

FACILITY NAME: Harris Nuclear Plant

Section 2

REPORT NUMBER: 05000400/2009-302

DRAFT RO WRITTEN EXAM

CONTENTS:

- Draft RO Written Exam (75Q with ES-401-5 Information)

Location of Electronic Files:

Submitted By:

Edward W. Laska

Verified By

Mark J. Riches

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

HARRIS RO DRAFT

1. 2009B NRC RO 001

Given the following plant conditions:

- Offsite Power has been lost
- The crew is performing EPP-004, Reactor Trip Response

Step 3 directs the operators to stabilize and maintain temperature between 555°F and 559°F.

Which ONE of the following temperature indications would the operators use to control temperature AND, what is the purpose of the step IAW the WOG Basis document?

A. Tavg

To ensure adequate RCS heat removal is occurring

B. Tavg

To check for natural circulation established

C. Tcold

To ensure adequate RCS heat removal is occurring

D. Tcold

To check for natural circulation established

Plausibility and Answer Analysis

- A. *Incorrect. Plausible, since Tavg is a commonly used indication for many aspects of transients, but in this case, with a loss of offsite power, there is no power to the RCPs, and therefore Tavg is not a reliable indication. Candidate correctly recognizes that the reason for maintaining RCS temperature between 555°F and 559°F is to ensure adequate heat removal is occurring.*
- B. *Incorrect. Plausible, since Tavg is a commonly used indication for many aspects of transients, but in this case, with a loss of offsite power, there is no power to the RCPs, and therefore Tavg is not a reliable indication. Checking for natural circulation is plausible since this is a goal of the procedure, but only towards the end, and is not the specific reason .*
- C. **CORRECT.** *Tcold is the correct indication to use, per EPP-004, and because there are no RCPs in service, Tcold is the most accurate indication. Basis is IAW WOG Basis Document for ES-0.1 (Harris EPP-004).*
- D. *Incorrect. Plausible, since Tcold is the correct indication to use, since there are no RCPs in service. Checking for natural circulation is plausible since this is a goal of the procedure, but only towards the end, and is not the specific reason.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

007 EK3.01

007 Reactor Trip

EK3 Knowledge of the reasons for the following as they apply to a reactor trip:
(CFR 41.5 / 41.10 / 45.6 / 45.13)

EK3.01 Actions contained in EOP for reactor trip

Importance Rating: 4.0* 4.6*

Technical Reference: EPP-004 step 3.b pp 6 Rev 18
WOG Basis Document for ES-0.1 (Harris EPP-004), pp
10 Rev 1C

References to be provided: None

Learning Objective: EOP-LP-3.1 Obj. 3.e

Question Origin: Bank

Comments: Meets K/A because applicant must know the actions in
EPP-004 for controlling RCS temperature after a Reactor
Trip.

Tier/Group: T1G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

D. STABILIZE AND MAINTAIN temperature between 55°F AND 59°F using Table 1.

TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP

- o Guidance is applicable until another procedure directs otherwise.
- o IF no RCPs running, THEN use wide range cold leg temperature.

STEP DESCRIPTION TABLE FOR ES-0.1 Step 1

STEP: Check RCS Temperatures

PURPOSE: To ensure that RCS heat is being properly removed through the secondary side

ES-0.1	10	HP-Rev. 1C
HES01		
Origin: BANK		Cog Level: LOWER
Difficulty:		Reference:
Ref. Provided:		Key Words:
K/A 1: 007 EK3.01		K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

2. 2009B NRC RO 002

Given the following plant conditions:

- A Reactor Trip and Safety Injection have occurred
- PRZ pressure is 1785 psig
- PRT pressure is 45 psig
- ONE PRZ PORV is partially OPEN

Which ONE of the following identifies (1) the temperature indicated on the PRZ PORV Tailpipe Temperature Indicator, TI-463 AND (2) the expected PRZ level trend?

