

FACILITY POST-EXAMINATION COMMENTS
FOR THE
CLINTON POWER STATION INITIAL EXAMINATION
AUGUST 2007



An Exelon Company

Clinton Power Station
R. R. 3, Box 228
Clinton, IL 61727

U-603832
August 31, 2007

Mr. J. L. Caldwell
Regional Administrator, Region III
U. S. Nuclear Regulatory Commission
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Clinton Power Station
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Comments Regarding Initial License Operator Examination
Administered on August 23, 2007

This letter is to request that questions 12, 69, 71 and 75 be reviewed per the attached comments for the Clinton Power Station Reactor Operator License Examination administered on August 23, 2007. Enclosed are the questions and associated documentation that justifies this request. Required references have been provided with the original exam submittal on letter U-603818 dated June 22, 2007.

If you should have any questions concerning this matter please contact Mr. M. Helton at (217) 937-4046.

Sincerely,

F. A. Kearney
Plant Manager
Clinton Power Station

Attachments

cc: NRC Clinton Licensing Project Manager (w/o Attachment)
NRC Resident Office, V-690 (w/o Attachment)

U-603832
August 31, 2007

Subject: Comments Regarding Initial License Operator Examination
 Administered on August 23, 2007

bcc: B. C. Hanson, V-275 (w/o Attachment)
 F. A. Kearney, T-31A (w/o Attachment)
 NRC Document Control Desk (w/o Attachment)
 Director – Licensing, Mid-West Regional Operating Group (w/o Attachment)
 Document Control Desk Licensing (w/o Attachment)
 G. J. Mosley, T-31R, (w/o Attachment)
 A. D. Bailey, V-922 (w/o Attachment)
 G. D. Setser, V-922 (w/o Attachment)

DATE: 8/24/07

SUBMITTED BY: _____

RO/RO

EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 2

Concern or Problem: The question as stated asks for ways the operator can check RR pump temperatures. The ROs routinely use Display Screen (DCS) #10 for RR PMS Points on Group Point #7.

Recommended Resolution: Accept distractors c. or d.

Attached Reference(s): CPS No. 3512.01, DISPLAY CONTROL SYSTEM (DCS/CX) AND PERFORMANCE MONITORING SYSTEM (PMS/CZ)

LP85283, DISPLAY CONTROL SYSTEM (DCS/CX) AND PERFORMANCE MONITORING SYSTEM II.A and III.A.2

USAR 7.7.1.21.1/2, Display Control System (DCS)

USAR 7.7.1.7.1.1, Performance Monitoring System (PMS)

Remarks/ Justification: USAR, Sections 7.7.1.7 & 7.7.1.21 and LP85283, Sections II.A & III.A.2 includes Display Screen #10 as part of DCS and does not differentiate a separation from DCS when a PMS input is selected for display.

Additional comments: When an alarm on RR temperatures is received the first step the RO does is select PMS Group Point #7 on DCS Display Screen #10. This will provide the needed information without leaving the MCR area.

Exam Analyzer comments:

Final Resolution: CPS Management response: Answer c. is the only correct answer. Even though RR pump temperatures are available on DCS Screen #10, the RO must change this screen to select Group Point #7 on PMS.

Approved by: [Signature] / 8/31/07
Operations Management Date

Approved by: [Signature] / 8/31/07
Training Management Date

Question Number 2

The unit is operating at rated power. Component Cooling Water (CC) pump 1A is out of service for repair.

Annunciator 5040-1B, AUTO TRIP PUMP/MOTOR, actuates when CC pump 1C trips.
A few seconds later annunciator 5003-3D, RECIRC MTR A WDG CLG WTR FLOW LO actuates.

Three minutes later annunciator 5003-1K, RECIRC PMP MTR A OR B TEMP HI actuates.

How can the control room operator determine which Reactor Recirculation (RR) Pump component temperature is causing the alarm?

- A: Direct the Equipment Operator to check RR temperatures at local panel 1B33-P001A(B).
- B: Direct the Equipment Operator to check RR temperatures at local HCU panel.
- C: Check Recirc pump temperatures on Control Room panel 1H13-P614 recorder.
- D: Check Recirc pump temperatures on DCS.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 2

Question No: ILT-6921

STA_Question

RO Question

SRO Question

AorB

c

The RR pumps' motor winding, bearing, seal, and cooling water outlet temperatures are recorded on recorder 1B33-R601 at panel 1H13-P614. These temperatures may also be monitored on PMS.

Reference:

None

Reference Provided:

CPS 5003-1K, RECIRC PMP MTR A OR B TEMP HI, R

Explanation:

a and b are incorrect - There are no local indications for RR pump component temperatures; however, may be selected dependent upon examinee knowledge of local RR instrumentation.

d is incorrect - RR pump temperatures can be monitored on PMS but not on DCS. The RR DCS displays contain a lot of information but do not have indication of pump temperatures.

ANSWER KEY

1.0

PURPOSE

To detail normal and backup methods of interfacing with the plant Process Computer System (CX/CZ).

The purpose of the CX/CZ system is to provide timely and useful data in a highly understandable fashion which will assist the operator in the decision making process during planned operations and during upset conditions.

2.0

DISCUSSION/DEFINITIONS

2.1

The CX/CZ System Is Divided Into Two Subsystems:

1. PERFORMANCE MONITORING SYSTEM (PMS, CX) - BOP and NSS Processors make up the PMS System, performing process computer functions and supporting DCS.
2. DISPLAY CONTROL SYSTEM (DCS, CZ) - displays plant information on the NUCLENET control console CRT's in accordance with the operator selected format.
3. As a computer process application, the major system consoles are simply referred to by their **Function** name. Following is a **Function Noun Name/EIN** cross-reference.
 - NSS CP1, C91-P600
 - DCP-1 CP3, C94-P603
 - DAP-1 CP5, C94-P601
 - TRU DT7, C94-P600
 - Programmer/Results Center Console, 1C91-P642
 - BOP CP2, C91-P601
 - DCP-2 CP4, C94-P604
 - DAP-2 CP6, C94-P602

2.2

Safety Parameter Display System (SPDS), part of PMS/DCS dedicated to CRT #5, assists control room personnel in evaluating the safety status of the plant.

The primary function of SPDS is to aid the operator in the rapid detection of abnormal operating conditions, by displaying inputs to the 5 Critical Safety Functions.

Refer to Precaution 4.2 if SPDS display capability is lost.

2.3

The MCR Large Screen LCD Monitor System supports displaying 3D Monicore, Power/Flow Map, Reactivity & DARs information. PMS data is not accessible for display.

The system is LAN based through the 'B' RO's PC Terminal, and is normally controlled by the 'B' RO. Normal computer skills are all that is required to operate the system.

The Power/Flow Map is recommended to be the normal display screen, however, other custom displays can be used in support of plant activities as determined by SMngt.

During off-normal/emergency conditions, the use of the Display System shall not interfere or distract with the operators response or use of Safety-Related instrumentation. Once plant conditions are stabilized, the Display System can be used to help monitor the plant.

RO QUESTION #2 ATTACHMENT #1

Content/Skills

Activities/Notes

II. System Purpose

A. System Purpose

[1.1]

The purpose of the CX/CZ system is to provide timely data in an organized manner which will assist the operator in the decision making process during planned operations and during upset conditions. The CX/CZ System Is Divided Into Two Subsystems, the Performance Monitoring System and the Display Control System.

The Performance Monitoring System (PMS, CX) - BOP and NSS Processors make up the PMS System, performing process computer functions and supporting 3D Monicore.

The Display Control System (DCS, CZ) - displays plant information on the NUCLENET control console Cathode Ray Tubes (CRT's) in accordance with the operator , selected format.

The Safety Parameter Display System (SPDS) is a subsystem of DCS and assists the control room personnel in evaluating the safety status of the plant. Through the use of four Critical Safety Functions (CSFs), the SPDS provides a continuous indication of plant parameters or derived variables representative of the safety status of the plant.

B. Design Basis

1. The CX/CZ system is classified as a power generation system and is not related to safety.
2. The Clinton SPDS sensor signals are electrically isolated from all safety-related systems. With the exception of the isolators, the SPDS does not require Class 1E power sources or equipment qualification. The SPDS need not meet single failure criteria or Seismic Category I requirements.
3. The power for the process computer system is supplied from a reliable AC power source, which includes an Uninterruptible Power Supply with a four-hour battery back-up.

Content/Skills

Activities/Notes

III. SYSTEM FLOWPATH(S)

A. Overview

The Plant Computer consists of the following major sections:

1. The PMS performs the monitoring functions and calculations required for the effective operation of the power plant. The PMS computer includes the Nuclear Steam Support (NSS) and Balance of Plant (BOP) Computer.
 - a. The functions performed include monitoring of process inputs, performing calculations on these inputs, and displaying the inputs and calculated results on one or more of the following: video monitor, typewriter, line printer, and PMS trend recorder.
 - b. The calculations performed by PMS include process validation and conversion, combination of points, Nuclear Steam Supply performance calculations, and Balance of Plant performance calculations. Operator communication is provided to accomplish the above functions.
2. The DCS, through the use of color displays located on 1H13-P680, provides the operator with all pertinent information concerning the normal operation and status of plant systems. Data is obtained directly from plant process inputs and supporting information is available from the PMS.
 - a. A selection of display formats is available to the operator, which provides considerable flexibility in obtaining information that is applicable to various plant operating modes.
 - b. The design utilizes both modularity and redundancy to ensure a highly reliable system. Redundancy helps ensure operational continuity.
3. The Safety Parameter Display System (SPDS) display is a part of the PMS/DCS Systems.
 - a. The CPS SPDS provides a concise display of critical plant parameters to the Main Control Room (MCR) operators to aid them in rapidly and reliably assessing the safety status of the plant.

CPS/USAR

7.7.1.7 Performance Monitoring System (PMS)7.7.1.7.1 System Identification7.7.1.7.1.1 General

The objective of the PMS are to provide a fast and accurate determination of core thermal performance; to improve data reduction, accounting, logging function, and to pass pertinent data to the display control system described in subsection 7.7.1.21.

7.7.1.7.1.2 Classification

This system is a power generation system and is classified as a system not related to safety.

7.7.1.7.1.3 Reference Design

Table 7.1-2 lists reference design information.

7.7.1.7.2 Power Sources

The power for the performance monitoring system is supplied from a reliable ac source which includes a UPS with a four hour battery back-up.

7.7.1.7.3 Equipment Design7.7.1.7.3.1 Circuit Description

The PMS performs the monitoring functions and calculations defined as being required for the effective operation of a nuclear power plant. The functions performed include monitoring of process inputs, performing calculations on these inputs, and displaying the inputs and calculated results on one or more of the following: video monitor, typewriter, line printer, and PMS trend recorder. The calculations performed by PMS include process validation and conversion, combination of points, nuclear steam supply performance calculations, and balance of plant performance calculations. Operator communication is provided to accomplish the above functions.

The PMS hardware is composed of the following major components:

- (1) The central processors perform various calculations, make necessary interpretations, and provide for general input/output device control and buffered transmission between I/O devices and memory.
- (2) An automatic priority interrupt (API) module provides processor capability to respond rapidly to important process functions and to operate at optimum speed.
- (3) A random access type processor memory. A memory parity check feature is capable of stopping computer operation subsequent to completing an instruction in which a parity error is detected. The processor memory has suitable shutdown protection to prevent information destruction in the event of loss of power or incorrect operating voltage.

RO QUESTION #2 ATTACHMENT #2

CPS/USAR

7.7.1.20.3.2 Equipment Arrangement

PGCC design provides a defense-in-depth approach to fire protection. Each floor section contains at least four smoke detectors and eight thermal detectors. Fire stops of RTV/silicon rubber foam are installed in the cable ducts. A Halon 1301 extinguishing agent is introduced into the floor section cable ducts via a header manifold and nozzle distribution system. This provides at least a 6% concentration of Halon within 10 seconds of activation; there is sufficient Halon to maintain this concentration for at least 10 minutes. In addition, the floor plate design allows for quick removal so that the main control room operators may use hand-held fire extinguishers when required.

There are four smoke detectors in each termination cabinet. Smoke detectors are also located in the main control room panel bays.

The detectors and manifold piping and distribution system is part of the PGCC/control room complex.

7.7.1.20.4 Environmental Considerations

PGCC fire protection system will operate satisfactorily through a temperature range of -40° F to +120° F and through a humidity range from 10% to 90% relative humidity.

7.7.1.20.5 Operational Considerations

7.7.1.20.5.1 General

The PGCC detectors provide alarm annunciation in the main control room.

7.7.1.20.5.2 Reactor Operator Information

Defense-in-depth is again implemented by the reactor operator upon failure of initiation of the Halon system. As an option he can use the hand-held fire extinguishers.

7.7.1.20.6 Setpoints

Products of combustion detectors respond to .003 grams of product per cubic foot of air. The thermal detectors respond to a temperature rate of rise of 15° F per minute (minimum) or an ambient temperature of 140° F (minimum).

7.7.1.21 Display Control System (DCS)

7.7.1.21.1 General

Through the DCS and its color displays located on the PPC, the operator receives all pertinent information concerning the normal operation and status of plant systems. Primary data is measured directly from plant process inputs and supporting information is available from the Performance Monitoring System (PMS) described in Section 7.7.1.7. Considerable flexibility is provided in display formats to accommodate the various plant operating modes. The design utilizes both modularity and redundancy to ensure a highly reliable system. It is emphasized that such redundancy is provided to secure the benefits of operational continuity. The DCS

RO QUESTION #2 ATTACHMENT #2

CPS/USAR

computer system is not safety-related and is not necessary to determine the status or proper performance of any safety system.

7.7.1.21.2 Hardware Configuration

Plant process data are received and signal conditioned by the remote analog and digital units. Process inputs are checked by the two data acquisition processors and then transmitted to each of two display control processors, provided there is a significant change in the data since they were last transmitted. Common memory connections and flexible priority interrupt structures permit the direct interchange of information with the Performance Monitoring System (PMS). The display control processors format data from the data acquisition processors in the DCS and from PMS into the required graphical and tabular displays. This information is then transferred to the display generators and then to the displays.

The operator initially selects the set of DCS processors which are to be active. The other processors are in operational standby so that they will be ready to take over the display control function if failure is detected. Detection of Display Control System failures is accomplished by the Test and Reconfiguration Unit (TRU).

The TRU receives DCS elements status signals from the data acquisition and display control processors, and performs logical operations on the status signals; it annunciates failures and automatically switches the active operations path to bypass the failed element.

The TRU has the ability to accept an Operator manual override control signal which takes precedence over a TRU decision as to which processors shall be active.

Although display control processor inputs to the display generators are verified by the technique described above, display failures are not detected by the Test and Reconfiguration Unit. Changing display symbols transmitted continuously to a dedicated portion of each display screen may be readily verified by the operator for assurance that he is receiving a dynamic display. In addition, the operator may select a single predefined format to test any given display. If the operator detects a malfunction of any display, he may switch the desired format to an alternate display.

7.7.1.21.3 Selection of Displays

To accommodate varying plant conditions and operating information requirements, considerable flexibility is allowed in the selection and presentation of the various formats which the system can display. The operator establishes communication with the Display Control System by operating switches located adjacent to each display. These, and other DCS controls located on the PPC may be operated as follows:

- (1) System Assignment - A switch located adjacent to each display allows the operator to assign the displays for any of the predefined systems to that display. Since system formats are normally displayed on the display directly above the control devices for that system, this control would be used primarily in the event of display failure.
- (2) Format Selection - A second switch located adjacent to each display allows the operator to display any one of the formats normally associated with the system assigned to that display. In addition to codes for formats, the switch includes

DATE: 8/24/07

SUBMITTED BY: _____

RO/SRO

EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 12

Concern or Problem: Distractor a. is based on the assumption that a Rod Block occurs at 3.0 cps however conflicting information in CPS No. 3306.01, SOURCE/INTERMEDIATE RANGE MONITORS (SRM/IRM), section 2.7 & 6.2, as well as, in CPS No. 3304.02, ROD CONTROL AND INFORMATION SYSTEM (RC&IS), TABLE 1: ROD BLOCK TROUBLESHOOTING GUIDE, Page 27. Actual Rod Block on low SRM count occurs when SRM count is ≤ 3.0 cps.

Recommended Resolution: Accept distractors a. or b.

Attached Reference(s): CPS No. 3304.02, ROD CONTROL AND INFORMATION SYSTEM (RC&IS), TABLE 1: ROD BLOCK TROUBLESHOOTING GUIDE, Page 27
CPS No. 3306.01, SOURCE/INTERMEDIATE RANGE MONITORS (SRM/IRM), Step 2.7 & 6.2.
CPS No. 5005-3K, SRM DOWNSCALE
ITS SR 3.3.1.2.4, SOURCE RANGE MONITOR (SRM) INSTRUMENTATION
ORM OR 2.2.2, SOURCE RANGE MONITORS - CONTROL ROD BLOCK INSTRUMENTATION
LP85215, SOURCE RANGE MONITOR (SRM),

Remarks/ Justification: The incorrect procedure information has not yet been updated.

