LOI-03-01
POST EXAMINATION REVIEW
ANSWER KEY CHANGE

QUESTION NUMBER
- 12/13

ISSUE
- 2 Correct answers, A and B

RECOMMENDATION
- Accept both answers as correct

RESULT
- No impact on sample plan. All candidates demonstrated K/A knowledge

IMPACT
- Exam balance of coverage and content validity are preserved

BASIS
- All incorrect respondents selected distracter 'B'
- No proctor notes, candidate notes or debrief comments
- Additional review conducted based upon high error rate

CONCLUSION
- Although not specifically stated, the intent of the question was to recognize that the direct/immediate impact of the high pressure signal is to trip the recirculation pump drive motor breakers and energize the alternate rod insertion solenoids thus making 'A' the correct response.
- The examination development process failed to recognize that the generator field breakers would also trip as a result of the respective drive motor breaker trip.
- The high-pressure signal referenced in the stem is a direct trip of the recirculation pump drive motor breakers (71-10110/10210) (Reference attached ARP-09-4-2-16). **The generator field breakers will open approximately 17 seconds later** (Reference NOTE preceeding step F.1.5 of the attached OP-27, Section F.1 excerpt).
- The question (stem) conditions did not specify a sequence or direct result condition therefore 'B' is also a correct response.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
High Reactor Pressure / 3	Group #	1	1
Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE: (CFR: 41.7 / 45.6) ARI/RPT/ATWS: Plant-Specific	K/A # 295025	EA1.07	EA1.07
	Importance Rating	4.1	4.1

Proposed Question: Which **ONE** of the following describes the effect a reactor vessel pressure signal of 1170 psig will have on the reactor recirculation pumps and alternate rod insertion (ARI) system?

The Recirculation motor/generator...

RO/SRO
12/13

a) drive motor breakers will trip and the ARI solenoid valves will energize.

b) generator field breakers will trip and the ARI solenoid valves will energize.

c) drive motor breakers will trip and the ARI solenoid valves will de-energize.

d) generator field breakers will trip and the ARI solenoid valves will de-energize.

Proposed Answer: a) drive motor breakers will trip and the ARI solenoid valves will energize.

Explanation (Optional):

Technical Reference(s): ITS-3.3.4.1/SR-3.3.4.1.4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: SDLP-02H EO 1.05.C.2, SDLP-03C EO1.05.C.2 (As available)

Question Source: Bank # Quad Cities 1 INPO Bank # 16832 (Modified for JAF)

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam 3/16/1998

(Optional - Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 6

55.43 2

Comments:

F.1 RWR Loop A Shutdown with Reactor in Mode 3 or 4

CAUTION

If RPV water level is less than 234.5 inches with no forced core recirculation, reactor coolant temperature indications could be invalid due to insufficient natural circulation.

F.1.1 Verify the following:

- All control rods are full in.
- Each running RWR MG set is at minimum speed (30%).

NOTE 1: Annunciator 09-4-3-2 RWR LOOP A OUT OF SERVICE will alarm when only RWR Pump B is running.

NOTE 2: RWR Pump A will trip when 02MOV-53A is 10% open.

F.1.2 Close RWR PMP A DISCH 02MOV-53A.

F.1.3 Verify RWR PMP 02-2P-1A is tripped.

F.1.4 Place RWR PMP 02-2P-1A control switch in PULL TO LOCK.

NOTE: RWR MG Set A generator field breaker will open approximately 17 seconds after RWR Pump A drive motor breaker trips.

F.1.5 Verify open RWR MG A GEN FIELD BKR.