- A. (1) 274°F
(2) rising
- B. (1) 274°F
(2) lowering
- C. (1) 293°F
(2) lowering
- D. (1) 293°F
(2) rising

Plausibility and Answer Analysis

- A. *Incorrect. First part is plausible if applicant determines PRT saturation temperature using 45 psig without correcting for absolute P. Second part is correct.*
- B. *Incorrect. First part is plausible if applicant determines PRT saturation temperature using 45 psig, adding containment pressure and correcting for absolute P. Second part is plausible if applicant determines that a loss of RCS mass through the PORV will result in lowering PRZ level.*
- C. *Incorrect. First part is correct. Second part is plausible if applicant determines that a loss of RCS mass through the PORV will result in lowering PRZ level.*
- D. *Correct. This is the superheat temperature PRZ pressure and throttling to 60 psia using Mollier diagram. Pressurizer level will rise due to lowering RCS pressure and insurge into the pressurizer.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

008 AK1.01

008 Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)

Knowledge of the operational implications of the following concepts as they apply to a Pressurizer Vapor Space Accident:

(CFR 41.8 / 41.10 / 45.3)

AK1.01 Thermodynamics and flow characteristics of open or leaking valves

Importance Rating: 4.4 4.6

Technical Reference: Steam tables and Mollier diagram

References to be provided: Steam Tables and Mollier Diagram

Learning Objective: EOP-LP-3.1 Obj 3.f

Question Origin: Modified from OIT Dev Bank IE-3.5-R2 3

Comments: Meets KA by having applicant determine thermodynamic conditions evident with a leaking PORV and the expected conditions indicated in the MCR.

Tier/Group: T1G1

QUESTIONS REPORT
for OIT Development Bank

45. IE-3.5-R2 003

Given:

- Pressurizer pressure is 1685 psig

- PRT pressure is 15 psig

Which ONE of the following indications supports a diagnosis that a Pressurizer PORV is stuck open?

	PRZ LEVEL	TEMP DOWNSTREAM OF PORV
A.	Increasing	613°F
B. ✓	Increasing	250°F
C.	Decreasing	613°F
D.	Decreasing	250°F

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: MODIFIED

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided: STEAM TABLES/MOLLIER

Key Words:

K/A 1: 008 AK1.01

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

3. 2009B NRC RO 003

Given the following plant conditions:

- A Reactor Trip and Safety Injection have occurred
- EPP-009, Post LOCA Cooldown and Depressurization, is in progress
- PI-455.1, PRZ pressure, is reading 1835 psig
- PI-456, PRZ pressure, is reading 1865 psig
- PI-457, PRZ pressure, is reading 1885 psig
- The highest Core Exit Thermocouple is reading 560°F
- The highest RCS Hot Leg Temperature is reading 550°F
- ERFIS is unavailable

Which ONE of the following choices correctly completes the statement below?

Subcooling is monitored to (1) AND the current value of subcooling is (2) .

- A✓ (1) ensure SI reinitiation if required
 (2) 65°F
- B. (1) prevent voiding during depressurization
 (2) 79°F
- C. (1) ensure SI reinitiation if required
 (2) 79°F
- D. (1) prevent voiding during depressurization
 (2) 65°F

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

The EOP-Users Guide priority requires using lowest pressure and core exit TCs

- A. Correct. Per EPP-009 Foldout item RCS subcooling is monitored for SI Reinitiation Criteria. Subcooling condition: Saturation temperature at 1835 psig is 625°F. Final CET temperature in stem is 560°F. ($625^{\circ}\text{F} - 560^{\circ}\text{F} = 65^{\circ}\text{F}$)*
- B. Incorrect. Plausible because a depressurization will be performed during EPP-009. While the RCS is depressurizing subcooling could be lost. But during the depressurization subcooling is NOT monitored. A Caution in the procedure states that voiding may occur in the RCS during RCS depressurization. This will result in rapidly increasing PRZ level. The Second part is plausible using 1885 psig and 550°F the final CET value to calculate subcooling ($629^{\circ}\text{F} - 550^{\circ}\text{F} = 79^{\circ}\text{F}$)*
- C. Incorrect. First part is correct. Second part is plausible if using saturation temperature minus Tavg ($629^{\circ}\text{F} - 550^{\circ}\text{F} = 79^{\circ}\text{F}$)*
- D. Incorrect. Plausible because a depressurization will be performed during EPP-009. While the RCS is depressurizing subcooling could be lost. But during the depressurization subcooling is NOT monitored. A Caution in the procedure states that voiding may occur in the RCS during RCS depressurization. This will result in rapidly increasing PRZ level. The Second part is correct ($625^{\circ}\text{F} - 560^{\circ}\text{F} = 65^{\circ}\text{F}$).*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

009 EK1.02

009 Small Break LOCA

EK1 Knowledge of the operational implications of the following concepts as they apply to the small break LOCA:

(CFR 41.8 / 41.10 / 45.3)

EK1.02 Use of steam tables

Importance Rating: 3.5 4.2

Technical Reference: Steam tables, EOP Users Guide, Sec 6.2 pg 33 and 34
Rev. 26

References to be provided: Steam Tables

Learning Objective: EOP-LP-3.5 Obj. 5.c

Question Origin: Bank

Comments: Meets K/A by having the applicant determine subcooling using the steam tables while in a procedure that is addressing SI reinitiation criteria.