Additional comments: CPS No. 3306.01, SOURCE/INTERMEDIATE RANGE MONITORS (SRM/IRM), discussion in section 2.7 is incorrect. A comment control form was previously submitted in 2006 to the Procedure Group to correct. Also a NTD Lesson Plan feedback TRACER was submitted during Systems phase.

Depending upon which conflicting information from one source to another the candidate remembers, will determine his choice of distractors.

Exam Analyzer comments:

Final Resolution: CPS Management agrees with the candidate's challenge that there are two correct answers. See above comments.

Approved by: [Signature] / 8/31/07
Operations Management Date

Approved by: [Signature] / 8/31/07
Training Management Date

Question Number 12

Which ONE of the following describes the LOWEST power level that will result in a ROD OUT BLOCK initiation from the Source Range Monitoring (SRM) and Intermediate Range (IRM) Systems?

(NOTE: Choices are listed from LOWEST to HIGHEST power level.)

- A: SRM A: 5 cps, SRM B: 3 cps, SRM C: 5 cps, SRM D: 4 cps, ALL SRMs are FULLY INSERTED. ALL IRMS on Range 1.
- B: SRM A: 120 cps, SRM B: 100 cps, SRM C: 95 cps, SRM D: 140 cps, ALL SRMs are PARTIALLY WITHDRAWN. ALL IRMS on Range 1.
- C: SRM A: 600 cps, SRM B: 750 cps, SRM C: 700 cps, SRM D: 650 cps, ALL SRMs are PARTIALLY WITHDRAWN. ALL IRMS on Range 1.
- D: SRM A: 1.0×10^5 cps, SRM B: 1.2×10^5 cps, SRM C: 1.1×10^5 cps, SRM D: 1.2×10^5 cps, ALL SRMs are PARTIALLY WITHDRAWN. ALL IRMS on Ranges 2 or 3.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 12

Question No: ILT-6356

STA_Question

RO Question

SRO Question

AorB

a

SRM Setpoint for the downscale Rod Block is less than or equal to 3.0 cps.

Reference:

Reference Provided:

None

CPS 3306.01, Rev. 11, Source / Intermediate Range M

Explanation:

b is incorrect - This is a ROD BLOCK due to SRM NOT FULL IN and less than 100 cps; however, it is not the lowest power level listed causing a rod block.

c is incorrect - This is not a ROD BLOCK condition.

d is incorrect - This is an upscale ROD BLOCK because some IRMs are not on Range 3 or above and all four SRM Channels are tripped upscale. This is not the lowest power level listed causing a rod block.

ANSWER KEY

TABLE 1: ROD BLOCK TROUBLESHOOTING GUIDE

Source	Rod Block Condition	Alarm	
RC&IS	Control Rod is <u>not</u> selected.	5006-2H	✓
MODE Switch	Rod block when in Mode Switch is in SHUTDOWN.	5004-3E 5005-3E	
SRM	Any SRM upscale (10 ⁵ cps) or inoperable • Bypassed when associated IRM's are ≥ Range 8. • Bypassed when MODE Switch is in RUN.	5005-1K	
SRM	Any SRM downscale (≤ 3 cps) • Bypassed when associated IRM's are ≥ Range 3. • Bypassed when MODE Switch is in RUN.	5005-3K	
SRM	SRMs <u>not</u> fully inserted and ≤ 100 cps • Bypassed when associated IRM's are ≥ Range 3. • Bypassed when MODE Switch is in RUN.	5005-1L	
IRM	Any IRM upscale alarm (108/125% scale) • Bypassed when MODE Switch is in RUN.	5005-3H	
IRM	Any IRM downscale (5/125% scale) • Bypassed when associated IRM's are on Range 1. • Bypassed when MODE Switch is in RUN.	5005-3J	
IRM	Any IRM inoperative • Bypassed when MODE Switch is in RUN.	5004-2H/2J 5005-2H/2J	
IRM	IRM's <u>not</u> fully inserted • Bypassed when MODE Switch is in RUN.	5006-2H	
APRM	Any APRM upscale (108% max when MODE Switch in RUN; and $> 12\%$ when MODE Switch is <u>not</u> in RUN)	5004-1K	
APRM	Any APRM inoperative when MODE Switch is in RUN (< 16 LPRM Inputs, Channel <u>not</u> in OPER, etc.)	5004-1H/1J 5005-1H/1J	
APRM	Any APRM downscale ($\leq 9\%$) when MODE Switch is in RUN	5004-1L	
APRM	Any APRM flow reference upscale ($> 113\%$ rated Flow)	5005-2K	
SDV	SCRAM discharge volume high water level (12 gal)	5006-1D	
SDV	SCRAM discharge volume high water trip bypassed when Mode Switch is in SHUTDOWN or REFUEL (Div 1/2 only)	5004-1F 5005-1F	
Rod Pattern Controller	The rod selected for movement violates the rod pattern data (HPSP/LPSP) built into the controller.	5006-3G	
Rod Pattern Controller	A substitute position violation exists or position indication from the two channels are different.	5006-3G	
Rod Pattern Controller	Rod selected is at its Rod Withdrawal Limit latch.	5006-3G	
Redundant Hoist Loaded Interlock	Rod Block when there is a $\geq 700 \pm 50$ lbs hoist loaded signal on the main grapple, and the Refuel Bridge is over the core.	5006-2H	

- 2.0 DISCUSSION/DEFINITIONS (cont'd)
- 2.5 The IRM system inputs the IRM channel Upscale Trip (120/125) and Inoperative Trip into the RPS system. To cause a scram, one of the two IRM channels in two of the four divisions must develop one of these trips. RPS trips from the IRMs are bypassed when the mode switch is in RUN.
- 2.6 The entire neutron monitoring system is placed in a non-coincidence mode of operation when the shorting links in the RPS are removed. In this condition if any one of the neutron monitoring system inputs to the RPS should trip, a scram will occur.
- 2.7 SRMs provide inputs to the Rod Control and Information System (RCIS) which will produce a rod block due to:
(Bypassed if the associated SRM channel is bypassed, or if both IRM channels associated with their respective divisional SRM channel are on range 8 or above.)
1. SRM Inoperative (INOP)
 2. SRM Downscale at 3 cps.
 - ☞ Rod block bypassed when IRMs associated with that divisional SRM channel are on range 3 or above.
 3. SRM Upscale at 1×10^5 cps
 4. SRM detector not full-in and < 100 cps
 - ☞ Rod block bypassed when IRMs associated with that divisional SRM channel are on range 3 or above.
- 2.8 IRMs provide input to RC&IS which will produce a rod block: Bypassed if the associated IRM channel is bypassed. IRM channel may be bypassed either by the mode switch being in RUN, by using sensor bypass, or via a Temp Mod jumper.
1. IRM Inop
 2. IRM Downscale at 5/125 of full scale
 - ☞ Rod block bypassed if its associated range switch is selected to range one.
 3. IRM Upscale at 108/125 of full scale
 4. IRM Detector not full-in with mode switch not in RUN

6.0 LIMITATIONS

6.1 Prior to de-energizing or rendering an SRM/IRM channel INOP, refer to:

- ① Shared power supplies with APRM/LPRM/OPRM/MSL Hi Rad monitors.
 1. ITS LCO 3.3.1.1: RPS Instrumentation
 2. ITS LCO 3.3.1.2: Source Range Monitors
 - ① 3. ITS LCO 3.3.1.3: OPRM Instrumentation
 4. ORM OR 2.2.1: APRM Control Rod Block Instrumentation
 5. ORM OR 2.2.2: SRM Control Rod Block Instrumentation
 6. ORM OR 2.2.3: IRM Control Rod Block Instrumentation
 7. ORM OR 2.2.5: RR Flow Control Rod Block Instrumentation
 8. ORM OR 2.2.16: MSL Radiation Monitoring Instrumentation

6.2 SRM count rate must be ≥ 3 cps to be OPERABLE.
(ITS SR 3.3.1.2.4)

6.3 SRMs should be positioned to maintain count rate between 100 - 10^5 cps during a reactor startup. Prior to complete withdrawal of SRMs during a startup from the fully inserted position, SRM/IRM channel overlap shall be verified. (ITS SR 3.3.1.1.6)

6.4 IRMs (DCS display) should be maintained between 15/125 and 75/125 of full scale.

① IRM Range 10 at reading 100 = 40% RTP (1389 MWth).

There is an operational difference between DCS display, 1C51-R603A/B/C/D 1H13-P678 recorders, and backpanel IRM drawers in that:

- 1C51-R603A/B/C/D (1H13-P678) is a function of $\sqrt{10}$ between ranges with a range of 0 - 125 on all ranges.
- DCS is a function of $\sqrt{10}$ between ranges with a range of 0 - 125 on all ranges.
- IRM backpanel drawers displays:
 - 0 - 40 for odd ranges, and
 - 0 - 125 for even ranges.

7.0 MATERIALS/TEST EQUIPMENT - None

SRM DNSC

TITLE: SOURCE RANGE MONITOR DOWNSCALE			5005-3K
DEVICE	NAME	SETPOINT	INDICATION
1CS1-K025A-D	SRM DNSC ALARM RELAYS	< 3 cps	1. SRM that is downscale will have its amber downscale light illuminated on 1H13-P680 2. DCS display

POSSIBLE CAUSE

1. Improper detector position
2. Channel failure

AUTO ACTIONS

Initiates a rod block
(bypassed when associated IRM channels are on range 3 or above)

OPERATOR ACTIONS

1. Position SRM detector to maintain
SRM indication > 100 cps or fully inserted.
2. Bypass SRM if it has failed.
Refer to ITS LCO 3.3.1.1 & ORM OR 2.2.2.

REFERENCES

1. CPS 3306.01, Source/Intermediate Range Monitors (SRM/IRM)
2. E02-1NR99, Sh. 17
3. ITS LCO 3.3.1.1
4. ORM OR 2.2.2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.2.4 -----NOTE----- Not required to be met with less than or equal to four fuel assemblies adjacent to the SRM and no other fuel assemblies in the associated core quadrant. ----- Verify count rate is ≥ 1.0 cps.</p>	<p>12 hours during CORE ALTERATIONS AND 24 hours</p>
<p>SR 3.3.1.2.5 -----NOTE----- Not required to be performed until 12 hours after IRMs on Range 2 or below. ----- Perform CHANNEL FUNCTIONAL TEST.</p>	<p>31 days</p>
<p>SR 3.3.1.2.6 -----NOTES----- 1. Neutron detectors are excluded. 2. Not required to be performed until 12 hours after IRMs on Range 2 or below. ----- Perform CHANNEL CALIBRATION.</p>	<p>18-24 months</p>

2.2.2 SOURCE RANGE MONITORS - CONTROL ROD BLOCK INSTRUMENTATION (continued)

ACTIONS

3.2.2 With the number of OPERABLE Channels:

- a. One less than required by the minimum OPERABLE channels per trip function requirement, restore the inoperable channel to OPERABLE status within 7 days or place the inoperable channel in the tripped condition within the next hour.
- b. Two or more less than required by the minimum OPERABLE channels per trip function requirement, place at least one inoperable channel in the tripped condition within 1 hour.

TABLE 3.2.2-1
SOURCE RANGE MONITORS TRIP SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
a. Detector not full in	N/A	N/A
b. Upscale	$\leq 1 \times 10^5$ cps	$\leq 1.6 \times 10^5$ cps
c. Inoperative	N/A	N/A
d. Downscale	≥ 3 cps	≥ 1.8 cps

TESTING REQUIREMENTS

4.2.2.1 Perform a CHANNEL FUNCTIONAL TEST every 31 days for the following trip functions:

- a. Detector not full in
- b. Upscale
- c. Inoperative
- d. Downscale

<p>c. SRM Channel Upscale (1×10^5 cps) - Trip output to RCIS rod block to prevent the operator from withdrawing control rods that could over-power the core. Automatically bypassed when the associated IRM channels are on range 8 or above.</p>	[.1.8]
<p>d. SRM Detector Not Full In and < 100 cps (Detector Retract not permitted) - Trip output to rod block to assure count rate remains sufficient to monitor change until power is high enough for the IRMs to properly monitor. This rod block is automatically bypassed when IRMs associated with that divisional SRM channel are on range 3 or above.</p>	[.1.8]
<p>e. SRM Downscale (3 cps) - Input to rod block to assure minimum count rate is available prior to withdrawing control rods. Rod block is automatically bypassed when IRMs associated with that divisional SRM channel are on range 3 or above.</p>	[.1.8]
<p>J. Analog Output Module</p> <p>1. This module provides the following analog signals:</p> <p>a. Analog output of count rate to the recorder located on P678. Recorder 1C51-R602A paperless recorder that is fed the LCR signal from SRMs A and C. Conversely, paperless recorder 1C51-R602B is fed the LCR signal from SRMs B and D.</p> <p>b. Analog output of both Reactor Period and LCR to DCS.</p>	[.1.4.9]
<p>K. Front Panel Assembly</p> <p>1. The assembly is composed of the Graphic Data Display, Status Display, Front Panel Keys, and the Selector Switch. This provides the interface needed to operate, calibrate, set and/or verify trip set and reset points, and maintain the instrument. Instrument status, current trip status and past trip status are continuously indicated on the display.</p> <p>2. Graphic Data Display</p> <p>a. A seven decade horizontal bar graph displays counts per second (cps). Counts are also shown digitally.</p> <p>b. A horizontal bar graph displays reactor period. Period is also shown digitally.</p>	[.1.4.10], Figure 10

IX. Operational Characteristics

A. Precautions and Limitations from CPS 3306.01 SRM/IRM

1. The Control Rod Drive Maintenance Platform must be locked in its proper position before SRM or IRMs are withdrawn, otherwise detector damage could result. Proper Maintenance Platform position is determined by:
 - a. Platform rotated 165° from Control Rod Drive removal position, which aligns the two black arrows just to the right of the area entrance.
 - b. Platform grating and handrails, which would interfere with SRM/IRM withdrawal, are removed/fully lowered.
 - c. Under vessel Control Rod Drive Mechanism trolley secured at either end of its travel.
2. SRM count rate must be ≥ 3 cps to be operable (ITS SR 3.3.1.2.4).
3. SRM detectors should be positioned to maintain count rate between 100 and 10^5 cps during a reactor startup.
4. Prior to complete withdrawal of SRM during a startup from the fully inserted position, SRM/IRM channel overlap shall be verified (ITS SR3.3.1.1.6).

B. Precautions and Limitations from CPS 3001.01 Approach to Critical

1. The reactor is critical when a positive stable period exists with no rod motion.
2. Due to the design operating characteristics of the SRM instrumentation, large fluctuations in DCS SRM Period indication with periods greater than ± 300 seconds are not unusual. The DCS indication is derived from -0.01 to $+1.0$ volt signal representing a period range of -100 seconds to $+10.0$ seconds respectively. With period at ≈ 300 seconds a 0.004 V change in the period signal can cause the indication to toggle between 300 seconds to 999 seconds (a similar affect will be seen at ≈ -300 seconds).

[.1.14]

Note: Instructor, emphasize Procedure Adherence IAW AD-AA-104-101. CPS has damaged detector dry tubes in the past when they were withdrawn and the CRD Maintenance Platform was not locked in the proper position.

Q: What is required before an SRM that is required to be OPERABLE per Tech Specs can be placed inoperable for surveillance?

A: Tech Spec compliance, OP-AA-108-104 requires a peer check before LCO entry.

[.1.14]

Instructor emphasize that the operator must use a questioning attitude when pulling control rods to approach criticality. Look at multiple indications, challenge abnormal indications, and validate information.

Attachment B (Page 1 of 1)
List of Significant Annunciators (Panel P680)

Window Name	Window Nomenclature	Actuating Device	Setpoint	Automatic Action
5004-3B [.1.11.2]	DIV 1 OR 4 NMS TRIP	SRM A Upscale or INOP relay	2 x 10 ⁵ cps or INOP	If shorting links are removed, then RPS will function to Scram the reactor from any SRM, IRM or APRM trip signal.
		SRM D Upscale or INOP relay		
5005-3B [.1.11.2]	DIV 2 OR 3 NMS TRIP	SRM B Upscale or INOP relay	2 x 10 ⁵ cps or INOP	If shorting links are removed, then RPS will function to Scram the reactor from any SRM, IRM or APRM trip signal.
		SRM C Upscale or INOP relay		
5005-3K [.1.11.3]	SRM DNSC	1C51-K025A-	< 3 cps	Initiates a rod block (bypassed when associated IRM channels are on range 3 or above)
5005-2K [.1.11.6]	SRM PERIOD	1C51-K026A-D	50 sec	None
5005-1K [.1.11.1], [.1.11.4]	SRM UPSC ALARM OR INOP	1C51-K023A-D	10 ⁵ cps	<ol style="list-style-type: none"> 1. A rod block will be initiated. <ol style="list-style-type: none"> a) Rod block is bypassed when associated IRMs are ≥ range 8. b) Rod block is bypassed when the mode switch is in the RUN mode. 2. A reactor scram will occur when RPS shorting links have been removed and a SRM INOP or upscale condition occurs.
		1C51-K023A-D	<ol style="list-style-type: none"> 1. Channel switch not in OPERATE 2. Any module unplugged 3. HV Power Supply low voltage 	

Yes, the IMD procedure has the SRM setpoint at 3.0 cps and this is where the IMD Techs set it. However this procedure is not listed as a reference in the SRM lesson plan or any other ILT material and therefore the operators are NOT trained on nor do they perform this procedure in the plant or training. There is no task on the task list for the candidate to perform or simulate this procedure during OJT/TPE.