DEVICE

- 02-3LT-72A or C and 02-3LT-72B or D
- 02-3PT-102A or C and 02-3PT-102B or D

SETPOINT

- Reactor pressure
  - **[CTS]**
    LESS THAN OR EQUAL TO 1155 psig (when either zero or one SRV is out of service and MODE switch in Run)

    [ITS]
    ≤1153 psig with ≥10 SRVs OPERABLE
  - **[CTS]**
    LESS THAN OR EQUAL TO 1120 psig (when two or more SRVs are out of service and MODE switch in Run)

    [ITS]
    ≤1118 psig with <10 SRVs OPERABLE
- Reactor water level
  - **GREATER THAN OR EQUAL TO** 105.4 inches above TAF (when MODE switch in Run)

Reference: 1.62-150, 1.62-151, ESK-7FH, FE-1E

CAUSES

- Reactor water level - Low Low
- Reactor pressure - High

AUTOMATIC ACTIONS

71-10110 (feed to RWR MG set A motor) TRIP

PROCEDURE

Verify RWR PMP 02-2P-1A is tripped.

Entergy

Interoffice Correspondence

August 4, 2003
JENG-03-0215

MEMO TO: PAT BERRY 8/6/03

FROM: STEVE BONO

SUBJECT: **TRIPS ASSOCIATED WITH THE RWR-MG SET GENERATOR FIELD BREAKER**

Generator Trip Circuit Elements

The generator field breaker's trip circuit is comprised of three discreet contacts in the trip logic as shown on attached print 1.62-151. Two of the contacts are associated with the Generator Lockout circuit as shown on print 1.62-150. An actuation of the lockout circuit is designed to energize the trip coils for both the drive motor breaker and the generator field breaker. The last contact in the generator field breaker trip circuit is the Generator Loss of Field Aux relay. The Generator Loss of Field Aux relay is actuated by two contacts in series. The series contacts are Field Application and Under Voltage relay and Generator Loss of Field relay. The Field Application and Under Voltage relay (print 1.62-152) is energized during the pump start sequence to block the trip of the generator field breaker for the Generator Loss of Field relay until the start sequence is complete. The Generator Loss of Field relay (print 1.62-153) is the field undervoltage relay and during a start of the system the field is in an undervoltage condition so this trip would require a by-pass until the field voltage is established.

System response to a manual trip of the Drive Motor Source Breaker or any other trip that is not common to the Generator Lockout circuit

The manual trip of the Drive Motor Source Breaker will de-energize the drive motor. The inertia of the MG set will maintain the generator output for some finite period of time. The output of the generator will decrease in voltage as the generator slows down. The generator field is powered from the exciter, a smaller generator driven directly by the Drive Motor. Exciter output voltage also decreases as motor speed decays. When the voltage from the exciter decreases to the set point of Generator Loss of Field relay the Generator Field Breaker will trip.

System response to a Generator Lockout circuit actuation

The actuation of the Generator Lockout circuit will energize the trip coils to both the drive motor breaker and the generator field breaker de-energizing the drive motor and the generator field with no coast down output of the generator.

The above information was supplied at the request of Rick Devercelly and if you have any further questions feel free to contact Keith Brazeau at x6014.

KEITH BRAZEAU
SYSTEM ENGINEER

PEER REVIEW
LARRY LEITER
SYSTEM ENGINEER

STEVE BONO
MANAGER, SYSTEM ENGINEERING

Attachments

KB/SB/djc

CC: JENG File

LOI-03-01
POST EXAMINATION REVIEW
ANSWER KEY CHANGE

QUESTION NUMBER
- 23/26

ISSUE
- Two correct answers, B and D

RECOMMENDATION
- Accept both answers as correct

RESULT
- No impact on sample plan. All candidates demonstrated K/A knowledge

IMPACT
- Exam balance of coverage and content validity are preserved

BASIS
- All incorrect responses selected distractor 'B'.
- No proctor notes, candidate notes or debrief comments
- Additional review conducted based upon exam analysis