Tier/Group: T1G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

4. 2009B NRC RO 004

Given the following plant conditions:

- A Large Break LOCA has occurred
- Foldouts A and B apply
- The crew is checking "RHR System - Capable of Cold Leg Recirculation" IAW PATH-1

The following conditions exist:

- The 'A' RHR pump tripped on overcurrent
- The 'B' train RHR containment sump suction valves, 1SI-301 and 1SI-311, are without power due to the respective MCC being de-energized
- ALB-04-2-2, REFUELING WATER STORAGE TANK LOW LEVEL has alarmed
- The Containment sump pumps failed to isolate automatically resulting in overflow of the Waste Holdup Tank and elevated WPB radiation levels

Which ONE of the following identifies the correct procedure action?

- A. Remain in PATH-1
- B. GO to EPP-010, Transfer to Cold Leg Recirculation
- C. GO to EPP-012, Loss of Emergency Coolant Recirculation
- D. GO to EPP-013, LOCA Outside Containment

Plausibility and Answer Analysis

- A. *Incorrect. This is plausible though because it represents the expected progression*
- B. *Incorrect. This is plausible because an annunciator indicates the need to go to EPP-010 but it is the 2/4 LOW LOW Level annunciator*
- C. *Correct. The transition to EPP-012 is correct, with 1SI-301 and 1SI-311 deenergized and 'A' RHR tripped, a transition to EPP-012 required.*
- D. *Incorrect. This is plausible because WPB radiation level are used to transition to EPP-013, but the radiation is not due to RCS inventory loss outside of CNMT*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

011 EG2.4.4

011 Large Break LOCA

2.2.4 Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.

(CFR: 41.10 / 43.2 / 45.6)

Importance Rating: 4.5 4.7

Technical Reference: PATH-1, Rev 26, Pg 65 and 80

References to be provided: None

Learning Objective: EOP-LP-3.5 Obj. 3.j

Question Origin: NEW

Comments: KA is matched due to evaluation of plant conditions and need to determine entry into appropriate procedure.

Tier/Group: T1G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

57. Initiate Evaluation Of Plant Status:

a. RHR system CAPABLE OF COLD LEG RECIRCULATION

(Refer to Attachment 3.)

a. GO TO EFP-011, "LOSS OF EMERGENCY COOLANT RECIRCULATION" Step 1

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Attachment 3
Sheet 1 of 1
MANUAL ALIGNMENT FOR COLD LEG RECIRCULATION

NOTE: Component cooling water to the RHR heat exchangers is NOT required to be available in order to establish flow from the recirculation sumps.

1. At least one train of the following components must be capable of establishing flow from the recirculation sumps. Each component must satisfy the conditions in the associated table AND must NOT otherwise be known to be failed.

Train A:

Component	Conditions for Recirculation Alignment
RHR PUMP A 1RH-1 OR 1RH-2 (RCS loop A to RHR pump A)	Power Available Either valve - SHUT

Train B:

Component	Conditions for Recirculation Alignment
RHR PUMP B 1RH-39 OR 1RH-40 (RCS loop B to RHR pump B)	Power Available Either valve - SHUT
1SI-301 (CMWT sump to RHR pump B)	Power Available
1SI-311 (CMWT sump to RHR pump B)	Power Available
1SI-323 (RWST to RHR pump B)	Power Available

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Origin: BANK

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 011 EG2.4.4

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

5. 2009B NRC RO 005

Given the following plant conditions:

- The plant is operating at 45% power
- RCP 'C' #1 seal leakoff is 9 gpm and rising
- The crew is implementing AOP-018, Reactor Coolant Pump Abnormal Conditions

Which ONE of the following describes the correct sequence of actions in response to these conditions?