The concern on this question is that the procedures/training materials the operators receive have different values for this rod block that need to be resolved rather than a problem with candidate knowledge. It would appear that depending on the setpoint that the candidate remembers, distractor (a.) or (b.) could be correct.

Procedure/Reference	CPS No. 3304.02, ROD CONTROL & INFORMATION SYSTEM
Section	Table 1: Rod Block Troubleshooting Guide
Statement	Any SRM downscale (< 3 cps).
Justification	This setpoint would make (b.) correct due to distractor (a.) containing exactly 3.0 cps.
Procedure/Reference:	CPS No. 3306.01, SOURCE/INTERMEDIATE RANGE MONITORS (SRM/IRM)
Section:	Step 2.7.2
Statement:	SRM Downscale at 3 cps.
Justification:	This setpoint would make (a.) correct due to distractor (a.) containing 3.0 cps.
Procedure/Reference:	CPS No. 5005-3K, SRM DNSC (annunciator)
Section:	SETPOINT
Statement:	<3 cps
Justification:	This setpoint would make (b.) correct due to distractor (a.) containing less 3.0 cps.
Procedure/Reference:	Tech Specs
Section:	SR 3.3.1.2.4
Statement:	Verify count rate is ≥ 3.0 cps.
Justification:	This setpoint would make (a.) correct due to distractor (a.) containing 3.0 cps.
Procedure/Reference:	CPS OPERATIONAL REQUIREMENTS MANUAL (ORM)
Section:	Table 3.2.2-1.d
Statement:	Downscale setpoint ≥ 3.0 cps.
Justification:	This setpoint would make (a.) correct due to distractor (a.) containing 3.0 cps.
Procedure/Reference:	LP85215, Source Range Monitors
Section:	IV.J.1.e
Statement:	SRM Downscale (3 cps)
Justification:	This setpoint would make (a.) correct due to distractor (a.) containing exactly 3.0 cps.
Procedure/Reference:	LP85215, Source Range Monitors
Section:	Attachment B
Statement:	Setpoint <3 cps
Justification:	This setpoint would make (b.) correct due to distractor (a.) containing exactly 3.0 cps.

DATE: 8/24/07

SUBMITTED BY: _____



EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 18

Concern or Problem: Distractor d. is also correct based on CPS MCR layout and OP-AB-300-1001, Section 4.5 criteria which specifically states "... in proximity to the Reactor Operator ...". This is a SHOULD statement, which is treated as a SHALL statement unless waived by Shift Management. Answer a. is based on a MAY statement which is encompassed by distractor d.

Recommended Resolution: Accept distractors a. or d.

Attached Reference(s): OP-AB-300-1001, BWR CONTROL ROD MOVEMENT REQUIREMENTS. Section 4.5

Remarks/ Justification: Both a. and d. distractors are discussed in Section 4.5 of procedure OP-AB-300-1001, BWR CONTROL ROD MOVEMENT REQUIREMENTS.

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management response: The only correct answer is a. For rods that are fully inserted or fully withdrawn the reactivity change is minimal therefore the CRS may adequately supervise control rod exercises from anywhere in the "At Controls" area.

Approved by: [Signature] / 8/31/07
Operations Management / Date

Approved by: [Signature] / 8/31/07
Training Management / Date

Question Number 18

The plant is operating at rated power with the following:

Weekly control rod exercising is in progress.

The next control rod to be exercised is rod 28-21 which is currently at position 48.

Which ONE of the following identifies the REQUIREMENT regarding where the Control Room Supervisor (CRS) MUST be positioned in order to adequately supervise the performance of this rod movement?

- A: Anywhere within the "At the Controls" area.
- B: Immediately behind the Reactor Operator.
- C: Anywhere within the Main Control Room.
- D: In proximity to the Reactor Operator.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 18

Question No: ILT-6876

STA_Question

RO Question

SRO Question

AorB

a

Per OP-AB-300-1001, Section 4.5:

For rods that are fully inserted or fully withdrawn the reactivity change is minimal and the Unit Supervisor (Control Room Supervisor) may adequately supervise control rod exercising from any location in the "at the controls" area. The "at the controls" area is defined in the UFSAR Ch 13.5.1.3 and shown in Figure 13.5-1

Reference:

None

Reference Provided:

OP-AB-300-1001, Rev. 3, BWR CONTROL ROD MOV

Explanation:

b is incorrect - The CRS may be at this location but it is not "required" by procedure.

c is incorrect - Not allowed by procedure. May not be outside the "At the Controls" area

d is incorrect - Per OP-AB-300-1001: During control rod exercising the Unit Supervisor (Control Room Supervisor) should POSITION themselves in proximity to the Reactor Operator, typically the location from which EOP actions are directed. However, for a fully withdrawn (position 48) control rod the requirement is relaxed and the CRS may be at any location in the "At the Controls" area.

ANSWER KEY

BWR CONTROL ROD MOVEMENT REQUIREMENTS

1. **PURPOSE**
 - 1.1. The purpose of this T&RM is to define responsibilities and provide guidance for BWR control rod maneuvers utilizing normal operating procedures during non-transient conditions.
2. **TERMS AND DEFINITIONS**
 - 2.1. **Approved (Governing) Procedure**: as used in this document, refers to a procedure approved for use at the station, or to a document whose generation is described in and directed by a procedure approved for use at the station.
 - 2.2. **Target Control Rod Position**: the final position the control rod is required to be at when control rod movement for the given step is complete.
3. **RESPONSIBILITIES**
 - 3.1. Operations is responsible for all Control Rod movements.
4. **MAIN BODY**
 - 4.1. Operations shall **PERFORM** control rod movements in a deliberate, carefully controlled manner while constantly monitoring nuclear instrumentation and redundant indications of reactor power level and neutron flux (SOER 96-02).
 - 4.2. Operations shall **PERFORM** peer checking of all non-transient control rod movements when the unit is in Mode 1 or Mode 2. During transient conditions, peer checking of control rod movement is **not** required. When plant conditions permit, control rod positions shall be verified.
 - 4.2.1. A second licensed operator should **PERFORM** all MCR peer checks.
 - 4.3. The Unit Supervisor shall **ENSURE** all planned control rod movement is performed in accordance with an approved procedure.
 - 4.4. The Unit Supervisor shall **ENSURE** that approved procedures for planned control rod movements when the unit is in Mode 1 or Mode 2 contain initial and target rod positions for each planned move and contain a means for the performer to document reaching the target position and for documenting the peer check.
 - 4.5. During control rod exercising the Unit Supervisor (Control Room Supervisor) **should POSITION** themselves **in proximity to the Reactor Operator**, typically the location from which EOP actions are directed. For rods that are fully inserted or fully withdrawn the reactivity change is minimal and the Unit Supervisor (Control Room

Supervisor) may adequately supervise control rod exercising from any location in the "at the controls" area.

NOTE Steps 4.6 and 4.6.1 do **not** apply when the target control rod position is full-in or full-out. In these cases, the continuous insert or continuous withdraw feature as appropriate may be used to achieve the target control rod position.

NOTE: Step 4.6 does **not** apply when performing partial stroke timing of control rods. In this case, continuous rod insertion or withdrawal is permitted to be used to the target rod position. However, prior Reactor Engineering confirmation is required that rod insertion or withdrawal to one position beyond the target position is acceptable.

- 4.6. When using the continuous rod insert or continuous rod withdrawal feature, then the Licensed Operator shall **STOP** control rod movement such that the control rod settles at least one notch prior to the target notch position **and USE** single notch movement to reach the final target rod position.

NOTE For control rods that are difficult to withdraw from the full-in position (00), use of the continuous control rod withdrawal feature is allowed for initial rod movement.

- 4.6.1. The continuous rod insert or continuous rod withdrawal feature shall **not** be used for control rod movements of three notches or less (e.g., moving from position 00 to position 06). **USE** single notch insert or single notch withdrawal to perform control rod movements of three notches or less.
- 4.7. The Unit Supervisor shall **ENSURE** all planned control rod movements in accordance with the following:
- 4.7.1. Prior to stating agreement with the performer, the peer checker shall **POINT, TOUCH, or physically MARK** the controlling document to confirm correct control rod and target position.
- 4.7.2. The Licensed Operator (LO) shall **SELECT** the control rod (or control rod gang) to be moved on the rod select matrix in accordance with the governing procedure.
- 4.7.3. The individual performing the peer check shall **VERIFY** that the correct control rod has been selected by **COMPARING** the control rod selected with the governing procedure.
- 4.7.4. The LO shall **STATE** the selected control rod's initial position and target position, the method (i.e. single notch or continuous), and the direction of movement.

DATE: 8/24/07

SUBMITTED BY: _____

RO/SRO

EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 27

Concern or Problem: Distractor b. is plausible. There is no direct indication or cause in the question stem that would lead the examinee to assume the Turbine Generator tripped. Therefore, based on the conditions provided, the UAT would continue to power the non-safety related busses. This plant response would then make the RR pump (distractor b.) the most likely to be damaged by this transient of the choices provided.

Recommended Resolution: Accept distractor a. or b.

Attached Reference(s): CPS No. 3004.01, TURBINE STARTUP AND GENERATOR SYNCHRONIZATION, Section 8.2.17.

Remarks/Justification: Normal electric lineup at full power – UATs supplying 6.9 KV and 4.16KV non-safety related busses.

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management response: Answer a. is the only correct answer. This scenario was performed on the simulator with the end result being that the Turbine tripped. With the loss of DC power, the Emergency Bearing Oil Pump would not be available and damage would result to the Main Turbine.

Approved by: [Signature] / 8/31/07
Operations Management Date

Approved by: [Signature] / 8/31/07
Training Management Date

Question Number 27

The unit is operating in normal, full power lineup when a loss of off-site power occurs and the indicating lights for all breakers on the 6.9KV and 4.16KV 1A panels extinguish.

Which ONE of the following components will likely be damaged?

- A: Main Turbine
- B: Recirculation Pump A Motor
- C: Circulating Water Pump B Motor
- D: Motor Driven Reactor Feedwater Pump

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 27

Question No: ILT-6888

STA_Question

RO Question

SRO Question

AorB

a

Main Turbine

All breaker lights on the 6.9KV and 4.16KV 1A panels not lit would be caused by a loss of DC MCC 1E.

The Main Turbine Emergency Bearing Oil Pump is powered from DC MCC 1E.

Reference:

Reference Provided:

None

CPS 3503.01E001, Rev. 11b, Battery and DC Electrical

Explanation:

b is incorrect, RR pump motor could be damaged by a loss of CCW but a loss of DC MCC 1E will not effect CCW.

C is incorrect, CW pump B DC excitation is from DC MCC 1F and will not be effected by a loss of DC MCC 1E.

D is incorrect, the MDRFP Aux Oil Pump is powered from TB MCC 1M and will not be effected by the loss of DC MCC 1E.

ANSWER KEY

8.2 At - 18 - 21% Reactor Power (cont'd) Initial

8.2.16 IF There any substituted computer values,
THEN Update any substituted computer values.

8.2.17 Transfer/verify following busses transferred to the Preferred or Alternate source per CPS 3501.01, High Voltage Auxiliary Power System:

CAUTION

Main Generator output voltage shall be greater 21,560 volts prior to transferring 6.9KV busses or the 4.16KV BOP busses to the UATs. Voltages less than 21,560 volts will under voltage some BOP equipment.

1. 6.9KV Busses 1A & 1B (1AP04E/05E)
 (N/A the on-line configuration not used.)
 - 1) Preferred Source: to/on the UATs.
 - 2) Alternate Source: to/on the RAT.

2. 4.16KV Busses 1A & 1B (1AP06E/08E)
 (N/A the on-line configuration not used.)
 - 1) Preferred Source: to/on the UATs.
 - 2) Alternate Source: to/on the RAT.

3. 4.16KV Busses 1A1, 1B1 & 1C1 (1AP07E/09E; 1E22-S004)
 (N/A the on-line configuration not used.)
 - 1) Preferred Source: to/on the RAT.
 - 2) Alternate Source: to/on the ERAT.

Step	CRS Scheduling NOTE (SN) (Criteria in 2.8) Describe the activity to perform, including any restraints to continuing with procedure. Place a circle 'SN' in the left hand margin next to the step number affected.	SRO review	SM/CRS: Item complete

DATE: 8/24/07

SUBMITTED BY: _____

RO/SRO

EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 36

Concern or Problem: Distractor c. is plausible based on EOP-1 direction. The CRS has directed (given permission) to the RO to "Inhibit ADS if the timer initiates".

Based on the stem conditions, it is the CRS would to be at the "WAIT until TAF" and the ADS inhibit direction would have already been issued.

This would then allow the RO to "immediately" inhibit ADS and notify the CRS. At this time the CRS would not be expected to once again give the RO direction to inhibit ADS. The CRC would expect the RO to take actions immediately.

Recommended Resolution: Accept distractors b. or c.

Attached Reference(s): OP-CL-101-111-1001, STRATEGIES FOR SUCCESSFUL TRANSIENT MITIGATION, Step 4.0.B.3

Remarks/ Justification: SRO (CRSs) are trained to give direction to the ROs to "Inhibit ADS" prior to RPV level reaching -145.5 inches. When level reaches -145.5 inches the ROs are expected to take the action, then notify the CRS.

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management response: Answer b. is the only correct answer. To take EOP actions requires direction of the CRS. Pre-direction from the CRS was not included in the question stem.

Approved by: [Signature] / 8/31/07
Operations Management Date

Approved by: [Signature] / 8/31/07
Training Management Date

Question Number 36

A reactor coolant pressure boundary leak has occurred inside the Drywell.

- All control rods are fully inserted
- Drywell pressure is 4.6 psig and rising slowly
- Reactor water level has just reached -145.5 inches and is dropping slowly
- Reactor pressure is 885 psig and rising slowly
- CRD is the only high pressure injection source available
- All low pressure ECCS pumps have started

What is the status of the Automatic Depressurization System (ADS) and what procedural actions are required to mitigate the consequences of these conditions?

- A: ADS has automatically initiated. Verify the seven (7) ADS valves are open.
- B: ADS will automatically initiate in 105 seconds. Inhibit ADS at the direction of the CRS.
- C: ADS will automatically initiate in 105 seconds. Immediately inhibit ADS and notify the CRS.
- D: ADS will automatically initiate in 6 minutes. Reset the RPV water level low ADS seal-in logic.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 36

Question No: ILT-6938

STA_Question

RO Question

SRO Question

AorB

b

ADS will automatically initiate in 105 seconds. Inhibit ADS at the direction of the CRS.

EOP-1 directs inhibiting ADS until RPV water level drops to TAF then enter EOP-3 and perform blowdown.

Reference:

Reference Provided:

CPS 3101.01, Rev. 4c, Main Steam (MS, IS, & ADS)

Explanation:

a is incorrect - ADS has not yet initiated. All conditions are met except the 105 sec. timer timed out.

c is incorrect - The RO is not permitted to inhibit ADS unless directed by management.

d is incorrect - With high drywell pressure and RPV L-1 signals present the 6-min. timer is not in the initiation logic. Resetting the RPV water level low ADS seal-in logic will restart the 105 sec timer, which is what we used to do in EOP-1.

ANSWER KEY

B. System Status

- 1) The RO should report that automatic actions have occurred as expected. This should be reported in a fashion that minimizes unnecessary communications and doesn't stop the flow of other more pertinent communications. Initial verifications are to be done utilizing walkdown/hard cards and followed up with procedure references as time allows to ensure correct plant response.

Automatic actions should be verified in a fashion observable by Shift Management. The operator is expected to utilize the procedure and point to the parameters or indications that he/she is using to verify proper operation. The reason for pointing is to ensure the Control Room Supervisor knows proper verification is being done and to force the verifier to perform a visual "**Self Check**" of automatic actions.
- 2) If an automatic action fails to occur, place the system in the required desired state. Tell the Control Room Supervisor ahead of the action if possible but do not delay the action waiting to talk to him/her.
- 3) Get the CRS permission PRIOR to defeating an automatic initiation of an ECCS component. Other parameters may need to be checked prior to stopping automatic initiation. The use of diverse, redundant indications is required prior to stopping the initiation. (This does not apply if directed to do so per Immediate Operator actions of An Off-Normal or Annunciator Response procedure.)
- 4) If it is desired to insert a group isolation in anticipation of receiving it automatically, it is appropriate to do so from the hard card and subsequently follow up with CPS 4001.02, AUTO ISOLATION CHECKLIST.
- 5) Whenever the RO is going to insert a manual SCRAM it is expected that he/she call out to the crew, "Inserting a manual SCRAM due to..." This is not necessary if the Control Room Supervisor just ordered a SCRAM.
- 6) Following a Rx SCRAM, reports should be made per the SCRAM Choreography in Attachment B.