CONCLUSION
- Isolation of extraction steam to a Feedwater heater will result in a reduction of Feedwater heating and a new stable higher power level thus making 'D' a correct response as originally intended.
- Distracter 'B' indicated that a rise in bus frequency supplying the recirculation motor generator set had occurred. Applying standard AC motor theory, this rise in frequency will result in a new higher generator speed resulting in a new higher recirculation pump speed and ultimately a new higher reactor power.
- Distracter 'B' was written with the understanding that the speed feedback loop would return the generator to the previously selected speed demand thus returning reactor power to the previous value.
- Post examination analysis revealed a plant modification (F1-87-043) that removed the speed feedback loop to address a speed oscillation issue. System Engineering provided information on the modification during a series of communications evaluating this question.
- Considering the removal of the speed feedback loop, a rise in bus frequency will result in a new higher stable power level thus making 'B' a correct response.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
Inadvertent Reactivity Addition / 1	Group #	2	2
Knowledge of the interrelations between INADVERTENT REACTIVITY ADDITION and the following: (CFR: 41.7 / 45.8) Reactor power	K/A # 295014	AK2.07	AK2.07
	Importance Rating	3.9	3.9

Proposed Question: From normal full power operation, which of the following will result in a stable higher power level?

RO/SRO
23/26

a) Inadvertently isolating the Reactor Water Cleanup System.
b) Raising 10100 Bus frequency.
c) Main Condenser Circulating Pump Trip.
d) Closing the manual extraction steam valve for Feed Heater 6B.

Proposed Answer: d) Closing the manual extraction steam valve for Feed Heater 6B.

Explanation (Optional): Explanation:

a) Inadvertently isolating the Reactor Water Cleanup System results in higher feedwater temperature- therefore a lower power level.
b) Raising 10100 bus frequency will momentarily raise Recirc MG speed. Speed vs. Speed demand will reduce it back down.
c) A Main Condenser Circulating Pump Trip will result in higher condensate and therefore feedwater temperature resulting in a lower power level.
d) The manual extraction steam valve for Feed Heater 6B closing will prevent the heating of the feedwater in the 6B heater, thereby, causing colder feedwater to enter the vessel and drive reactor power up.

Technical Reference(s): AOP-62, AOP-32, OP-3A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LP-AOP EO 1.02 (As available)

Question Source: Bank # Clinton INPO # 20412 (Modified to JAF)
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam 7/23/2001

(Optional - Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

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

10 CFR Part 55 Content: 55.41 7
55.43

Comments:

Entergy

MASTER

Course/Program:	BWR Technology	Module/LP ID:	SDLP-021
Title:	Recirculation Flow Control	Course Code:	
Preparer: (Print/Signature)	E. Riley / E. Riley	Revision/No:	9
Prerequisites:	NONE	Date: (Handwritten)	4/4/02
File/ID		Est. Teach Time:	4 Hours

Lead Accreditation Specialist Review (Rev 0 required) Print/Signature	NA	Date:	NA
Technical Review: Print/Signature	R. Manning / R. Manning	Date:	4/4/02
Training Supervision Approval Print/Signature:	Steve Remington / [signature]	Date:	4/4/02

OBJECTIVES

The following shall be accomplished from memory and without error except where otherwise noted:

Objective #	Licensed Operator/Shift Technical Advisor Objective Description
1.01	State the purpose(s) of the Recirculation Flow Control System.
1.02	State the Recirulation Flow Control System design bases as referenced in the FSAR.
1.03	N/A
1.04	State the ELECTRICAL DISTRIBUTION SYSTEM which powers the components listed below: a. MG Set Speed Control Scoop Tube Actuator b. MG Set Speed Limiter Signal Generator c. MG Set Speed Demand Limiter d. #2 Speed Limiters e. Jet Pump Flow Square Root Extractors