- A. Trip the Reactor, secure RCP 'C' and then implement PATH-1
- B. Trip the Reactor, implement PATH-1, secure RCP 'C' as time permits
- C✓ Secure RCP 'C', shut 1CS-437, RCP 'C' #1 Seal Water Return and initiate a plant shutdown IAW GP-006, Normal Plant Shutdown from Power Operation to Hot Standby
- D. Shut 1CS-437, RCP 'C' #1 Seal Water Return, secure RCP 'C' and initiate a plant shutdown IAW GP-006, Normal Plant Shutdown from Power Operation to Hot Standby

Plausibility and Answer Analysis

- A. *Incorrect. RCP 'C' seal has failed as evidenced by the magnitude of seal leakoff and continuing degrading conditions. This is plausible because when above P-8, the correct action is to trip the reactor, go to PATH-1, and secure the RCP as time allows.*
- B. *Incorrect. This would be the correct sequence per AOP-018 if power was greater than P-8. Plausible if applicant does not recognize that power is below P-8.*
- C. *Correct. Per AOP-018, with power less than P-8, the RCP is secured, seal return isolated, and commence a plant shutodwn.*
- D. *Incorrect. This is plausible because it cantains the correct actions in the wrong sequence.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

015 AK1.02

015/017 Reactor Coolant Pump (RCP) Malfunctions

AK1. Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow):

(CFR 41.8 / 41.10 / 45.3)

AK1.02 Consequences of an RCPS failure

Importance Rating: 3.7 4.1

Technical Reference: AOP-018, Rev 35, pp 12/13

References to be provided: None

Learning Objective: AOP-LP-3.18 Obj. 3

Question Origin: NEW

Comments: Meets KA by having applicant identify operational implications for the failed RCP seal which requires securing the RCP.

Tier/Group: T1G1

<input type="checkbox"/> 4. CHECK more than ONE RCP affected.	<input type="checkbox"/> 4. PERFORM the following: <ul style="list-style-type: none"><input type="checkbox"/> a. STOP the affected RCP.<input type="checkbox"/> b. REFER TO Attachment 7, Operation With Two RCPs.<input type="checkbox"/> c. SHUT the affected RCP Seal Water Return Valve(s) between three and five minutes after securing the RCP.<ul style="list-style-type: none"><input type="checkbox"/> • 1CS-355, RCP A #1 Seal Water Return<input type="checkbox"/> • 1CS-396, RCP B #1 Seal Water Return<input type="checkbox"/> • 1CS-437, RCP C #1 Seal Water Return<input type="checkbox"/> d. GO TO Step 12.	
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QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

* 12. CHECK all RCPs RUNNING.

12. PERFORM the following:

- a. IF RCP A is SECURED, THEN SHUT 1RC-107, PRZ Spray Loop A.
- b. IF RCP B is SECURED, THEN SHUT 1RC-103, PRZ Spray Loop B.
- c. VERIFY SG levels being maintained between 52% and 62%.
- d. MONITOR rod insertion limits (Refer to Section F curve from Curve Book).
- e. INITIATE a plant shutdown using ONE of the following:
 - GP-006, Normal Plant Shutdown from Power Operation to Hot Standby
 - AOP-038, Rapid Downpower

AOP-018

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Origin: NEW
Difficulty:
Ref. Provided:
K/A 1: 015 AK1.02

Cog Level: HIGHER
Reference:
Key Words:
K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

6. 2009B NRC RO 006

Given the following plant conditions:

- The plant is operating at 100% power
- A leak has occurred in the reference leg of Pressurizer Level Transmitter LT-459
- The leak size is insufficient to affect CNMT parameters

Which ONE of the following identifies (1) the level trend that will be displayed on Pressurizer Level Indicator LI-459 AND (2) the initial impact on Pressurizer Level Control?

- A. (1) Rising
(2) NO impact because LI-460 is controlling
- B. (1) Rising**
(2) FCV-122 throttles CLOSED and actual level lowers
- C. (1) Lowering
(2) Letdown isolates and actual level rises
- D. (1) Lowering
(2) FCV-122 throttles OPEN and actual level rises

Plausibility and Answer Analysis

Because the LT uses a wet reference leg, differential pressure between the reference and variable leg would reduce resulting in indicated level will rising. Based on LI-459 being the controlling instrument during normal operations, the FCV will close in an attempt to restore indicated level to program level and actual level would lower.