DATE: 8/24/07

SUBMITTED BY: _____

RO/RO

EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 46

Concern or Problem: Distractor a. is technically correct when the stem condition "final" is applied to the expected operator actions for the transient. Per CPS No. 4005.01, a loss of FW heating > 100 °F may occur requiring a SCRAM. CPS No. 3006.01 directs removing SJAEs; therefore "final" FW temp would be 87 °F.

Recommended Resolution: Accept distractors a. or b.

Attached CPS No. 4005.01, LOSS OF FEEDWATER HEATING

Reference(s): CPS No. 3006.01, UNIT SHUTDOWN, Section 8.7.2.3

Remarks/

Justification:

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management response: The only correct answer is b. When ETS pressure drops below the turbine trip setpoint the Main Turbine trips and steam flow is shut off to all FW heaters. This results in "final steady state" FW temperature being approximately the temperature at the discharge of the Condensate-Booster pumps. Based on the provided figures that temperature is 90 °F.

Approved by: SOY / 8/31/07
Operations Management / Date

Approved by: AL [Signature] / 8/31/07
Training Management / Date

Question Number 46

The plant is operating at 25% power. The Main EHC System Emergency Trip System pressure drops to 350 psig.

Using the attached DCS displays.

What will be the final steady state Feedwater temperature entering the Reactor?

A: 87°F

B: 90°F

C: 286°F

D: 312°F

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 46

Question No: ILT-6941

STA_Question

RO Question

SFO Question

AorB

B

Reference:

None

Reference Provided:

5007-1B, R 27b, Turbine Trip

Explanation:

B is correct, the low ETS pressure will cause a turbine trip which will stop steam flow to all feedwater heaters

A is incorrect, the turbine trip will not stop feedwater heating from the Steam Packing Exhauster, Steam Jet Air Ejector Inter-Condenser or the Off Gas Recombiner Condenser.

C is incorrect, all Feedwater Heaters will lose heating steam not just the High Pressure Heaters.

D is incorrect, the low ETS pressure will cause a turbine trip which will stop steam flow to all feedwater heaters

ANSWER KEY

NOTE

These off-normal actions are not applicable when < 21.6% power.

FW heating is not a USAR concern below this point.

1.0 **SYMPTOMS**

- 1.1 Increasing reactor power with no change in RR flow or rod motion.
- 1.2 Feedwater (FW) temperature decreasing.
- 1.3 FW heater(s)/MSR(s) indicate:
1. High or low level
 2. Heater train bypass valve(s) OPEN
 3. Emergency drain valve(s) not fully closed
- 1.4 Closed LP(HP) HTR ES CHECK VALVE annunciator(s).
- 1.5 Main turbine steam bypass valve(s) OPEN.
- 1.6 Stuck open SRV.

2.0 **AUTOMATIC ACTION**

- 2.1 Possible reactor scram on high neutron flux.
- 2.2 FW heater extraction steam valves close on HI-HI level.
- 2.3 FW heater normal drain inlet valves close and emergency drain valves to condenser open on HIGH level.
- 2.4 FW heater bypass valve(s) open automatically when heater inlet or outlet valve(s) are not fully open.

3.0 **IMMEDIATE OPERATOR ACTIONS**

NONE

4.0 SUBSEQUENT ACTION4.1 Within 15 minutes of initiating event:

Using as appropriate for existing plant conditions:

Restore and maintain power at or below
the original power level,andWithin Figure 1, CPS Stability Control &
Power/Flow Map limits.

- * Adjusting RR flow with FCV(s).
 - ☞ Core flow shall not be used to recover from an inadvertent/forced REGION violation or a limit violation.
- * Control rods in normal sequence or CRAM RODS.

4.2 IF Transient starts in, or results in entry
into the OPRM ENABLED REGION (5006-3D),

THEN Concurrently enter and execute
CPS 4100.02, Core Stability Control.
☞ Specific prompt maneuvering guidance.

4.3 IF FW temperature drops by > 100°F,THEN 1. Turn mode switch to SHUTDOWN. <CM-1>

2. Enter CPS 4100.01, Reactor SCRAM.

4.4 IF Reactor power > 21.6% in Single Loop,andLoss of 'FULL' Feedwater Heating ($\pm 10^\circ\text{F}$ of
design NORMAL temperature: Table A - Pg. 5).

THEN Enter ITS LCO 3.2.1/3.2.2/3.2.3 actions [Thermal
limits can not be assured due to no valid COLR].

4.5 IF The main turbine trips without a SCRAM,

THEN Insert control rods to reduce power to < 21.6%.

8.7 COMMENCEMENT OF FULL ROD INSERTION (cont'd) Initial

8.7.2 IF A cooldown is not desired,
OR
 Decay heat will not support the steam loads,

THEN The following loads may be removed from service as required to minimize cooldown:

1. MSL drain valves per
 CPS 3101.01, Main Steam (MS, IS & ADS). _____
2. At < 5% power, start vacuum pumps per
 CPS 3112.01, Condenser Vacuum (CA). _____
3. Shutdown SJAE - Recombiner Trains per
 CPS 3215.01, Off-Gas (OG). _____
4. TG drain valves:
IF Turbine is tripped,
THEN Reset the turbine per CPS 3105.01
 (TG, EHC, TS), (OK to reset when the
 turbine speed is > zero.) _____

AND

Throttle as needed the following drains:

- 1B21-CA-1,2,3(4,5,6), MSR 1B(1A) Lo Pt Drn Vlvs.
- 1TD-MSR3 & 4(1 & 2), MSR 1A(1B) Drn Vlvs.
- 1B21-F312, RPPT LP Inlt Lo Pt Drn Vlv.
- 1B21-F310A(B), RPPT 1A(1B) LP Stm Inlet Vlv.
- 1TD006A(6B), RPPT 1A(1B) LP Stop Vlv Before SDV.
- 1TD007A(7B), RPPT 1A(1B) LP Stop Vlv After SDV.
- 1TD-SV1(3,5,7), Mn Turb Stop Vlv #1(2,3,4) Drn Vlv.
- 1B21-SPDV1(2), MS Lead Lo Pt Drn Vlvs.
- 1TD-CV, Mn Turb Control Vlv Drn Vlv.

Step	<u>CRS Scheduling NOTE (SN)</u> (Criteria in 2.7) Describe the activity to perform, including any restraints to continuing with procedure. Place a circle 'SN' in the left hand margin next to the step number affected.	SRO review	SM/CRS: Item complete

DATE: 8/24/07

SUBMITTED BY: _____



EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 51

Concern or Problem: Distractor a. is plausible. CPS No. 3315.03, RADIATION MONITORING (AR/PR), Step 2.2.12 directs RP to survey the area to validate a "spike" and CPS No. 5140.08, AR/PR ANNUNCIATOR - SPENT FUEL STORAGE - 1RIX-AR016, directs RP to survey if alarm is due to a "spike".

Recommended Resolution: Accept distractors a. or b.

Attached Reference(s): CPS No. 3315.03, RADIATION MONITORING (AR/PR), Step 2.2.12
CPS No. 5140.08, AR/PR ANNUNCIATOR - SPENT FUEL STORAGE - 1RIX-AR016

Remarks/
Justification:

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management response: The only correct answer is b. Question asks what actions to take to confirm if the alarm is due to a "spike". The question is not asking what actions to take if it is a spike.

Approved by: [Signature] / 8/31/07
Operations Management Date

Approved by: [Signature] / 8/31/07
Training Management Date

Question Number 51

Irradiated fuel is being transferred from the Containment fuel storage pool to the Fuel Building spent fuel storage pool.

1RIX-AR016 SPENT FUEL STORAGE FB 755' AH-117 ALERT and HIGH alarms simultaneously actuate.

The alarm procedure directs you to determine if the alarm is due to a spike.

How is this accomplished?

- A: Direct Radiation Protection to survey the area.
- B: Access DNA History Plot for the affected instrument.
- C: Access the digital recorder history for the affected instrument.
- D: Direct the Equipment Operator to verify radiation level on local instrument.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 51

Question No: ILT-6946

STA_Question

RO Question

SRO Question

AorB

b

Access DNA History Plot for the affected instrument.

Reference:

Reference Provided:

None

CPS 5140.08, Rev. 0, AP/PR Annunciator - Spent Fuel

Explanation:

a is incorrect - RP is directed to survey the area if it is determined to be a spike.

c is incorrect - There is no digital recorder for this ARM.

d is incorrect - Not an ALARA practice to send EO into area before RP.

Candidate may select one of the distracters if unfamiliar with the procedure to retrieve the instrument history plot.

ANSWER KEY

TITLE: SPENT FUEL STORAGE - 1R1X-AR016
--

2.3 CHANNEL TROUBLE:

- a. HI FAIL: Count rate > 1.2 E6 cpm.
- b. LO FAIL: Zero counts detected over the previous ten minute period.
- c. PARAMETER DISAGREE: Monitor parameter file disagrees with ARPR server database file. Monitor channels should not change unless manually edited. A complete loss of power to the monitor may cause parameters to change when power is restored.
- d. NOT INITIALIZED: Channel not initialized. Possible condition after powering up monitor.

2.4 CHANNEL STATUS:

- a. MAINTENANCE: Monitor channel "MAINT" switch is ON (up)
- b. CHK SRC EXPOSED: Monitor channel check source is exposed. Audible and flashing indication does not occur when a Source Check command is given from the Channel Status screen or Source Check screen. Audible and flashing indication will occur if the source check is not completed within 15 minutes.
- c. DELETED: Monitor channel has been deleted.

AUTO ACTIONS - NoneOPERATOR ACTIONS

1. ALERT/HIGH: Review monitor history to determine if alarm is due to a spike.

IF Alarm is due to a spike,
THEN Direct RP to perform survey in the monitor vicinity.

IF The alarm is not due to a spike,
THEN Enter CPS No. 4979.02, ABNORMAL HIGH AREA RADIATION LEVELS.

IF The alarm may be due to a dropped fuel bundle.
THEN Enter CPS No. 4979.07, DROPPED FUEL BUNDLE.

IF High Alarm
THEN Enter EOP-8, SECONDARY CONTAINMENT CONTROL

2.2 Definitions (cont'd)

- 2.2.13 AR/PR CT Alarms - The CTs provide alarm and annunciation of AR/PR field unit measured processes.

There are five primary alarm types available on a CT.

- Normal - No active alarms.
Indicated by a gray color in the AR/PR annunciation.
- High Alarm - A radiation level above the High Alarm Setpoint has been detected on an AR/PR field unit channel. Indicated by a red color in the AR/PR annunciation.
- Alert/Trend Alarm - An alert alarm indicates a high radiation level that has not reached the High Alarm set point. A trend alarm is a rate of change alarm indicating increasing radiation levels. Alert and trend alarms are indicated by a yellow color in the AR/PR annunciation.
- Trouble - A trouble alarm indicates a problem other than an abnormal radiation value at the field unit. There are different conditions that can initiate a trouble alarm. The specific trouble condition is indicated at the CT and addressed by the applicable annunciator procedure. Indicated by a white color in the AR/PR annunciation.

- 2.2.11 Insight Manager - Utility software that provides notification of system functionality to the AR/PR System Manager.

- 2.2.12 Spike - A sudden momentary increase in count rate possibly caused by line noise.

AR/PR field units recognize radiation as a number of discrete counts.

The counts are kept in a local field unit buffer until such time as 512 counts are accumulated, or 10 minutes have passed.

Because of the way field unit counts are accumulated, spikes and low count rates are not observed as they would be on an analog meter.

Low count rates will typically not update until 10 minutes have passed.

It may be necessary to wait to verify spikes and low count rate indications.

RP should be sent to perform a survey when necessary to validate conditions.

DATE: 8/24/07

SUBMITTED BY: _____

RO/SRO

EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 54

Concern or Problem: The stem of the question places the examinee in the role of Reactor Operator (RO). The RO is required to follow the SRO orders. The correct action in this situation was to "push-back/challenge" the CRS on the directed action. This was not a listed answer. Therefore distractor b. could be considered correct based on the Chain of Command during implementation of EOPs.

Recommended Resolution: Accept distractors a. or c.

Attached Reference(s): OP-AA-101-111, ROLES AND RESPONSIBILITIES OF ON-SHIFT PERSONNEL, Step 4.6.2.2
OP-CL-101-111-1001, STRATEGIES FOR SUCCESSFUL TRANSIENT MITIGATION, Section 5.C.3)

Remarks/Justification: ILT candidates are trained that if ≤ -100 inches not to initiate Containment Sprays due to RHR pumps are needed for adequate core cooling. The RO should challenge the SRO direction for CT Sprays at this RPV Level.

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management response: The only correct answer is c. EOP-6 states to start "Containment Sprays" but the "finger" states "Do not use RHR you need for core cooling. The plant conditions given indicate both loops are needed for core cooling.

Approved by: [Signature] / 8/31/07
Operations Management Date

Approved by: [Signature] / 8/31/07
Training Management Date

Question Number 54

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

- All Control Rods are fully inserted.
- Reactor Pressure is 200 psig.
- Reactor Water Level is -155 inches on Wide Range and steady.
- The Reserve Auxiliary Transformer has Locked out.
- The only ECCS pumps that will run are LPCI A and B which are injecting at maximum.
- Containment Temperature is 180°F and rising.

You have been directed to initiate Containment Spray to maintain Containment integrity. What action should you take?

- A: Initiate ONE loop of Containment Spray only.
- B: Initiate BOTH loops of Containment Spray.
- C: Do NOT initiate either loop of Containment Sprays.
- D: Initiate Shutdown Service Water in the Containment Spray mode of operation.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 54

Question No: ILT-6949

STA_Question

RO Question

SRO Question

AorB

C

Reference:

None

Reference Provided:

EOP-6 R 27

Explanation:

C is correct, Both loops of LPCI are needed for Core Cooling and should not be diverted to Containment Spray

A is incorrect, Both loops of LPCI are needed for Core Cooling and should not be diverted to Containment Spray

B is incorrect, Both loops of LPCI are needed for Core Cooling and should not be diverted to Containment Spray

D is incorrect, Shutdown Service Water could be lined up to spray the Containment but a LPCI loop would have to be shutdown

ANSWER KEY

- 4.6.2. **OPERATE** the plant in accordance with approved procedures, and within the Limiting Conditions for Operation of the Technical Specifications to ensure the reactor is operated in a safe, conservative, and efficient manner at all times.

NOTE: The RO's immediate actions to stabilize the plant during transient conditions take priority over verbalization to the Unit Supervisor. If possible, verbalization should be accomplished to inform the Unit Supervisor of actions being taken.

1. During transient conditions, the RO may perform immediate operator actions of abnormal procedures from memory, while verbalizing actions being taken to the Unit Supervisor.
2. Subsequent actions taken during transient conditions will be based on direction of the Unit Supervisor per the applicable procedure(s).
3. **COORDINATE and/or PERFORM** necessary reactivity changes on the unit during the shift.
4. Shutdown the reactor when the RO determines the safety of the reactor is in jeopardy or when operating parameters exceed any of the reactor protection circuit setpoints and automatic shutdown does **not** occur.
5. Manually initiate safety systems' automatic actions when operating parameters exceed the systems' automatic initiation setpoints and automatic initiation does **not** occur.

- 4.6.3. **MAINTAIN** an active Reactor Operator's license.

- 4.6.4. One RO on each unit **SHALL** be designated the Unit RO and **SHALL** be "at the controls" (as defined by each station).

1. **MONITOR** the reactor and **ENSURE** reactor operation remains within established bands.
2. **MONITOR** all assigned control room panels and **NOTIFY** the Unit Supervisor regarding unusual or unexpected conditions.
3. **ENSURE** applicable Technical Specification time clocks are entered and exited and associated action requirement completed as appropriate based on the scope of the work.
4. **MAINTAIN** cognizance of the activities and work impacting the unit, and the work of the assist RO(s) assigned to the unit.
5. **ENSURES** a narrative log of activities occurring on the assigned unit during the shift is maintained.

C. EOP 1 RPV CONTROL

1) Level Leg

Determination that Level is "Unknown"

The achievement of saturation conditions in the Drywell is not sufficient in and of itself to call the instruments unreliable. **WHEN** indications of boiling in the instrument legs are observed, **THEN** the water level indications should be considered unreliable for that instrument. **If all indications are unreliable, then level is "unknown"**.

2) Pressure Leg

Direct initial band of 800 - 1065 psig IAW 4411.09. The lower limit of 800 psig will not complicate level interpretation from the charts. The upper limit of 1065 psig is consistent with the EOPs. Remember that you must start a cooldown in the pressure leg.