Content/Skills	Activities/Notes/Objectives
II. Presentation	
A. Purpose	
1. The Recirculation Flow Control System provides:	1.01
a. A high degree of stability for the recirculation system	
b. A reasonably fast control of reactor power	
c. A means of automatically reducing reactor power due to abnormal plant conditions	
d. A means of preventing plant transients caused by a loss of the control system signal	
B. Design Bases	
1. Power Generation Design Basis: The Recirculation Flow Control System is designed to allow variation of the recirculation flow rate.	1.02
2. Safety Design Basis: The Recirculation Flow Control System functions so that no abnormal operational transient resulting from a malfunction in the system can result in damaging the fuel or exceeding the Reactor Coolant System pressure limits.	
C. System Description	Figure 1
1. Reactor recirculation flow rate is changed by adjusting the speed of the two reactor recirculating pumps.	
The master controller is located on panel 09-5 and can be used to control the pump speed. In manual, the controller will hold the recirculation pumps at the set speed. The master controller is pinned in the manual position and automatic operation is prohibited. The speed demand limiter provides the upper and lower speed limits which the master controller can send to the M/A transfer stations. The high limit is set to give 102.5% speed and the low limit is set at approximately 44% pump speed.	NOTE: Modification F1-87-043 removed the speed control feedback signals to the M/A transfer station. It is now used for speed indication only.

H. Technical Specifications

1. Discuss Section 3/4.2.6, Recirc Pump Trip Instrumentation (CTS

2. Discuss Section 3.3.4.1, ATWS-RPT Instrumentation (ITS)

I. Industry/Plant Operating Experience

1. Modification F1-87-150

   During several years in the 1980's both scoop tube positioners were locked during normal plant operation due to noise problems in the recirculation flow control system. Modification F1-87-150 added "Auto – Unlock" switches which would automatically unlock the scoop tube brake and allow the scoop tubes to "Runback" to the #2 speed limiter (44% position) when the "Auto-Unlock" switch is "ON" and a low vessel level with < 2 RFPs exists.

2. Modification F1-87-043 Recirculation Flow Control Improvement

   Both recirculation speed control loops were modified from closed to open loop type control by this modification. The Speed demand indicator was moved in the circuitry so as to provide "instant" speed indication to the operator. A new rate limiter was added to limit rate of change in recirc pump speed.

3. RICSIL #066 4/1/94

   One of two recirculation pumps inadvertently increased in speed from minimum to maximum speed and remained at maximum speed for 30 minutes. The plant was in a refueling outage with vessel level near the vessel flange. As a result of this speed increase, excessive crud was released negatively impacting visibility and radiation levels. Per GE Nuclear Energy's recommendation and our operating experience evaluation, OP-27 requires the scoop tubes be locked if the recirculation pump will be at minimum speed for greater than 8 hours.

LOI-03-01
POST EXAMINATION REVIEW
ANSWER KEY CHANGE

QUESTION NUMBER
- 35/47

ISSUE
- No Correct answer

RECOMMENDATION
- Discharge from examination

RESULT
- Reduces Tier 1 Group 1 by one A1 item leaving 2

IMPACT
- Exam balance of coverage and content validity are preserved

BASIS
- All incorrect responses selected the 'D' distracter.
- During exam administration, 2 candidates questioned if "UPS was still out of service". Both were told YES. Both responded that this resulted in no correct answer.
- One candidate documented an assumption on the exam (attached) indicating "after UPS returned" and then selected his response.
- Two candidates documented a dilemma with "Blue SCRAM lamps" and "SCRAM Rod Positions"
- Five candidates debriefed a dilemma with using the blue scram lamps to verify scram rod positions
- An additional instructor review also indicated that there was no correct answer.

CONCLUSION
- A loss of the UPS power supply will de-energize RPIS resulting in a loss of all rod position indication.
- In the event of a reactor scram, the loss of rod position indication will require EOP-3 entry.
- The question (stem) conditions ask how the operator can verify rod position. This is not possible with UPS de-energized.
- None of the responses offers that no rod position information is available.
- Per AOP-21, excerpt attached, the operator can only verify that rods scrammed by observing a downward power trend and individual rod 'blue' scram lamps and 'yellow' accumulator trouble lamps.
- Those candidates who selected the intended response apparently made an unstated reasonable assumption that "scram rod positions" translated to "confirm reactor scram" as stated in AOP-21.
- One candidate has a stated reasonable assumption that UPS was restored and selected an incorrect response that was consistent with the assumption. Page 47 of this candidate's examination package is attached.
- Misleading stem information and the lack of proctor guidance forced assumptions on the part of the candidates to support an answer selection when no correct answer existed.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1	Group #	1	1
Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : (CFR: 41.10 / 43.5 / 45.13) Control rod position	K/A # 295037	EA2.05	EA2.05
	Importance Rating	4.2	4.3

Proposed Question: While operating at full power, the plant has experienced a complete loss of UPS. Operator actions failed to prevent a Reactor SCRAM.