- A. Incorrect. This is plausible as the selector switch is in 459/460 but 459 is the controlling channel*
- B. Correct. Because the LT uses a wet reference leg, the indicated level will raise. Based on LI-459 controlling, the FCV will attempt to restore and lower actual level.*
- C. Incorrect. This is plausible if applicant incorrectly determines the change in measured differential pressure due to the failure. The second part is a plausible response based on part 1 of this distractor.*
- D. Incorrect. This is plausible if applicant incorrectly determines the change in measured differential pressure due to the failure. The second part is a plausible response based on part 1 of this distractor.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

022 AA1.03

022 Loss of Reactor Coolant Makeup

AA1. Ability to operate and / or monitor the following as they apply to the Loss of Reactor Coolant Makeup:

(CFR 41.7 / 45.5 / 45.6)

AA1.03 PZR level trend

Importance Rating: 3.2 3.2

Technical Reference: APP-ALB-009-2-1, pp 8 Rev 12

References to be provided: None

Learning Objective: Student Text Pressurizer Level Control Obj. 9

Question Origin: NEW

Comments: (K/A MATCH) This question matches the K/A because the candidate must evaluate the impact of a malfunction and how it affect the PZR Level trend. The faulty reference leg will shut the Charging FCV resulting in a loss of Charging/RCS Makeup

Tier/Group: T1G1

<p>DEVICES: LS-01RC-04590W (LB-4590)</p>	<p>SETPOINT: 5% above programmed level</p>	<p align="right">2-1</p> <div style="border: 2px solid black; padding: 5px; text-align: center;"> <p>PRZ CONT HIGH LEVEL DEVIATION AND HEATERS ON</p> </div>
<p>REFLASH: NO</p>		
<p>OPERATOR ACTIONS:</p>		
<p>1. CONFIRM alarm using:</p> <ul style="list-style-type: none"> a. Pressure level LI-459A1, LI-460, LI-461,LI b. Charging flow FI-122A.1 c. Letdown flow FI-150.1 d. Generator load e. Tavg indication TR-408 		
<p>2. VERIFY Automatic Functions:</p> <ul style="list-style-type: none"> a. Pressurizer backup heaters energize 		
<p>3. PERFORM Corrective Actions:</p> <ul style="list-style-type: none"> a. IF level deviation is due to load changes, THEN verify that PRZ Level Control system is returning level to normal. b. IF Tavg is stable, THEN adjust charging or letdown flow to bring PRZ level to normal per OP-107. c. IF maintenance is to be performed, THEN refer to OWP-RP. 		
<p>Although deviation is not due to a load change, the level control system will attempt to restore PRZ to normal value based on seeing a high level.</p>		
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QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: NEW

Difficulty:

Ref. Provided:

K/A 1: 022 AA1.03

Cog Level: HIGHER

Reference:

Key Words:

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

7. 2009B NRC RO 007

Given the following plant conditions:

- The plant is in Mode 5
- 'A' and 'B' RCPs are in service
- Both trains of RHR are in service for shutdown cooling
- Both ESW Headers are being supplied by NSW
- CCW is aligned to support RHR Operations
- 1CC-99 and 1CC-128, Non-Essential Header Supply and Return to 'A' Header, SHUT

The following occur:

- A large leak from CCW develops
- CCW Surge Tank level lowers to 38% on LI-670A1 SA and 3% on LI-676A1 SB

Which ONE of the following identifies the location of the leak and the action required by AOP-014, Loss of Component Cooling Water?

<u>Leak Location</u>	<u>Action Required</u>
A. 'B' RHR HX	ONLY the 'B' CCW Pump must be stopped
B✓ 'B' CCW HX	ONLY the 'B' CCW Pump must be stopped
C. 'B' CCW HX	The 'A' and 'B' CCW Pumps must be stopped
D. 'B' RHR HX	The 'A' and 'B' CCW Pumps must be stopped

Plausibility and Answer Analysis

- A. Incorrect. 'B' RHR HX is plausible as the leak location because with low RHR pressure, CCW can leak to RHR but with present conditions (RCPs in service) pressure is high. Only stopping 'B' CCW Pump is correct.*
- B. Correct. 'B' CCW HX is the correct leak location and only the 'B' CCW Pump is stopped.*
- C. Incorrect. 'B' CCW HX is the correct leak location. Stopping 'A' and 'B' CCW pumps is plausible because the normal 100% alignment has both headers X-connected through the non-essential header. Candidate must understand given conditions and only stop 'B'.*
- D. Incorrect. 'B' RHR HX is plausible as the leak location because with low RHR pressure, CCW can leak to RHR but with present conditions (RCPs in service) pressure is high. Stopping 'A' and 'B' CCW pumps is plausible because the normal 100% alignment has both headers X-connected through the non-essential header. Candidate must understand given conditions and only stop 'B'.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