3) Alignment of Systems Needed For Adequate Core Cooling (ACC)

RPV injection sources (i.e., RHR pumps) are required to be maximized (aligned and capable of injection) when RPV level is below TAF, regardless of RPV pressure. [CR 171631]

A trigger point of '-100 in. and lowering' is recommended for evaluating the need to re-align or not initiate containment sprays [RHR pumps are needed for adequate core cooling (ACC)] based upon the following items:

- The rate of level drop when < -100 in. increases dramatically.
- Allows for successful realignment prior to reaching TAF.
- Re-emphasizes to the MCR Team that the focus is on maintaining ACC.
- Allows for a focused decision over initiating Containment Spray to avoid a Blowdown on Figure N, with the risk of not having RHR realign to provide ACC when < TAF.
- Crew resources may not be readily available during the Blowdown event; therefore the strategy of realigning the RHR systems for injection prior to reaching TAF ensures that the systems will inject as soon as pressure is < 472 psig. [satisfies USAR analyses]
- Up front re-alignment of RHR will afford the crew the opportunity to detect and correct any RHR system failures which would prevent successful injection. [EOP Bases Strategy]

Re-alignment of RHR pumps is not required if there is a HIGH degree of certainty that RPV level will remain above TAF during the event (i.e., RCIC is able to maintain > TAF, but not > -100"). The crew should be prepared to realign pumps should conditions adversely change.

DATE: 8/24/07

SUBMITTED BY: _____

RO/RO

EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 58

Concern or Problem: Distractor a. is plausible based on CPS No. 4410.00C012, DEFEATING ATWS INTERLOCKS, Section 1.2 heading which encompasses distractor d.

Recommended Resolution: Accept distractors a. or d.

Attached Reference(s): CPS 4410.00C012, DEFEATING ATWS INTERLOCKS, Section 1.2 and 4.2

Remarks/ Justification: Distractor a. as written is true. By defeating ATWS Interlocks results in interlocks be reset that allow subsequent scrams and insertion of control rods. Question stem does not ask for why the RPS Interlocks are defeated but for the ATWS Interlocks.

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management response: The only correct answer is d. After Defeating RPS Logic Trips the Div 1 through 4 RPS automatic scram signals are bypassed but not the actions to insert control rods. Question asks purpose for defeating all ATWS interlocks does.

Approved by: [Signature] / 8/31/07
Operations Management Date

Approved by: [Signature] / 8/31/07
Training Management Date

Question Number 58

Following entry into EOP-1A, ATWS RPV Control, CPS 4411.08, Alternate Control Rod Insertion, directs defeating ATWS interlocks as required.

What is accomplished by defeating ATWS interlocks?

- A: It bypasses RPS logic trips to drain the scram discharge volume and insert control rods.
- B: It bypasses the scram signal to allow all rods to be fully inserted using normal insertion with CRD.
- C: It vents the over piston area and enables control rod insertion using individual control rod scram switches.
- D: Allows the scram to be reset, the scram discharge volume drained, and the CRD accumulators recharged for subsequent manual scram attempts.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 58

Question No: ILT-6953

STA_Question

RO Question

SRO Question

AorB

d

Allows the scram to be reset, the scram discharge volume drained, and the CRD accumulators recharged for subsequent manual scram attempts.

Accomplished by defeating RPS Logic Trips, which is one of the ATWS interlocks defeated in CPS 4410.00C012, Defeating ATWS Interlocks.

Reference:

None

Reference Provided:

CPS 4411.08, Rev 5c, Alternate Control Rod Insertion

Explanation:

a is incorrect - draining the scram discharge volume does not allow rod insertion

b is incorrect - the rod insert block needs to be bypassed to allow normal individual rod insertion using CRD.

c is incorrect - Does not vent over piston area.

ANSWER KEY

DEFEATING ATWS INTERLOCKS

STARTED: _____ / _____ (DATE/TIME)

1.0 GOAL

When directed by CPS 4411.08, Alternate Control Rod Insertion, defeat following isolations/trips as necessary:

NOTE

Permission to perform these actions does not imply that the operation needs to be performed under all plant conditions.

Perform only those items necessary for the degraded plant conditions, and to support ATWS mitigation actions.

1.1 Defeating IA Isolations [Section 3.1: Page 3]

Allows instrument air (IA) supply to the containment to be re-established or maintained.

1.2 Defeating RPS Logic Trips [Section 3.2: Page 3]

Allow the scram to be reset, the scram discharge volume drained, and the CRD accumulators recharged for subsequent manual scram attempts.

1.3 Defeating Rod Pattern Controller [Section 3.3: Page 4]

Allows manual insertion of control rods irrespective of pattern and sequence constraints which would otherwise be imposed on movement of control rods under "high" reactor power conditions (Turbine 1st Stage Pressure).

1.4 Defeating ARI Logic Trips [Section 3.4: Page 4]

Allows ARI/RPT trip logic to be manually reset irrespective of automatic trip signals.

NOTE

Controlled procedures, tools, & equipment which support Section 3.0 are located in the EOP Supply Cabinet (MCR).

2.0 SPECIAL EQUIPMENT/TOOLS REQUIRED

2.1 EOP Tool Bag (1)

2.2 [3.2] NSPS Backplane Jumpers (4)

2.3 [3.4] H1 Room Key
ARI/RPT Test Switch Keys (2)

- 4.0 FINAL CONDITIONS
- 4.1 After completion of Section 3.1:
Defeating IA Isolations:
RPV Level 1 Instrument Air valves 1IA005, 1IA006,
1IA007, and 1IA008 isolation signal is defeated.
- 4.2 After completion of Section 3.2:
Defeating RPS Logic Trips:
Div 1 through 4 RPS automatic scram signals are bypassed.
- 4.3 After completion of Section 3.3:
Defeating Rod Pattern Controller:
Divisional Turbine 1st Stage Pressure ATM trip setpoints at
minimum (actual 1st stage pressure will not reach the ATM
trip setpoint), thus allowing control rod insertion without
interference from the rod pattern controller.
- 4.4 After completion of Section 3.4:
Defeating ARI Logic Trips:
1. 1C11-F401A(B), Scram Valve Pilot
Air Header Block Solenoid Valves open.
 2. 1C11-F402-405A(B), Scram Valve Pilot
Air Header Vent Solenoid Valves shut.
 3. RR pump automatic ATWS trips defeated.
- 5.0 REFERENCES
- 5.1 CPS 4411.08, Alternate Control Rod Insertion
- 5.2 [Section 3.1] E02-1CC99, Sh. 16
E02-1IA99, Sh. 5
- 5.3 [Section 3.2] E02-1RP99, Sh. 19, 22-24
E03-1P661, Sh. 678
E03-1P662, Sh. 671
E03-1P663, Sh. 648
E03-1P664, Sh. 644
- 5.4 [Section 3.3] E03-1P661, Sh. 759
E03-1P662, Sh. 739
- 5.5 [Section 3.4] E02-1RR99, Sh. 512-515
- 6.0 ATTACHMENTS
Panel Location Map

DATE: 8/24/07

SUBMITTED BY: _____

RO/RO

EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 66

Concern or Problem: Distractor a. also technically correct based on CPS No. 3112.01, CONDENSER VACUUM (CA), Limitation 6.1 which directs opening Vacuum Breaker until turbine speed is < 1200 rpm. The determination of the extent of the vibration emergency is subjective and would allow both a. and c. to be correct.

The additional information added to distractors a. and c. for less than < 1200 rpm or < 24" vacuum is not applicable for a tripped turbine. Limitation 6.1 of 3112.01 discusses opening the vacuum breaker for emergency conditions of high vibes; however, there is no procedure limitation or section that limits once you open the vacuum breaker what you are attempting to accomplish, other than the operating philosophy of stopping the turbine from rotating.

Cps No. 3105.01, TURBINE (TG, EHC, TS), Limitation 6.3 allows lowering vacuum to 23" if a more rapid reduction in turbine speed is desired for an EMERGENCY CONDITION. High Turbine vibration is listed as an EMERGENCY CONDITION.

Recommended Resolution: Accept distractors a. or c.

Attached Reference(s): CPS No. 3112.01, CONDENSER VACUUM (CA), Limitation 6.1

CPS No. 3105.01, TURBINE (TG, EHC, TS)

Remarks/ Justification: The turbine/generator complex is the second most expensive piece of equipment at CPS and turbine blade failure due to high vibrations is a personal safety concern and an analyzed event. Operators are trained to take conservative action to protect equipment and ensure personal safety.

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management response: The only correct answer is c. The Main Turbine does trip on High Vibrations. If the high vibration trip was disabled the "TROUBLE TSI CAB" alarm would be lit. The vibration trip may be bypassed for plant evolutions but vacuum should still not be lowered to less than 24" Hg until Main Turbine speed is less than 1200 RPM.

Approved by: [Signature] / 8/31/07 Date Operations Management

Approved by: [Signature] / 8/31/07 Date Training Management

Question Number 66

The plant is performing a down power to shift Rod patterns.

- Annunciator 5007-4D, High Vibr Turb Shaft (Pre Trip), alarms.
- NO other annunciators are LIT on this panel.
- Bearing # 9 indicates 9 mils vibration and increasing.

(1) If NO operator action is taken, what will be the impact on the Main Turbine?

(2) What operator actions should be taken at this time?

- A: (1) The Main Turbine will trip.
(2) Scram the reactor, trip the Main Turbine and fully open the vacuum breaker until Turbine speed is less than 1200 RPM.
- B: (1) The Main Turbine will NOT trip.
(2) Scram the reactor, trip the Main Turbine and fully open the vacuum breaker until Turbine speed is less than 1200 RPM.
- C: (1) The Main Turbine will trip.
(2) Scram the reactor, trip the Main Turbine and reduce vacuum to no lower than 24" Hg.
- D: (1) The Main Turbine will NOT trip.
(2) Scram the reactor, trip the Main Turbine and reduce vacuum to no lower than 24" Hg.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 66

Question No: ILT-6964

STA_Question

RO Question

SRO Question

AorB

C

Reference:

None

Reference Provided:

CPS 3105.01 Turbine R 34b

Explanation:

C is correct, the turbine will trip on high vibrations. If the high vibration trip was disabled the "Trouble TSI Cab" annunciator would be alarming. The vibration trip may be bypassed for plant evolutions. Vacuum should not be lowered to less than 24" Hg until turbine speed is less than 1200 RPM.

A is incorrect, vacuum should not be lowered to less than 24" Hg until turbine speed is less than 1200 RPM.

B is incorrect, the turbine will trip on high vibrations. If the high vibration trip was disabled the "Trouble TSI Cab" annunciator would be alarming, Vacuum should not be lowered to less than 24" Hg until turbine speed is less than 1200 RPM.

D is incorrect, the turbine will trip on high vibrations. If the high vibration trip was disabled the "Trouble TSI Cab" annunciator would be alarming,

ANSWER KEY

6.0 LIMITATIONS (cont'd)6.3 Vacuum Considerations

☞ CPS 4004.02, Loss of Vacuum provides abnormal response actions, up to and including a Rapid Plant Shutdown.

1. The turbine should not be operated above 1200 rpm with a condenser vacuum < 24" Hg (6" Hg abs).

NOTE

When experiencing excessive vibration at or near critical speeds, vacuum may be reduced to as low as 23" Hg to allow a rapid reduction of turbine speed.

2. Vacuum should not be broken until the turbine has reached 1200 rpm, unless an EMERGENCY CONDITION exists that requires the turbine to be slowed as rapidly as possible, which includes, but is not limited to:
 - Loss of main turbine lube oil.
 - Uncontrollable high bearing temperatures.
 - High main turbine vibration/load metallic noise.
 - Non-isolable turbine casing boundary failure.
 - Loss of gland sealing steam.
 - Generator fire

When desired to slow the turbine more quickly while > 1200 rpm, vacuum may be reduced to as low as 23" Hg to allow a more rapid reduction of turbine speed, then vacuum can be fully broken once < 1200 rpm.

6.4 Temperature / Ramp Rate Considerations

☞ Refer also to Limitation 6.5:
Power Decrease Guidance to Minimize TG Vibrations.

1. The temperature ramp rate for the first stage shell temperature should not exceed 150°F/hr.
2. The temperature ramp rate of reheat steam to the LP Turbine should not normally exceed 125°F/hr.

Ramps up to 250°F/hr are acceptable for short intervals.

3. The dT between the LP Turbine inlets should not exceed 25°F dT with all 4 CIVs in service.
Refer to Discussion 2.6.
4. As turbine exhaust hood temperature increases, the exhaust hood temperatures should be maintained within 20°F between A & B exhaust hoods.

6.0 LIMITATIONS

- 6.1 Do not open ICA007, Vacuum Breaker Valve unless turbine speed is < 1200 rpm, except in the case of the following Main Turbine emergencies:
- Loss of main turbine lube oil.
 - Uncontrollable high bearing temperatures.
 - High main turbine vibration/load metallic noise.
 - Non-isolable turbine casing boundary failure.
 - Loss of gland sealing steam.
 - Generator fire
- 6.2 Ensure that a continuous supply of seal water is present while operating the Mechanical Vacuum Pumps.
- 6.3 Notify MCR prior to switching from the SJAE/Recombiner Trains to the Vacuum Pumps or vice versa so that the proper Process Radiation Monitor (PRM) may be placed in service.
- 6.4 With sealing steam applied to the main turbine, ensure that ICA007, Condenser Vacuum Breaker Valve is maintained open until a vacuum pump is started to preclude overpressurizing the main condenser.
- 6.5 Vacuum Pump Motor Restart Requirements:
1. With the windings at ambient temperature, the motor can be started and brought to speed 2 times in succession, coasting to rest between stops.
 2. With the windings at operating temperature, the motor can be started and brought to speed once.
 3. If the motor has been started once from operating temperature, restart may be attempted after the following time constraints.

The motor windings can be assumed to have returned to operating temperature after 60 minutes unenergized or after 30 minutes running at operating speed.

More frequent starts may cause damage to motor windings.

Consult the technical manual or the motor supplier.

7.0 MATERIALS/TEST EQUIPMENT

Lengths of tygon tube approx. 15' each, or other suitable material (used in CPS 3112.01C001, Drawing Vacuum Without CW and/or GS Checklist)

8.2 INFREQUENT OPERATION**CAUTION**

The following events occur when vacuum is broken:

- Main Turbine Trip: 21.6" Hg vac
- Rx Feed Pump Turbine Trip: 18.5" Hg vac
- Group 1 Isolation: 8.5" Hg vac
- Bypass Valve Inhibit: 7.5" Hg vac

8.2.1 Breaking Vacuum

1. **IF** Breaking vacuum for a Main Turbine emergency, **THEN**
 - 1) SCRAM, enter CPS 4100.01, Reactor Scram.
 - 2) Trip the Main Turbine,
 - 3) Open 1CA007, Condenser Vacuum Breaker Valve.
 - 4) Monitor for lowering vacuum.
 - 5) **WHEN** the emergency condition has cleared and it is desired to restore condenser vacuum, **THEN** shut CA007, condenser vacuum breaker valve.
 - 6) **IF** the emergency condition returns, **THEN** return to step 8.2.1.1
2. Ensure plant conditions are suitable for breaking vacuum per CPS 3006.01, Unit Shutdown.

NOTE

The following step allows Inboard MSIVs to remain open when breaking vacuum as provided by CPS 3101.01 (MS, IS & ADS) for MSL Shutdown.

3. **IF** Desired to keep MSIVs open, and the MODE switch is in SHUTDOWN with Main Turbine Stop Valves shut,
THEN Place the Div 1, 2, 3 & 4 Cond Low Vacuum Bypass Switches on 1H13-P601 to BYPASS.

NOTE

The following step prevents the RFP Seal Tank from overflowing when vacuum is broken.

4. Open 1TD018, Seal Leakoff Tank Level Regulator Bypass Valve.
5. Open 1CA007, Condenser Vacuum Breaker Valve. Monitor for lowering vacuum.
6. **IF** Desired to ventilate the Main Condenser,
THEN Leave 1CA007 open.
Refer to step 8.1.1.1 thru 8.1.1.11 for starting the mechanical vacuum pump.
7. When ventilation is no longer desired, stop the mechanical vacuum pumps per 8.1.3.

DATE: 8/24/07

SUBMITTED BY: _____

RO/RO

EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 67

Concern or Problem: Distractor b. is also technically correct based on CPS No. 3104.01, CONDENSATE/ CONDENSATE BOOSTER (CD/CB), Discussion 2.6.1 which acknowledges that dP will not drop very much, implying that the evolution is virtually seamless and plant transient is minimal.

Recommended Resolution: Accept distractors b. or c.


Attached Reference(s): CPS No. 3104.01, CONDENSATE/ CONDENSATE BOOSTER (CD/CB), Discussion 2.6.1 & Section 8.2.4.1


Remarks/ Justification: In Section 8.2.4.1, does not state that CD flow and CB pressure lower because of slow valve response.

Additional comments: Dependent upon what the candidate remembers about this evolution would determine how he would answer this question.

Exam Analyzer comments:

Final Resolution: CPS Management response: The only correct answer is c. Based on plant experience CPS No. 3104.01, CONDENSATE/CONDENSATE BOOSTER (CD/CB) discusses the fact that the valve breaker is cycled to allow the system stabilize based on CD066A response time.

Approved by:  / 8/31/07
Operations Management Date

Approved by:  / 8/31/07
Training Management Date

Question Number 67

The unit is operating at near rated conditions.

Select the statement that describes the effect on the Condensate (CD) system of turning the SJAE CDSR 1A/1B selector switch clockwise one position from the "BOTH" position and the reason for that effect.