Plant control is directed by ______(1)______ and SCRAM Rod Positions are verified by ______(2)______.

RO/SRO

35/47

a) (1) EOP-2
   (2) Green Full In Lamps on the Full Core Display

b) (1) EOP-2
   (2) Blue SCRAM Lamps on the Full Core Display

c) (1) EOP-3
   (2) Blue SCRAM Lamps on the Full Core Display

d) (1) EOP-3
   (2) Green Full In Lamps on the Full Core Display

Proposed Answer: c) (1) EOP-3
(2) Blue SCRAM Lamps on the Full Core Display

Explanation (Optional): **Question was rewritten as SRO Only swapped original RO/SRO question 35/47 to make it a SRO Only- S35, SRO original question S35 was made RO/SRO question 35/47.**

RPIS is inoperable with a loss of the UPS. Per AOP-21, the SCRAM is verified by confirming the Blue & Yellow lamps lit on the Full Core Display. This indication only confirms that the SCRAM Inlet & Outlet Valves opened and the accumulator discharged. With no immediate way of confirming Rod Digital Position Indication, the Operators are forced to conclude that Rod Position is Unknown, thus entry into EOP-3 is required.

Technical Reference(s): EOP-3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: EOP's

Learning Objective: LP-AOP, EO-1.03, EOP3LP, EO-1.07 (As available)

Question Source: Bank #

Modified Bank # (Note changes or attach parent)

New NEW

Question History: Last NRC Exam

SRO (Phillips) / RO (Morris) – when we are verifying status were we doing this?.
Told them UPS was still at loss.
(comment – it was still out – so correct answered. Dave will get comment at debrief.

(Optional - Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level:	Memory or Fundamental Knowledge		X
	Comprehension or Analysis		
10 CFR Part 55 Content:	55.41	6	
	55.43		

Comments:

2003 Initial NRC Exam SRO

47. While operating at full power, the plant has experienced a complete loss of UPS. Operator actions failed to prevent a Reactor SCRAM.

Plant control is directed by _____(1)_____ and
SCRAM Rod Positions are verified by _____(2)_____.

A. (1) EOP-2
(2) Green Full In Lamps on the Full Core Display

B. (1) EOP-2
(2) Blue SCRAM Lamps on the Full Core Display

C. (1) EOP-3
(2) Blue SCRAM Lamps on the Full Core Display

D. (1) EOP-3
(2) Green Full In Lamps on the Full Core Display ← after UPS restored

(✓)

C.1 **Complete Loss of UPS - Prompt Actions (cont)**

C.1.4 **IF** a reactor scram occurs,
THEN perform AOP-1 using the following guidance in any order or concurrently.:

NOTE 1: SRM and IRM detectors cannot be driven into core.

NOTE 2: APRM/IRM and SRM recorders are not operable.

a. Verify reactor power is lowering using the following indications:

- SRM meters and IRM downscale indicators at panel 09-5 (_)
- EPIC APRM indication (_)

NOTE: RPIS is not operable.

b. Confirm reactor scram by verifying the following lights are on at full core display:

- Yellow ACCUM (_)
- Blue SCRAM (_)

NOTE: SRV acoustic monitors are not operable.

c. **IF** an SRV opens,
THEN use SRV tailpipe temperatures to confirm relief valve operation. (_)

d. Review E-Plan Emergency Action Levels (EALs) to determine if E-Plan entry is required. (_)