025 AK2.03

025 Loss of Residual Heat Removal System (RHRS)

AK2. Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following:

(CFR 41.7 / 45.7)

AK2.03 Service water or closed cooling water pumps

Importance Rating: 2.7 2.7

Technical Reference: AOP-014 Rev. 31, page 14
AOP-014-BD Rev. 14, page 4

References to be provided: None

Learning Objective: AOP-LP-3.14 Obj.s 2 and 6

Question Origin: NEW

Comments: (K/A MATCH) RHR loss is threatened because of the loss of CCW. Candidate must determine appropriate actions of AOP-014 to prevent the loss of RHR cooling

Tier/Group: T1G1

- | | |
|---|---|
| <p>* <input type="checkbox"/> 2. CHECK BOTH of the following conditions exist:</p> <ul style="list-style-type: none"> • ALL operable CCW Surge Tank level indicators are greater than 4% • CCW Pump flow indication is NORMAL | <p><input type="checkbox"/> 2. PLACE AND HOLD the control switch for ALL affected CCW Pumps to STOP until CCW header pressure is less than 52 psig.</p> |
|---|---|

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LOSS OF COMPONENT COOLING WATER — BASIS DOCUMENT

1.0 DISCUSSION (continued)

13. Due to pressure differential, the CCW System could leak into these systems/components:

- RHR Heat Exchanger (if RHR pressure is less than CCW pressure)

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QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: NEW

Difficulty:

Ref. Provided:

K/A 1: 025 AK2.03

Cog Level: HIGHER

Reference:

Key Words:

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

8. 2009B NRC RO 008

Given the following plant conditions:

- The plant tripped from 100% power due to PRZ PORV 1RC-116 failing open
- During the transient the following events occurred:
 - 1MS-58, 'A' SG PORV failed open resulting in PRZ Level lowering to 19%
 - The 'B' RCP tripped due to an electrical fault

The following conditions currently exist:

- 1MS-58 is isolated and the overcooling terminated
- The block valve for 1RC-116 is closed
- Core Exit Thermocouples are 557°F
- PRZ pressure is 2135 psig
- PRZ level is 28%
- PRZ Liquid Space temperature is 610°F

Which ONE of the following describes the response of RCS pressure over the next five minutes AND the reason for the response?

RCS pressure will....

- A. rise because spray flow has been reduced with the trip of 'B' RCP
- B. rise because PRZ heaters are raising PZR temperature
- C. lower because all heaters remain de-energized until manually reset
- D✓ lower because subcooled liquid insurged into the PZR

Plausibility and Answer Analysis

- A. *Incorrect. Plausible because the PZR surge line connects to the 'B' Hot Leg and therefore 'B' RCP provides the most spray driving head but 'A' RCP will provide adequate spray flow if required.*
- B. *Incorrect. Plausible because Pressurizer heaters would be adding heat to the liquid. However the liquid is currently ~ 35° F subcooled. The short term effect of this would be heat transfer from the vapor to the liquid which would result in lowering pressure.*
- C. *Incorrect. Plausible because Pressurizer heaters will automatically de-energized if level were to go below 17%. But the lowest level during the transient was 19%.*
- D. *Correct. Pressurizer water space temperature is 610°F, which is ~ 35°F subcooled. The short term effect of this would be heat transfer from the vapor to the liquid which would result in lowering pressure.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

027 AK3.04

027 Pressurizer Pressure Control System (PZR PCS) Malfunction

AK3. Knowledge of the reasons for the following responses as they apply to the Pressurizer Pressure Control Malfunctions:

(CFR 41.5,41.10 / 45.6 / 45.13)

AK3.04 Why, if PZR level is lost and then restored, that pressure recovers much more slowly

Importance Rating: 2.8 3.3

Technical Reference: WCAP-16376-P Rev 2, pp 1-1

References to be provided: Steam Tables

Learning Objective: PZRPC Obj 8

Question Origin: Bank

Comments: Original KA provided by NRC was 027 AK3.02. Replaced with KA 027 AK3.04.