- A: CD flow and pressure reduction causes low Feedwater pump suction pressure due to SJAE Condenser/OG Recombiner inlet isolation valve 1CD006B closure.
- B: CD flow and pressure remain stable as SJAE Condenser/OG Condenser inlet isolation valve 1CD006A closes and the SJAE Condenser/OG Recombiner bypass valve 1CD066A opens.
- C: SJAE Condenser/OG Recombiner inlet isolation valve 1CD006A closes, which lowers CD flow and CB pressure because response of the bypass valve 1CD066A is too slow to adequately compensate.
- D: CD flow and pressure are reduced as SJAE Condenser/OG Recombiner inlet isolation valve 1CD006B closes then returns to previous values as the SJAE Condenser/OG Recombiner bypass valve 1CD066B opens.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 67

Question No: ILT-6965

STA_Question

RO Question

SRO Question

AorB

c

SJAE Condenser/OG Recombiner inlet isolation valve 1CD006A closes, which lowers CD flow and CB pressure because response of the bypass valve 1CD066A is too slow to adequately compensate.

Reference:

Reference Provided:

None

CPS 3104.01, Rev. 26a, Condensate - Condensate Boo

Explanation:

a, b, and d are incorrect - The selector switch selects the SJAE Condenser/OG Recombiner train to be in service. As the isolation valve closes the bypass valve opens but not quickly enough for CD system flow and pressure to remain stable. When this evolution is performed, the isolation valve is closed in short increments by cycling the circuit breaker, allowing the system to stabilize in between valve operations.

The SJAE CDSR 1A/1B selector switch selects the SJAE Condenser/OG Recombiner train that is in service. With the selector switch in the "BOTH" position, both trains are in service. With the selector switch in the "1B" position, train 1B is in service and train 1A isolates.

The Switch positions from Left to Right are 1A Both 1B.

ANSWER KEY

2.0 DISCUSSION/DEFINITIONS (cont'd)

2.3 The Condensate/Condensate Booster System can be used as an alternate means for Suppression Pool cleanup using Condensate Polisher J.

2.4 The Reactor cavity and the upper Containment Pool can be filled using a CD pump and the RFP bypass.

2.5 When feedwater is not required, the system is normally lined up for Long Cycle Cleanup.

In this mode, instead of supplying RFP suction, the RFP's are bypassed.

Condensate is supplied by one CD Pump or one CD/CB Pump pair and flows through the High Pressure (HP) Feedwater Heaters back to the Main Condenser through a flushing line.

This allows the Condensate Polishing System to clean up the condensate and establish proper chemistry prior to admitting Feedwater to the Reactor.

2.6 During performance of section 8.2.4, Isolating a Steam Jet Air Ejector Condenser/Off-Gas Recombiner Condenser Train the system is expected to respond as follows:

1. As 1CD006A/B is going shut, THEN the 1CD066B/A is going open which allows the DP to not drop very much. The 1CD066A/B was going shut as the flow in that leg went down. An operator could be stationed at 1PA05J to verify that the 1CD066A and B are behaving properly.
2. Placing the switch in "BOTH" will stop any closing motion and provide an open signal to both valves (1CD006A/B) (contingency in case the bkr would fail to fully open during the closing evolution).

2.7 Operation of Condensate Min Flow Valves

1. When the associated CD Pump is running with the Min Flow Valve control switch in the AUTO position, The Min Flow Valve will modulate.
2. When the associated CD Pump is running with the Min Flow Valve control switch in the OPEN position, The Min Flow Valve will be open.
3. When the associated CD Pump is OFF the push-button control switch on 1H13-2680

8.2.4 ISOLATING A STEAM JET AIR EJECTOR
CONDENSER/OFF-GAS RECOMBINER CONDENSER TRAIN

NOTE

Refer to discussion 2.6 for discussion on operation of 1CD006A, SJAE & OG Recomb 1A Inlet Isol Vlv and 1CD006B, SJAE & OG Recomb 1B Inlet Isol Vlv.

CAUTION

Maximum plant power at which this section can be performed is 94.6% (winter) and 93.6% (Summer). Reference EC 346505 and Calc IP-M-0640, R. 1D

8.2.4.1 Isolating "A" Steam Jet Air Ejector
Condenser/Off-Gas Recombiner Condenser Train

1. Verify the Recombiner to be isolated is not in preheat and that Recombiner 3rd stage temperature is < 200°F.
2. Station an operator at Turbine Bldg MCC 1K-1C (1AP58E), 1CD006A, SJAE & OG Recomb 1A Inlet Isol Vlv (This breaker will be repeatedly cycled ON/OFF in order to control the closing of 1CD006A)

NOTE

Previous experience has shown that when closing 1CD006A use five 20 second steps and then used 4 second steps as required to fully close.

3. Place control switch "SJAE Cder 1A/1B Selector" on 1H13-P870 to the "1B" position.
4. **After** 20 seconds or 4 seconds, (See NOTE above)
THEN Turn OFF the breaker for 1CD006A, SJAE & OG Recomb 1A Inlet Isol Vlv.
5. **When** Plant conditions have stabilized and it is determined that conditions will support further closing of 1CD006A, SJAE & OG Recomb 1A Inlet Isol Vlv,
THEN Turn ON the breaker for 1CD006A, SJAE & OG Recomb 1A Inlet Isol Vlv to continue the closing operation.
6. Repeat steps 3 and 4 until 1CD006A, SJAE & OG Recomb 1A Inlet Isol Vlv is fully shut OR plant conditions and trends lead to further closing of 1CD006A, SJAE & OG Recomb 1A Inlet Isol Vlv is not desired.
7. 1CD006A, SJAE & OG Recomb 1A Inlet Isol Vlv breaker is to be left OFF during the maintenance activity.

DATE: 8/24/07

SUBMITTED BY: _____



EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 69

Concern or Problem: Lowering pressure to shift FW level control to CD/CB per distractor a. would be an operationally sound action and should be considered as a correct choice.

Recommended Resolution: Accept distractors a. or d.

Attached Reference(s): CPS No. 3103.01, FEEDWATER (FW), Section 8.2.2.17

CPS No. 3006.01, UNIT SHUTDOWN, Sections 8.8.2, 8.8.3 & 8.8.6

CPS No. 4411.09, RPV PRESSURE CONTROL SOURCES, Sections 2.1.6 & 2.1.7

Remarks/ Justification: Implicit in aligning CD/CB for feedwater injection is to ensure that Reactor pressure is within the capacity of the Condensate Booster pumps. Guidance in CPS No. 4411.09 is provided to lower pressure to < 725# to make CD/CB injection available. The question stem states that Reactor water level was trending upward, which demonstrates adequate inventory is available to support depressurization. Additionally, the TDRFP is already at its minimum setting on its controller, so sufficient makeup capacity exists. Thus, the strategy to lower pressure and align CD/CB for injection is a viable option. The action to lower pressure also depletes inventory and would compensate for rising level.

There is no information in the stem that would indicate that lowering pressure within the capability of the Condensate Booster pumps would exceed the required cooldown rate (<100 °F/hr).

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management agrees with the candidate's challenge that there are two correct answers. See above comments.

Approved by: [Signature] / 8/31/07
Operations Management Date

Approved by: [Signature] / 8/31/07
Training Management Date

Question Number 69

A plant cool down is in progress with Reactor pressure at 750 psig.

- The MDRFP is unavailable and Reactor water level is being controlled with the A TDRFP.
- The A TDRFP is being controlled with M/A Station in manual.
- The A TDRFP is at 2370 rpm and Reactor water level is slowly increasing.

What action must be taken to maintain Reactor water level in the normal operating band?

- A: Shift Feedwater level control to the Condensate Booster Pumps.
- B: Depress the DECREASE push button on the A TDRFP M/A Station.
- C: Shift the TDRFP to the Startup Level Controller and DECREASE push button.
- D: Shift the A TDRFP to the Manual Potentiometer and turn the potentiometer counter clockwise.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 69

Question No: ILT-6967

STA_Question

RO Question

SRO Question

AorB

D

Reference:

None

Reference Provided:

CPS 3103.01 Feed water R 24b

Explanation:

D is correct, Feed Pump speed needs to be reduced to stop the water level increase. The Feed Pump is at the low speed stop on the M/A station and must be transferred to the Manual Potentiometer to further reduce speed.

A is incorrect, the 750 psig is above the shutoff head of the Condensate Booster Pumps.

B is incorrect, The Feed Pump is at the low speed stop on the M/A station and cannot be reduced any further with this controller.

C is incorrect, the Startup Level Controller cannot lower the Feed Pump speed any further.

ANSWER KEY

8.2.2 Reactor Heatup and Pressurization Using a TDRFP (cont'd)NOTES

1. TDRFP speed should be brought to at least 2370 rpm in order to provide adequate steam cooling to the turbine.
2. TDRFP vibration can be monitored on DCS screen 3A(B).

{CS}

17. Slowly raise TDRFP speed to ~ 2370 rpm using the Manual Speed Control.

Perform the following as speed is increased:

CAUTION

The Turning Gear motor will not automatically trip (except on thermal overload or overcurrent) unless the Turning Gear disengages.

- 1) Verify:
 - a) Turning Gear is tripped (5016-1C(2C), AUTO TRIP RFPT 1A(1B) TURNING GEAR alarms IF Not tripped within 5 seconds of speed increase, THEN Manually stop the Turning Gear.
 - b) Turning Gear disengaged (Locally).
As necessary, manually disengage Turning Gear.
- 2) Reset the Turning Gear by depressing the RFPT 1A(1B) TURNING GEAR RESET push-button.

{CS}

{CS}

NOTES

1. The Main Turbine must be reset to satisfy MOV Control logic before any RFPT Motor Operated Drain valves will close.
2. Sub-step "3" does not need to be completed before continuing.
- 3) IF/WHEN Main Turbine is reset, THEN Shut/verify shut 1TD008A(B), RFPT 1A(B) First Stage Drain Vlv.
- 4) IF 1FW003A(B) is open **AND** the oncoming TDRFP begins feeding the RPV, THEN Adjust turbine speed and/or 1FW003A(B) position as necessary to control RPV feed rate.

8.8 COOLDOWN WITH MAIN CONDENSER (cont'd)InitialNOTE

Bypass valve oscillations may be seen at low operating pressures when cooling down with the pressure regulator.

Oscillations may be reduced by switching to the other pressure regulator or by using the bypass jack.

8.8.2 Control RPV pressure to establish the desired pressure and cooldown rate (< 100°F/hr) using any or all as appropriate:

- ☞ Refer to cooldown rate Precaution 4.5.
- Periodically adjusting the pressure regulator setpoint (preferred method).
- Using the bypass jack.
- MSL drain valves per CPS 3101.01, Main Steam (MS, IS & ADS). OK to shut MSIVs.
- RCIC per CPS 3310.01 (RCIC).
 - ☞ Normally only used when MSIVs are shut (MSL drains in use), however, RCIC can be used as needed. Will add heat to CNMT.
- RT per CPS 3303.01 (RT).
 - ☞ As directed by SMngt, OK to implement CPS 3303.01C001, PC-TCC For Bypassing RWCU Pump Low Flow Trip during cooldown.
- Reset Main Turbine/shut drains (MSL, Turbine, etc.)

8.8.3 Establish/maintain RPV level in the preferred range of 30" - 39" Narrow Range using any or all as appropriate:
(It is acceptable to deviate from this band for short periods of time, due to changing plant conditions.)

- MDRFP per CPS 3103.01 (FW).
 - ☞ Will be transferring to CD/CB at 500 - 600 psig.
- CD/CB per CPS 3103.01 (FW).
- RD per CPS 3304.01 (RD).
- RT (Reject Mode) per CPS 3303.01 (RT).

Step	CRS Scheduling NOTE (SN) (Criteria in 2.7) Describe the activity to perform, including any restraints to continuing with procedure. Place a circle 'SN' in the left hand margin next to the step number affected.	SRO review	SM/CRS: Item complete

8.8 COOLDOWN WITH MAIN CONDENSER (cont'd) Initial8.8.4 Condenser Vacuum actions:

1. Start/verify running a vacuum pump per CPS 3112.01 (CA). _____
2. Notify Chemistry to perform sampling, HVAC Noble Gas and Tritium, required by ODCM Table 3.4-1 TD.1 «LBD-23» (Ref: CPS 9940.01 Items S/T; CPS 6954.01). _____
3. Shutdown/verify shutdown any running SJAE Recombiner trains per CPS 3215.01, Off-Gas (OG). _____

NOTE

Steam tunnel entries are required for both RT shutdown lineup, and for RHR SDC mode preparation. It may be possible to do both tasks with one entry.

8.8.5 **WHEN** FW flow is < 300 gpm (0.15 mlbm/hr),
THEN Maintain RT return temperature within 100°F of FW temperature per CPS 3303.01 (RT). _____
 ☞ Refer to Limitation 6.5.11.

8.8.6 **WHEN** RPV pressure is between 500 - 600 psig, and cool down to MODE 4 is in-progress,
THEN

1. Transfer RPV level control to the condensate booster pumps. _____
2. Shutdown RFP per CPS 3103.01 (FW). _____
3. Notify Chemistry to secure GEZIP Skid per CPS 3223.02, Feedwater Metals Addition. _____
 ☞ Skid uses RFP dP as passive motive force.

Step	CRS Scheduling NOTE (SN) (Criteria in 2.7) Describe the activity to perform, including any restraints to continuing with procedure. Place a circle 'SN' in the left hand margin next to the step number affected.	SRO review	SM/CRS: Item complete

1.0 ENTRY CONDITIONS

This procedure is entered when directed by the EOP/SAGs, and provides appropriate instructions for utilization of available RPV pressure control sources.

- EOP events which require use of the Remote Shutdown Panel (RSP) shall default to the applicable CPS 4003.01 (RSP) series checklist for pressure control system procedure guidance.

2.0 OPERATOR ACTIONS2.1 PRESSURE CONTROL STRATEGIES

1. Based on plant conditions, resource availability and EOP/SAG directives, select a method to perform RPV pressure control (STABILIZATION or DEPRESSURIZATION).
2. Utilize as many sources as required in order to perform the directed RPV pressure control actions.
3. Maximize the use of RPV pressure control methods which release the energy to outside primary CNMT.
4. Lowering RPV pressure early in the event will simplify long term RPV inventory control.
 - Evaluate using entire 100°F/hr range when lowering pressure.
5. Lower RPV pressure as necessary to:
 - Minimize effects from leaks.
 - Maximize available injection sources.
6. Lowering RPV pressure will deplete RPV inventory.
7. Lowering RPV pressure to make CD/CB injection available (< 725 psig) will most likely be successful if adequate inventory and/or injection exists to support the depressurization.

CAUTION: Over injecting cold water may exceed 100°F/hr C/D.

NOTE: EOP-1A reactivity shutdown conditions (Pressure Leg WAIT) may prohibit this strategy due to initial ATWS stabilization band being above the CD/CB injection pressure (e.g., 800 - 1065 psig).

- Unless required by plant conditions or event progression, a high pressure injection source should be in-service until the low pressure system is capable of maintaining RPV level.
 - A rapid pressure reduction (2 - 3 SRVs or BPVs) will use less RPV inventory in order to achieve the desired pressure, but may result in a more dramatic level transient.
 - Lower pressure steam removes more energy per lbm of steam than does steam at high pressure.
8. Lowering RPV pressure to make low pressure ECCS pumps available is not recommended due to the potential challenge to the cooldown rate, and approach to TAF. Long term fuel cooling is enhanced by delaying the time to BLOWDOWN at TAF for as long as possible.

DATE: 8/24/07

SUBMITTED BY: _____



EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 71

Concern or Problem: Distractor a. is also plausible. The referenced OE from Hope Creek (OE6144) describes a resin intrusion event that caused Reactor power to decrease as Main Steamline Rads were elevated.

Additional references from other BWR-6 plants were reviewed that discussed that a decrease in surface tension resulted in a slow positive reactivity event followed several hours later by a negative reactivity event due to voiding caused by organic impurities.

The question stem did not provide a specific timeline or include the amount of resin that entered the Reactor vessel therefore both a. and b. are correct.

Recommended Resolution: Accept distractor a. or b.

Attached Reference(s): CPS No. 3303.01, REACTOR WATER CLEANUP, Section 8.1.3
CPS No. 5000-2A, F-D INFL CONDCT HI-LO
CPS No. 5000-2B, F-D EFL CONDCT HI-LO
CPS No. 5002-2C, F-D SYSTEM TROUBLE
CPS No. 5246-1B, STRAINER "A" DIFF PRESS HI
CPS No. 5246-1C, VESSEL "A" DIFF PRESS HI
05-1-02-V-02, GRAND GULF NUCLEAR STATION OFF-NORMAL EVENT PROCEDURE - CONDENSATE/REACTOR WATER HIGH CONDUCTIVITY
Brown's Ferry Event, Dated August 9, 2006.
OE6826 - Resin Intrusion Causes Reduction in Reactor Power - Duane Arnold

Remarks/ Justification: Industry experience has shown that resin intrusion events can result in power excursions in both a positive and negative fashion. As such the distractors a. and b. are both correct as power can rise or lower based on factors that were not specifically delineated or defined in the question stem.

Distractors c. and d. remain incorrect as MSL radiation level in resin intrusion events rises.

