1D240, 1D130, 2D240, 2D130) are energized from their (2) source.

Note: UPS = UNINTERRUPTIBLE POWER SUPPLIES

- A 250-VDC ALTERNATE source (1D662, 2D142).
250-VDC ALTERNATE source (1D652, 1D662, 2D652, 2D662)
- B 250-VDC PREFERRED source (1D662, 2D142).
480-VAC PREFERRED source (1B236, 1B246, 2B236, 2B246)
- C 480-VAC PREFERRED source (1B246, 2B246).
480-VAC BACKUP source (1B216, 1B226, 2B216, 2B226)
- D 480-VAC ALTERNATE source (1B246, 2B246).
250-VDC ALTERNATE source (1D243, 1D133, 2D243, 2D133).

① What are we talking answer same as if "A" rolled

② If 45 min answer is "D"

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - No
WRONG: Vital: Pfd v. Alt. Inst: wrong source of 250-VDC & would not be on 250-VDC

CHOICE (B) - YES

CHOICE (C) - No
WRONG: Vital: 480-VAC is not Pfd. Inst: would not swing to B/U cause EDG "E" brought on in under 20 minutes.

CHOICE (D) - No
WRONG: Vital: no reason to shift to 480-VAC alt Inst: would have shifted back to Pfd 480-VAC source

HOD because Applicant must distinguish LOOP from Blackout. Here, following a LOOP, the EDGs respond to power the ES busses.

References

Comments and Question Modification History

GI 09/26/05 - "A" and "C" not plausible with "all ...components operate as designed". That is, everyone should know 1E equipment will be energized. Use a different term (RPS MG Set or Instrument AC Distribution Panel 1Y216, etc) rather than "CLASS 1E".

Answer B does not appear correct. The way I read the references the preferred will be lost for about 10 seconds and the UPS will run on DC. Then when the EDG energizes the bus the UPS will automatically shift back to preferred.

R: will revisit this question.

Added "one minute after" to expressly show question is asking for conditions after the transient.

Suggestion: don't say "Class 1E" and just identify the buss itself.

MINOR

.....

• COMPLETE REWRITE 27 SEPTEMBER 2005 •

.....

Todd 09/30/05 - same question with substantial revisions. Saved old one as 481.

NRC K/A System/E/A

System 26200 Uninterruptable Power Supply (A.C./D.C.)
2

Number K6.01 **RO** 2.7 **SRO** 2.9 **CFR Link** (CFR 41.7 / 45.7)

Knowledge of the effect that a loss or malfunction of A.C. electrical power will have on the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.)

NRC K/A Generic

System

Number **RO** **SRO** **CFR Link**

250 VDC Battery Charger 2D683 has the following front panel indications:

- Battery Charger Float-Equalize switch is in FLOAT.
- Battery Charger Interval Timer set to FIVE HOURS.

If I see the float light and interval timer I can see the meters. Fill in BLANK

Which ONE of the following is correct concerning charger operation?

- A** Output voltage will be between 279 and 287 VDC for five hours, then lower to between 265 and 271 VDC thereafter.
- B** Output voltage will be between 265 and 271 VDC for five hours, then ^{Rise} lower to between 279 and 287 VDC thereafter.
- C** Output voltage will be between 279 and 287 VDC for five hours and will remain between 279 and 287 VDC thereafter.
- D** Output voltage will be between 265 and 271 VDC for five hours and will remain between 265 and 287 VDC thereafter.

Answers:

A

B

C

D

References Provided to Applicant:

Justification

CHOICE (A) - YES

Per TM-OP-088 and OP-1(2)88-001, this provides Equalizing Charge for five hours, then automatically reconfigures to the FLOAT mode.

CHOICE (B) - No

WRONG: Reverse of correct answer

VALID DISTRACTOR: First FLOAT, then EQUALIZE

CHOICE (C) - No

WRONG: Stay on EQUALIZE

VALID DISTRACTOR: Correct if Float-Equalize switch in EQUALIZE

CHOICE (D) - No

WRONG: Stay on Float

VALID DISTRACTOR: Applicant may believe that the Float-Equalize switch must be in EQUALIZE to conduct charge.

References

Comments and Question Modification History

GIJ 09/28/05 - add to stem: ...switch has just been placed in FLOAT. This ensures the full five hours at 279-287 will occur; making "A" correct

R: added "up to" in each answer choice. Pfd concept of Operator on tour discovering these conditions.

deleted "up to" and added "is" to the stem.

Todd 09/30/05 - OK

NRC K/A System/E/A

System 26300 D.C. Electrical Distribution
0

Number K1.02 RO 3.2 SRO 3.3 CFR Link (CFR 41.2 to 41.9 / 45.7 to 45.8)

Knowledge of the physical connections and/or cause-effect relationships between D.C. ELECTRICAL DISTRIBUTION and Battery charger and battery

NRC K/A Generic

System
Number RO SRO CFR Link

Reward minor

50

RO SRO

Question ID: 29819 Origin: Mod

Memory Level

consider reverse
Why and how does the Operator reduce and stabilize Diesel Generator load at 300 - 500 KW before opening the EDG-to-Bus breaker?

- A To prevent an ENGINE Trip on Reverse Power, by adjusting the Diesel Generator Voltage Adjust (HS-00053).
- B To prevent a STARTUP TRANSFORMER TAP Change which can cause a Diesel Generator Trip, by adjusting the Diesel Generator Voltage Adjust (HS-00053).
- C To prevent an ENGINE Trip on Reverse Power, by adjusting the Diesel Generator Speed Governor (HS-00054).
- D To prevent a STARTUP TRANSFORMER TAP Change which can cause a Diesel Generator Trip, by adjusting the Diesel Generator Speed Governor (HS-00054).

Answers: A B C D

References Provided to Applicant:

Justification

CHOICE (A) - No
WRONG: adjusting voltage changes reactive load (KVAR not KW).
VALID DISTRATOR: Correct Engine trip

CHOICE (B) - No
WRONG: adjusting voltage changes reactive load (KVAR not KW).
VALID DISTRATOR: S/U XFMR TAP Changer adjustments can cause EDG trips but this is not why REAL load is reduced. Reactive load is minimized (kept close to zero) to prevent TAP changes.

CHOICE (C) - YES

CHOICE (D) - No
WRONG: S/U XFMR TAP Changer adjustments can cause EDG trips but this is not why REAL load is reduced. Reactive load is minimized (kept close to zero) to prevent TAP changes.
VALID DISTRATOR: Correct DG control scheme.

References

Comments and Question Modification History

Gil 09/28/05 - OK

Todd 09/30/05 - revised from (1) (2) format to simple sentence structure.

NRC K/A System/E/A

System 26400 Emergency Generators (Diesel/Jet)
0

Number A1.09 RO 3.0 SRO 3.1 CFR Link (CFR 41.5 / 45.5)

Ability to predict and/or monitor changes in parameters associated with operating the EMERGENCY GENERATORS (DIESEL/JET) controls including Maintaining minimum load on emergency generator (to prevent reverse power)

NRC K/A Generic

System

Number RO SRO CFR Link