Tier/Group: T1G1

WESTINGHOUSE PROPRIETARY CLASS 2

I-1

1 BACKGROUND AND INTRODUCTION

The WOG program "Mitigation and Evaluation of Pressurizer Thermal Transients Caused by Insurges and Outsurgers" is documented in WCAP-14950 [1]. Under certain operating conditions, changes in reactor coolant system (RCS) mass inventory may cause fluid to enter the pressurizer (insurge) or exit the pressurizer (outsurge) through the pressurizer surge nozzle in the lower head. When there is a steam bubble in the pressurizer, the fluid in the pressurizer is typically at the saturation temperature corresponding to system pressure. The temperature of the fluid in the reactor coolant loop (RCL) hot leg is lower than in the pressurizer. The temperature difference typically varies between 30°F and 320°F, depending on the plant mode of operation. The larger temperature differences occur during heatup and cooldown operations. When a significant insurge occurs, the cooler fluid entering the pressurizer may produce a temperature transient, cooling the surge nozzle and portions of the lower head. In some cases, a subsequent outsurge may also produce a transient which heats these regions back to the initial pressurizer fluid temperature.

WCAP-16376-P

March 2008
Revision 2

Origin: BANK

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 027 AK3.04

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

9. 2009B NRC RO 009

Given the following plant conditions:

- The plant is operating at 7% power
- The crew is implementing AOP-010, Feedwater Malfunction

Current 'A' SG levels are:

- LI-474 is 26%
- LI-475 is 22%
- LI-476 is 23%

Which ONE of the following choices identifies (1) the annunciator(s) that are expected for this condition AND (2) the required crew actions?

- A. (1) SG A NR LVL/SP HI/LO DEV (ONLY)
(2) Continue in AOP-010 and restore SG levels
- B✓ (1) SG A NR LVL/SP HI/LO DEV and REACTOR TRIP STEAM GEN-A
LOW-LOW-LEVEL
(2) Trip the Reactor and enter PATH-1
- C. (1) SG A NR LVL/SP HI/LO DEV (ONLY)
(2) Trip the Reactor and enter PATH-1
- D. (1) SG A NR LVL/SP HI/LO DEV and REACTOR TRIP STEAM GEN-A
LOW-LOW-LEVEL
(2) Continue in AOP-010 and restore SG levels

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

SG A NR LVL/SP HI/LO DEV (ONLY) alarms on a lowering level of 52% which is 5% below setpoint. REACTOR TRIP STEAM GEN-A LOW-LOW-LEVEL alarms on a coincidence of 2 out of 3 low levels (25%). Therefore both annunciators should be on.

- A. Incorrect. The first part is plausible because it would be correct if the SG levels were above 30%. The second part is plausible since AOP-010 directs restoration of SG levels, but with valid trip signals the reactor should be tripped.*
- B. Correct. Both annunciators are received and the crew should trip the reactor.*
- C. Incorrect. The first part is plausible because it would be correct if the SG levels were above 30%. The second part is correct.*
- D. Incorrect. The first part is correct. The second part is plausible since AOP-010 directs restoration of SG levels, but with valid trip signals the reactor should be tripped.*

029 EA2.02

029 Anticipated Transient Without Scram (ATWS)

EA2 Ability to determine or interpret the following as they apply to a ATWS:

(CFR 43.5 / 45.13)

EA2.02 Reactor trip alarm

Importance Rating: 4.2 4.4

Technical Reference: APP-ALB-012-3-2, pp 8 Rev 8
APP-ALB-014-1-1B, pp 4 Rev 21

References to be provided: None

Learning Objective: EOP-LP-3.1 Obj 2

Question Origin: OIT Development Bank 054 G2.4.31

Comments: KA is met by identifying plant conditions and interpretation of alarms that would be indicative of an ATWS condition.

Tier/Group: T1G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

10. 2009B NRC RO 010

Given the following plant conditions:

- The plant was operating at 100% power
- A LOCA has occurred
- The crew is performing the actions of EPP-009, Post LOCA Cooldown and Depressurization

The following plant conditions exist:

- AFW flow to the SGs has been secured to maintain current level
- Charging Flow is 150 gpm
- Pressurizer level is 8% and lowering
- RCS subcooling is 23°F and lowering
- The BOP reports that 'C' SG level is increasing steadily

Which ONE of the following identifies the required action AND procedure transition?