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management agrees with the candidate's challenge. See above comments.

Approved by: [Signature] Operations Management, Date: 8/31/07

Approved by: [Signature] Training Management, Date: 8/31/07

Question Number 71

The plant is operating at near rated conditions when the following annunciators alarm:

5000-2A F-D INFL CONDCT HI-LO
5000-2B F-D EFL CONDCT HI-LO
5000-2C F-D System Trouble

The following RWCU parameters indicate:

- RWCU Filter Demin A flow indicates 0 gpm.
- RWCU Filter Demin B flow indicates 250 gpm
- RWCU Filter Demin B effluent conductivity indicates 1.0 $\mu\text{s/cm}$

Which one of the following would occur as a result of this event?

- A: Reactor power increases and Main Steam Line radiation increases.
- B: Reactor power decreases and Main Steam Line radiation increases.
- C: Reactor power decreases and Main Steam Line radiation decreases.
- D: Reactor power remains stable and Main Steam Line radiation remains stable.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 71

Question No: ILT-6969

STA_Question

RO Question

SRO Question

AorB

B

Reference:

None

Reference Provided:

OE6144 - Resin Intrusion

Explanation:

B is correct, the high F/D flow and conductivity annunciators are indicative of a resin intrusion. A resin intrusion will cause power to decrease due to increased voids and Steam Line Radiation to increase.

A is incorrect, power will decrease. The student may think that a resin intrusion will cause power to increase which would then cause steam line radiation to increase.

C is incorrect, Steam Line Radiation increases. The student may know that a resin intrusion will cause power to decrease which normally would cause steam line radiation to decrease.

D is incorrect, power will decrease. The student may not realize that the high F/D flow can cause a resin intrusion.

ANSWER KEY

CAUTION

Avoid sudden changes in flow to prevent filter demineralizer resin break through. <CR>

8.1.3 System/Filter Demin Flow Control

8.1.3.1 Establish communications between the MCR and the operator at local panel 1G36-P002.

8.1.3.2 Throttle 1G33-F044, RWCU Filter/Demin Bypass as necessary when placing Filter Demineralizers in or out of service per CPS 3303.02, Reactor Water Filter Demineralizer Operating Procedure to establish the following conditions:

# OF PUMPS	# OF F/Ds	1G33-F044 POSITION	FLOW (gpm)
1	0	THROTTLED	SYSTEM - 150
1	1	SHUT	DEMIN - 125
2	0	THROTTLED	SYSTEM - 300
2	1	THROTTLED	SYSTEM - 300
2	2	SHUT	DEMIN - 125 each

8.1.4 Removing RWCU Pump(s) From Service

8.1.4.1 Remove all F/D(s) from service per section 8.1.3, System/Filter Demin Flow Control.

8.1.4.2 Stop one of the operating pumps, RWCU Recirc Pump A, (B) [C], 1G33-C001A (B) [C].

①

1. Perform either 1) or 2):

1) IF A pump remains in operation,
THEN Throttle 1G33-F044, RWCU Filter/Demin Bypass to maintain - 150 gpm flow.

OR

2) IF No pump remains in operation,
THEN To prevent undesired cooldown and depressurization of return piping, 1G33-F044 should be maintained partially to fully open.

F-D INPL
CONDCT
HI-LO

TITLE: FILTER DEMINERALIZER INFLUENT CONDUCTIVITY HIGH OR LOW			5000-2A
DEVICE	NAME	SETPOINT	INDICATION
1G33-N602A	CLEAN-UP COND INFLUENT	HI: 1.00 $\mu\text{mho/cm}$	On H13-P678: Recorder, G33-R601. RWCU/RECIRC COND
1G33-N602B	RX RECIRC WATER COND	LO: 0.05 $\mu\text{mho/cm}$	

NOTE

A single out of spec process instrument alarm would tend to indicate a faulty instrument, bad sample or some other problem.

Generally, an off-normal chemistry condition will be indicated by several alarms with conductivity and other parameters out of spec.

POSSIBLE CAUSE

- HIGH - RT OOS, F/D resin breakthrough/depletion, CRUD bursts, etc.
- LOW - Conductivity instrument failure.

AUTO ACTIONS- None

OPERATOR ACTIONS

- Monitor RPV conductivity, and refer to CPS 4010.02, Plant Chemistry as necessary.
- Request Chemistry to verify the reading.

REFERENCES

- CPS 3303.01, Reactor Water Cleanup (RT)
- CPS 4010.02, Plant Chemistry
- E02-1RT99, Sh. 5

F-D EFL
CONDCT
HI-LO

TITLE: FILTER DEMINERALIZER EFFLUENT CONDUCTIVITY HIGH OR LOW			5000-2B
DEVICE	NAME	SETPOINT	INDICATION
1G33-N603A	F/D A EFFLUENT CONDUCTIVITY	HI: 0.10 $\mu\text{mho/cm}$	On H13-P678: Recorder, G33-R603, RWCU EFFLUENT COND
1G33-N603B	F/D B EFFLUENT CONDUCTIVITY	LO: 0.02 $\mu\text{mho/cm}$	

NOTE

A single out of spec process instrument alarm would tend to indicate a faulty instrument, bad sample or some other problem.

Generally, an off-normal chemistry condition will be indicated by several alarms with conductivity and other parameters out of spec.

POSSIBLE CAUSE

1. HIGH - RT OOS, F/D resin breakthrough/depletion, CRUD bursts, etc.
2. LOW - Conductivity instrument failure.

AUTO ACTIONS- None

OPERATOR ACTIONS

1. Monitor RPV conductivity, and refer to CPS 4010.02, Plant Chemistry as necessary.
2. Request Chemistry to verify the reading.
3. Check filter demin in operation for normal AP and flows.
4. **IF** A high conductivity condition is confirmed, (action may be performed prior to confirmation per SMngt direction)
THEN Place second filter demin in service (if available), and remove from service the filter demin in use.

REFERENCES

1. CPS 3303.01, Reactor Water Cleanup (RT)
2. E02-1RT99, Sh. 5

F-D SYSTEM TROUBLE

TITLE: FILTER DEMINERALIZER SYSTEM TROUBLE			5000-2C
DEVICE	NAME	SETPOINT	INDICATION
1G36A-K2	POWER FAILURE ALARM RELAY	POWER FAILURE > 1 Sec	STATUS ALARM ONLY
1G36A-K3	F-D TROUBLE ALARM RELAY	ANY ALARM ON 1G36-P002	

POSSIBLE CAUSE

1. Loss of power to 1G36-P001 and 1G36-P002

NOTE

1G36A-K3 is actuated by logitrol. Hence, if it is actuated by any other alarm, it will not see another alarm. The MCR alarm will not reset until all 1G36-P002 alarms are clear.

2. Filter demin alarm on 1G36-P002

AUTO ACTIONS - None

OPERATOR ACTIONS

(Local: CNMT 800' AZM 230)

Investigate the cause of the alarm at instrument rack 1G36-P001 and control panel 1G36-P002.

REFERENCES

1. CPS 3303.01, Reactor Water Cleanup (RT)
2. CPS 3303.02, Reactor Water Cleanup Filter Demineralizer Operating Procedure
3. CPS 5246, Alarm Panel 5246 Annunciators At 1G36-P002
4. E02-1RT99, Sh. 5, 101, 108

STRAINER "A"
DIFF PRESS
HI

TITLE: STRAINER "A" (D013A) DIFFERENTIAL PRESSURE HIGH			5246-1B
DEVICE	NAME	SETPOINT	INDICATION
1G36-N005A	Str A Diff Press Sw	5 psig	Indicator 1G36-R021A, DIFF PRESS STRAINER D013A, at 1G36-P003

POSSIBLE CAUSE

1. Fouling of the outlet strainer, possibly due to break in filter cake.
2. Filter has a damaged holding element.

AUTO ACTIONSNOTE

Filter A will isolate if differential pressure reaches 10 psig.

NONE

OPERATOR ACTIONS

1. If filter is not ready for backwashing, backwash strainer per CPS No. 3303.02, REACTOR WATER CLEANUP FILTER DEMINERALIZER OPERATING PROCEDURE, and return filter to service.
2. If filter is ready for backwashing, backwash strainer prior to backwashing and precoating filter.

REFERENCES

1. CPS No. 3303.02, REACTOR WATER CLEANUP FILTER DEMINERALIZER OPERATING PROCEDURE
2. E02-1RT99-105

VESSEL "A"
DIFF PRESS
HI

TITLE: VESSEL A DIFFERENTIAL PRESSURE HIGH			5246-1C
DEVICE	NAME	SETPOINT	INDICATION
1G36-N041A	Vessel A Diff Press Sw	25 psid	Indicator 1G36-R019A, VESSEL A DIFF PRESSE, at 1G36-P002

POSSIBLE CAUSE

Filtering process is becoming fouled.

AUTO ACTIONSNOTE

If vessel differential pressure reaches 30 psid, filter will isolate on Hi Diff Pressure and initiate backwash cycle.

NONE

OPERATOR ACTIONS

1. Check flow through filter to ensure alarm is not due to excessive flow. If so, coordinate with the MCR to reduce flow to 125 gpm.
2. If high due to filtration, ensure B filter is ready for service and remove A filter for backwashing.

REFERENCES

1. CPS No. 3303.02, REACTOR WATER CLEANUP FILTER DEMINERALIZER OPERATING PROCEDURE
2. E02-1RT99-105

Title: Condensate/Reactor Water High Conductivity	No.: 05-1-02-V-12	Revision: 22	Page: 1
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1.0 PURPOSE/DISCUSSION

- 1.1 Provide instructions concerning high conductivity in condensate, feedwater or reactor water while in Mode 1, 2, and 3. For abnormal chemistry in other modes, or for chemistry parameters less than those in the Action Table, refer to 01-S-08-29, EPRI Water Chemistry Guidelines.
- 1.2 The water chemistry limits of the reactor coolant system are established to prevent damage to reactor materials in contact with coolant. The reactor vessel acts as a large concentrator; therefore, low levels of conductivity or chlorides in systems can result in high conductivity or chloride levels in the reactor. Chloride limits are specified to prevent stress corrosion cracking of stainless steel at elevated temperatures. Chloride limits vary with power operation of the reactor. Conductivity recording is required on a continuous basis, since changes in this parameter are an indication of abnormal conditions (measures dissolved impurities). When conductivity is within limits, pH must also be within its acceptable limit. The Condensate Cleanup System is designed to reduce conductivity and prevent chlorides and corrosive sulfates from entering reactor vessel.
- 1.3 Provides actions to be taken in the event resin is injected into the Reactor from either the Condensate Cleanup System or the Reactor Water Cleanup System (RWCU).
- 1.4 Resin may be injected into the Reactor from either the RWCU filter - demineralizers (F/D) or the condensate precoat filters or demineralizers. In either case the results are the same. The resin intrusion will cause water conductivity and activity to rise substantially while pH substantially reduces. Depending on the amount and rate of resin injected, these changes may become detectable immediately or only after several hours. The most serious injection could cause a rapid change in vessel chemistry resulting in a large release of nitrogen-16 into the steam lines. Care should be exercised to ensure a main steam line radiation alarm is not the result of a fission product release caused by a fuel element failure.

A resin intrusion may cause a slow positive reactivity event for several hours due to decreases in the surface tension of the water followed by negative reactivity due to accumulation of organic impurities causing increased voiding in core. The overall effect may take several day to return to normal conditions.

2.0 IMMEDIATE OPERATOR ACTIONS

- 2.1 None

EVENT DATE: August 9, 2006
UNIT NAME: Browns Ferry Unit 3
NSSS/A-E: General Electric/Tennessee Valley Authority
TURBINE MANUFACTURER: General Electric

MAINTENANCE RULE APPLICABILITY: None

DESCRIPTION:

Unit 3 was operating in the first 6 months of cycle 13. The reactor power was very stable due to the flat reactivity trend at the time in cycle. 3C Condensate Demineralizer was removed from service due to high vessel differential pressure for normal backwash and precoat cycle. On completion, the vessel was returned to service per normal operating instructions.

Approximately 5 minutes after the demineralizer was returned to service the control room staff observed the reactor power calculated by the nuclear heat balance to be above 100% (3458 MWt). The highest observed power level was 3466 MWt (100.2%). Operations reduced power by lowering recirculation pump speeds to return power below 100%. Operations contacted reactor engineering and instrument and controls engineering to determine if the indicated power increase was real and, if so, identify the cause of the power excursion.

The power excursion was determined to be real. Gross electric power and Average Power Range Monitors indicated the increase. The first stage turbine pressure and final feedwater temperature confirmed the increase in power. The control rod positions were confirmed to be constant. The recirculation pump speeds were determined to be constant until the time Operations took control to reduce power by lowering pump speeds. The final feedwater temperature was observed to increase in accordance with the observed increase in power. In addition, it was verified that a feedwater temperature drop did not cause the increase in reactor power.

At the same time as the power excursion was observed, an increase on the offgas pretreatment monitor was observed which slowly returned to normal. Approximately 6-10 hours later the offgas pretreatment radiation and the recirculation pumps speeds returned to the values observed prior to returning 3C condensate demineralizer to service.

CAUSES:

The cause of the power excursion observed on unit 3 was determined to be due to the resin intrusion when 3C condensate demineralizer was returned to service. Subsequent investigation revealed other times on both units 2 & 3 when a small power increase occurred when a resin intrusion occurred. A power increase did not occur every time there was a resin intrusion, but did occur several times. The exact mechanism which caused the power increase could not be identified.

CORRECTIVE ACTIONS:

Operations personnel were trained on this event, to recognize the possibility of a small power increase when condensate demineralizers are returned to service

Date:08-19-1994

Subject:OE6826 - Resin Intrusion Causes Reduction in Reactor Power

Unit Name. DUANE ARNOLD
Year Commercial. 1974
Reactor Type (Size). BWR/4 (1658 MWTH)
Reactor Manufacturer GE
Turbine Manufacturer GE
Plant Designer BECHTEL
Event Date August 13, 1994

On August 13, 1994 the operating crew returned the 'B' condensate demineralizer to service following septa cleaning. Shortly afterwards the 'Recirc Dissolved Oxygen' annunciator on the hydrogen water chemistry panel alarmed and reactor water cleanup influent conductivity started to rise. This is not unusual when returning a demineralizer to service. Minutes later the operators noticed that reactor power was decreasing with no apparent cause. Over the next 23 minutes reactor power and load line continued to decrease (15 MWth total) even though recirculation flow was constant and the control rods were at the desired pattern. An increase in core plate differential pressure from 21.1 psid to 21.7 psid was noted.

At the same time, reactor conductivity continued to increase from 0.058 micromhos/cm to a peak of 1.62 micromhos/cm. Chemistry samples of reactor coolant indicated sulfate concentrations had increased to 200.5 ppb from less than 0.3 ppb. Main steam line radiation levels did not increase significantly during this event.

Cause of the Event

Like an event which occurred at Hope Creek (OE 6144), a resin intrusion occurred when the 'B' condensate demineralizer was placed back on line. The breakdown of the resin in the reactor decreased the surface tension of the water which caused an increase in void formation. The increase in the void fraction resulted in the reduction in power. The change in the void fraction also resulted in a change in the axial power distribution. Main steam line radiation levels did not increase because the resin intrusion was small. Past resin intrusions at the DAEC have historically not resulted in increased main steam line rad levels.

DATE: 8/24/07

SUBMITTED BY: _____

RO/SRO

EXAM: **WRITTEN** / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): RO Question # 75

Concern or Problem: Depending upon the time-frame being considered, distractor b. and c. are both plausible answers.

Recommended Resolution: Accept distractors b. or c.

Attached Reference(s): CPS No. 3309.01, HIGH PRESSURE CORE SPRAY (HP), Section 8.1.2

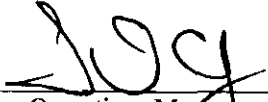
LP85380, High Pressure Core Spray, Section X.A, LER 88-022, Inadvertent HPCS Initiation

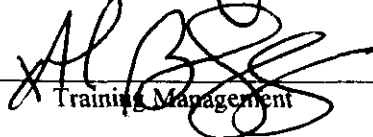
Remarks/Justification: The referenced OPEX states that parameters recover to their original values, Reactor pressure to 1002 and Reactor power to 100%. Because the question stem provides **NO** time frame (i.e. 10 seconds, 30 seconds, 10 minutes, etc.), the candidate could consider the time to be from steady-state to steady-state conditions which would make distractor b. correct also.

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management agrees with the candidate's challenge. See above comments.

Approved by:  / 8/31/07
Operations Management Date

Approved by:  / 8/31/07
Training Management Date

Question Number 75

The plant is operating at near rated power. HPCS is running "tank to tank" mode per CPS 9051.01, HPCS Pump and HPCS Water Leg Pump Operability.

A spurious HPCS initiation signal is received.

NO other systems are affected.

What effect if any does this have on Reactor Pressure and Reactor Power?

- A: Reactor Pressure increases, Reactor Power increases.
- B: Reactor Pressure decreases, Reactor Power increases.
- C: Reactor Pressure decreases, Reactor Power decreases.
- D: Reactor Pressure and Reactor Power remain the same.

ANSWER KEY

ILT 06-1 NRC RO Exam

ILT 06-1 NRC RO Exam

Exam Question Number 75

Question No: ILT-6958

STA_Question

RO Question

SRO Question

AorB

C

Reference:

Reference Provided:

None

CPS 3309.01 HPCS R15c

Explanation:

C is correct, the initiation signal will cause HPCS to shift from "tank to tank" to the injection mode of operation. A HPCS initiation at power causes reactor pressure to decrease from the spray flow and the pressure decrease causes reactor power to decrease due to the increase in voids in the core.

A is incorrect, pressure and power will decrease. If the student thinks the only effect from the HPCS injection is the addition of cold water the student may pick this answer.

B is incorrect, pressure and power will decrease. If the student thinks that the cold water will have more of an effect than the void increase the student may pick this answer.

D is incorrect, pressure and power will decrease. If the student does not know that an initiation signal will shift HPCS to the injection mode, the student may pick this answer.

ANSWER KEY

8.0 PROCEDURE8.1 Normal Performance8.1.1 STANDBY

Verify HPCS is lined up, ready to automatically initiate on a LOCA signal and inject water from the RCIC storage tank, or the suppression pool to the RPV.

1. Verify proper operation of HPCS Water Leg Pump, 1E22-C003.
2. Verify prerequisites (listed in section 5.0) are met.
3. Perform surveillance testing as specified in Tech Specs.

8.1.2 Automatic Initiation [HARD Card at P601]

1. During HPCS operation, verify as appropriate that 1E22-F012, HPCS Pump Min Flow To Suppr Pool:
Opens whenever HPCS flow is < 625 gpm with HPCS discharge pressure > 145 psig, and
Shuts whenever HPCS flow is ≥ 625 gpm.
2. Verify following events occur upon HPCS initiation:
 - 1) 1E22-F001, HPCS Storage Tank Suction Valve opens if 1E22-F015, Suppr Pool Suction Valve not open.
 - 2) HPCS Pump, 1E22-C001 starts.
 - 3) HPCS Pmp Rm Sply Fan, 1VY08CA starts.
 - 4) HPCS Pmp Rm Sply Fan, 1VY08CB starts.
 - 5) 1E22-F004, HPCS To CNMT Outbd Isln Valve opens.
 - 6) Diesel Generator 1C starts.
 - 7) SSW Pump 1C, 1SX01PC starts.
3. Verify shut:
 - 1) 1E22-F010, HPCS First Test Vlv To Storage Tank.
 - 2) 1E22-F011, HPCS Second Test Vlv To Storage Tank.
 - 3) 1E22-F023, HPCS Test Valve To Suppr Pool.

X. Operating Experience (OPEX)

A. Inadvertent HPCS Initiation

Read the Inadvertent HPCS Initiation event and be prepared to discuss the following points:

1. What was the sequence of events?

Discuss importance of verifying that all required action occurred as designed and that all automatic actions can be explained. (e.g. DG and SX not starting)

2. What was the initiating cause?

Discuss importance of slowly valving in instruments.

3. What cause the change in power and pressure?

The Reactor Power decrease was due to the cold HPCS injection above the reactor core exit region, which resulted in a partial steam collapse reducing core D/P. This D/P reduction caused more voiding in the core thus the power reduction.

4. What caused indicated RPV levels to vary from actual level?

As the plant is cooled down, the level tends to read higher than actual level because of density differences. The error introduced in the wide range instrumentation (the source of the Level 8 signal) becomes more pronounced as conditions deviated from power operating condition. This is especially apparent when compared to the reading of the narrow range, where the same percentage of level error is less pronounced over a narrower band. Because of this, typically the Level 8 signal is locked in until about 300 psig is reached during plant heatup. When vessel heatup is performed, the indicated level becomes more conservative, meaning the actual core level inside the shroud is closer to the actual setpoint. The reverse is true for cooldown.

Attachment A (Page 1 of 2)
OPEX LER 88-022
Inadvertent HPCS Initiation

On September 1, 1988 with the plant in Mode 1, a technician was restoring an RPV water level transmitter to service following calibration. The technician opened one of the transmitter's two high-pressure side isolation valves creating a hydraulic surge in the sensing line. This surge caused two adjacent RPV water level transmitters on the common sensing line to actuate and complete the trip logic for HPCS initiation. The actuation of these two transmitters completed the one-out-of-two-twice low RPV water level trip logic for HPCS initiation and resulted in the automatic start of the HPCS pump, the opening of injection valve 1E22-F004, and the injection of water into the RPV for twenty-eight seconds.

The Main Control Room observed that a RPV Low Water Level (Level 2) and RPV High Water Level (Level 8) alarm occurred. These alarms cleared and reset within a short period of time. The control room operators verified that RPV water level was normal and then closed the injection valves and secured the HPCS pump. Since the low RPV water level trip signal was short in duration, less than twenty milliseconds, the Division III (HPCS) diesel generator [DG] [EK] and the Shutdown Service Water system [BI] pump did not automatically start. Design of the logic for the start of the HPCS system is such that trip signals with duration less than twenty-five milliseconds may not actuate all associated equipment. Plant conditions were returned to normal by 2300 hours.

During this event, reactor water level increased from thirty-five inches to fifty inches, decreased to twenty-two inches, and then returned to thirty-five inches. Reactor pressure decreased from 1002 pounds per square inch (psi) to 995 psi and then increased to 1002 psi. Reactor power decreased from 100% to 93% and then increased to 100% after the transient.

Since the instruments used for the HPCS Level 2 initiation are calibrated for hot conditions, the indicated level varies from the actual level as a Reactor heatup or cooldown is performed.

DATE: 8/24/07

SUBMITTED BY: _____

RO(SRO)

EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): SRO Question # 03

Concern or Problem: Distractor a. is also a possible correct answer based on OP-AA-108-115, OPERABILITY DETERMINATIONS, Step 1.4 that cites the Corrective Action program for tracking actions.

LS-AA-125, CORRECTIVE ACTION PROGRAM (CAP) PROCEDURE, Attachment 6, provides examples of required corrective actions that result in tracking. One of the examples is Technical Specification Equipment.

Recommended Resolution: Accept distractors a. or b.

Attached Reference(s): OP-AA-108-115, OPERABILITY DETERMINATIONS, Step 1.4
LS-AA-125, CORRECTIVE ACTION PROGRAM (CAP) PROCEDURE, Attachment 6

Remarks/
Justification:

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management response: The only correct answer is b. The equipment should be declared inoperable immediately. Actual LCO tracking is controlled by OP-AA-108-104, OPERABILITY DETERMINATIONS for Technical Specification Compliance.

Approved by: [Signature] / 8/31/07
Operations Management Date

Approved by: [Signature] / 8/31/05
Training Management Date

Question Number 3

A reasonable expectation of operability does NOT exist a for piece of equipment and the onshift SRO determines that an OPERABILITY determination evaluation is required in accordance with OP-AA-108-115, Operability Determinations.

Which ONE of the following procedures is PRIMARILY used to track the status of the equipment?

- A: LS-AA-125 Corrective Action Program Procedure
- B: OP-AA-108-104 Technical Specification Compliance
- C: OP-AA-108-105 Equipment Deficiency Identification and Documentation
- D: OP-AA-108-111 Adverse Condition Monitoring and Contingency Planning

ANSWER KEY

ILT 06-1 NRC SRO Exam

ILT 06-1 NRC SRO Exam

Exam Question Number 3

Question No: ILT-6917

STA_Question

RO Question

SRO Question

AorB

B

Reference:

None

Reference Provided:

OP-AA-108-104 Technical Specification Compliance R

Explanation:

B is correct, the equipment should be immediately declared inoperable and actual tracking of an LCO is controlled by OP-AA-108-104 Technical Specification Compliance.

A is incorrect, LS-AA-125 Corrective Action Program Procedure is used to track corrective actions and actions to prevent recurrence but not the LCO.

C is incorrect, OP-AA-108-105 Equipment Deficiency Identification and Documentation directs the usage of OP-AA-108-104 Technical Specification Compliance.

D is incorrect, OP-AA-108-111 Adverse Condition Monitoring and Contingency Planning is used to help prevent the entry into an LCO

ANSWER KEY

OPERABILITY DETERMINATIONS**1. PURPOSE**

1.1 The operability determination process is used to assess operability of systems, structures, or components (SSCs) and support functions for compliance with Technical Specifications (TSs) when a degraded or nonconforming condition is identified for a specific SSC described in TSs, or when a degraded or nonconforming condition is identified for a necessary and related support function.

1.2 The process of ensuring operability is ongoing and continuous. The focus of operability is foremost on the capability to ensure safety. Operability is verified by day-to-day operation, plant tours, observations from the control room, surveillances, test programs, and other similar activities. Deficiencies in the design basis or safety analysis or problems identified by operability verification lead to the operability determination process by which the specific deficiency and overall capability of the SSC are examined.

Without any information to the contrary, once an SSC is established as operable, it is reasonable to assume that the SSC should continue to remain operable, and the previously stated verifications should provide that assurance. However, whenever the ability of an SSC to perform its specified safety function is called into question, operability must be determined from a detailed examination of the deficiency.

1.3 The operability determination process described in this procedure is used to assess operability of SSCs described in TSs. The scope of SSCs considered within the operability determination process is as follows:

- SSCs required to be operable by TSs. These SSCs may perform required support functions for other SSCs required to be operable by TSs (e.g., emergency diesel generators and service water); and
- SSCs that are not explicitly required to be operable by TSs, but that perform required support functions (as specified by the TSs definition of operability) for SSCs that are required to be operable by TSs.

1.4 Degraded and nonconforming conditions involving SSCs not meeting the criteria specified in Section 1.3 above are assessed for functionality under the corrective action program. These SSCs may perform specified functions described in the Updated Final Safety Analysis Report (UFSAR), Technical Requirements Manual, Operational Requirements Manual, Emergency Plan, Fire Protection Plan, regulatory commitments, or other elements of the current licensing basis (CLB).

Guidance for initiating Issue Reports (IRs) for conditions adverse to quality, including failures, malfunctions, deficiencies, defective items, and non-conformances, is discussed in LS-AA-120. The corrective action program procedures encompass investigation, corrective action determination, investigation report review and approval, action tracking, and issue analysis.

Attachment 6 Examples of Corrective Actions

(Page 1 of 1)

(Note: Any action that corrects a quality requirement, regardless of the examples in this procedure shall be a CA Type Assignment)

Types of Action	Example of Actions that require CA	Examples of Actions that typically would not require CA	Examples of Scope that Potentially Require CA	Examples of Scope that would not typically require a CA
<p>Actions that directly impact a System, Structure, or Component</p> <p>(Note: Typically, no CA Assignments are required for WR, PIMS ARs, ECRs)</p>	<ul style="list-style-type: none"> • Technical error in procedure that would impact the equipment function • Correction to a plant label deficiency that could directly lead to an error • Error in a Training Lesson Plan that provides Technically incorrect information • Incorrect data within a Surveillance Test that could result in the wrong conclusion for SSC • Scaffolding that could impact an SSC • Error in a WM schedule that could result in inappropriate action on SSC • Unavailability of material that directly impacts an SSC or potentially its availability. • Need to perform a missed QA Hold point that directly impacts SSC • Actions necessary to restore an SSC Alignment to insure function • Compensatory actions for a Non-conformance 	<ul style="list-style-type: none"> • Tailgate communication of a condition. • Typographical error in a procedure that would not impact SSC • Housekeeping issues that would not impact SSC • Coaching of individual with no formal cause determination. • Changes to PMs on non-safety related equipment. • Bringing requests for plant modifications to PHC or PRC. • Development of troubleshooting plans. 	<ul style="list-style-type: none"> • Technical Specification Equipment • Emergency Core Cooling Systems • Emergency Preparedness Equipment • Fire Safe Shutdown Equipment • Fire Protection Equipment • Security Equipment • ASME Section XI Equipment • EQ Equipment • Seismic Cat Equipment • Regulatory Guide 1.97 Equipment • Regulatory Guide 1.43 Equipment • Maintenance Rule Equipment • Spent Fuel Storage Equipment 	<ul style="list-style-type: none"> • Facility Equipment • Sewage Treatment system • Administration Building HVAC
<p>Actions that restore a Quality Commitment in an Excon Program</p>	<ul style="list-style-type: none"> • Actions necessary to restore examination security • Actions necessary to make a technical correction to any quality document (50.59, CR, ECR, WR, etc) • Correction to Quality Software classification • Actions necessary to ensure capability to implement the EP Plan (Planning Standards) 	<ul style="list-style-type: none"> • Clarification of non-quality program requirements • Adjustments to a Training Schedule • Coaching of individual with no formal cause determination. • Conducting additional training not directly linked to an issue or cause. 	<ul style="list-style-type: none"> • Corrective Action Program • Work Management Program • Environmental Qualification Program • Surveillance Testing Program • Fire Protection Program • In service Testing Program • ISI Testing Program • Ventilation Testing Program • Radiation Protection Program • NQA Program • EP Program • Security/FFD Program • MOV Program 	<p>Business Planning Procedure</p>
<p>Actions to address a cause determined through a RCR, EACE, ACE, QHPI, CCA</p>	<p>Actions that have been determined that will reduce or eliminate the possibility of repeat conditions through actions such as:</p> <ul style="list-style-type: none"> • Implementation of new barrier (i.e., QC Hold Point) • Required actions to address a determined knowledge gap. • Establish, enhance, or reinforce Standards, Policies, or Admin Controls. • Changes to improve Human Engineering. 	<p>Actions that were determined to be enhancements or further evaluation</p> <ul style="list-style-type: none"> • Actions to further evaluate EOC or Cause • Training CRC review of CRs to determine if formalized training should be performed. • Coaching of individual with no formal cause determination. 	<p>NA</p>	<p>NA</p>

DATE: 8/24/07

SUBMITTED BY: _____

RO(SRO)

EXAM: WRITTEN / WALK-THROUGH / SIMULATOR SCENARIO (circle one)

Test Item (Question/JPM/Scenario, etc.): SRO Question # 07

Concern or Problem: Answer a. is also a possible correct answer. Per CPS No. 4008.02, CORE SHROUD CRACKING, Section 4.1, the Reactor Engineer is to be notified.

This event is also reportable per LS-AA-1110, REPORTABLE EVENT, SAF 1.4. NRC would be notified as well. Question does not limit the student to choices of only using CPS No. 4008.02, CORE SHROUD CRACKING.

Recommended Resolution: Accept distractors a. or b.

Attached Reference(s): CPS No. 4008.02, CORE SHROUD CRACKING, Section 4.1
LS-AA-1110, REPORTABLE EVENT 1.4

**Remarks/
Justification:**

Additional comments:

Exam Analyzer comments:

Final Resolution: CPS Management response: The only correct answer is b. Indicated symptoms are indicative of a Core Shroud Cracking event. In accordance with CPS No. 4008.02, CORE SHROUD CRACKING, NSED and the RE are to be notified. Directions to perform Subsequent Actions of an Off-Normal are given by the CRS.

Approved by: [Signature] / 8/31/07
Operations Management Date

Approved by: [Signature] / 8/31/07
Training Management Date

Question Number 7

The plant is operating at near rated power. The A RO reports parameters that have a potential for core shroud cracking and that NSED should be notified.

Who else must be notified?

- A: NRC
- B: Reactor Engineering
- C: Reactor Engineering and Radiation Protection
- D: Reactor Engineering, Radiation Protection and Chemistry

ANSWER KEY

ILT 06-1 NRC SRO Exam

ILT 06-1 NRC SRO Exam

Exam Question Number 7

Question No: ILT-6899

STA_Question

RO Question

SRO Question

AorB

B

Reference:

None

Reference Provided:

CPS 4008.02 Core Shroud Cracking, R 2a

Explanation:

B is correct, The stated changes in plant conditions are symptoms of Core Shroud Cracking. The Core Shroud Cracking procedure requires notification of NSED and Reactor Engineering.

A is incorrect, Reactor Engineering must also be notified.

C is incorrect, Radiation Protection may be notified but is not required.

D is incorrect, Chemistry and Radiation Protection may be notified but are not required.

The performance of subsequent actions are to be directed by the SRO

ANSWER KEY

2.0 AUTOMATIC ACTIONS

2.1 Possible scram due to Level 8 (52 in.).

2.2 Possible main turbine and feed pump trip due to Level 8.

3.0 IMMEDIATE OPERATOR ACTIONS

NONE

4.0 SUBSEQUENT ACTIONS

① 4.1 Notify NSED and the Reactor Engineer of the event.

4.2 Enter CPS 4008.01, Abnormal Reactor Coolant Flow.

4.3 IF Core Shroud Cracking and Separation is confirmed,
orThe cause of the anomalous plant behavior
is not known nor deemed acceptable,THEN Commence a normal reactor shutdown per
CPS integrated operating procedures.5.0 FINAL CONDITIONS5.1 The anomalous plant behavior has been found and corrected, and
the plant is operating at steady state conditions per CPS
3005.01, Unit Power Changes, or5.2 The plant is in a safe, shutdown condition per
CPS 3006.01, Unit Shutdown.