- A. Manually align flow through the BIT AND GO TO PATH-1, Entry Point C
- B. Manually align flow through the BIT AND GO TO PATH-2, Entry Point J
- C. Actuate Safety Injection AND GO TO PATH-2, Entry Point J.
- D. Actuate Safety Injection AND GO TO PATH-1, Entry Point C

Plausibility and Answer Analysis

- A. *Incorrect Plausible because SI Reinitiation Criteria is met but while other procedures transition to PATH-1 Entry Point C on SI Reinitiation Criteria, EPP-009 does not transition but stays in the procedure*
- B. *Correct. Both the SI reinitiation and PATH-2 transition criteria are met.*
- C. *Incorrect Plausible because EPP-004 has SI Actuation Criteria requiring a manual SI and transition to PATH-1 but from EPP-009, SI would be manually aligned and followed by transition to PATH-2..*
- D. *Incorrect Plausible because EPP-004 has SI Actuation Criteria requiring a manual SI and transition to PATH-1.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

038 EG2.4.4

038 Steam Generator Tube Rupture (SGTR)

2.4 Emergency Procedures / Plan

2.4.4 Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.

(CFR: 41.10 / 43.2 / 45.6)

Importance Rating: 4.5 4.7

Technical Reference: EPP-009 Rev. 14, PATH-2 Transition Criteria Foldout

References to be provided: None

Learning Objective: EOP-LP-3.5 Obj. 4

Question Origin: NEW

Comments: KA is met by having applicant evaluate plant conditions and determine entry into PATH-2 is required to address SGTR event.

Tier/Group: T1G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 038 EG2.4.4

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

11. 2009B NRC RO 011

Given the following plant conditions:

- The plant is in Mode 3
- GP-007, Normal Plant Cooldown Mode 3 to Mode 5, is in progress
- RCS temperature is 495°F
- RCS pressure is 1900 psig
- All SG pressures are 630 psig
- All actions required by GP-007 for present plant conditions have been completed

A Steam Line Break occurs inside Containment and the following conditions exist:

- Containment is 2.7 psig and increasing
- 'A' SG pressure has decreased to 440 psig in the last 30 seconds

Which ONE of the following identifies the ESFAS signals that have automatically initiated with these conditions?

- A. Safety Injection and Main Steam Isolation ONLY
- B. Safety Injection and AFW Isolation ONLY
- C✓ Main Steam Isolation and AFW Isolation ONLY
- D. Safety Injection, Main Steam Isolation, and AFW Isolation

Plausibility and Answer Analysis

For present plant temperature and pressure the Low Pressurizer Pressure and Low Steam Pressure SI are blocked. With these signals blocked, Main Steam Line Isolation occurs on High Negative Rate. High Negative Rate does not cause the SI Signal therefore SI will not occur until 3 psig in CNMT. MSLI with 100 psig delta causes the AFW isolation.

- A. Incorrect. Plausible because the MSLI has occurred and 'A' SG pressure has lowered to less than the SI setpoint but SI is blocked.*
- B. Incorrect. Plausible because 'A' SG pressure has lowered to less than the SI setpoint but SI is blocked and with the given SG pressures AFW Isolation has occurred.*
- C. Correct. MSLI and AFW Isolation have occurred.*
- D. Incorrect. Plausible because the MSLI and AFW Isolation have occurred and 'A' SG pressure has lowered to less than the SI setpoint but SI is blocked*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

040 AA2.04

040 Steam Line Rupture

AA2. Ability to determine and interpret the following as they apply to the Steam Line Rupture:

(CFR: 43.5 / 45.13)

AA2.04 Conditions requiring ESFAS initiation

Importance Rating: 4.5 4.7

Technical Reference: APP-ALB-014-2-3, pp12 Rev 21
APP-ALB-014-1-1A, pp 3 Rev 21 (2-1A for B loop, 3-1A for C loop, these have the same attributes as 1-1A. 1-1A provided in this bank for reference)

References to be provided: None

Learning Objective: ESFAS Student Text Obj 5.f
AFW Student Text Obj 4

Question Origin: NEW

Comments: KA is met by evaluating recognition of need for ESFAS actuation during a Main Steam Rupture.

Tier/Group: T1G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

		2-3
DEVICES: Loop 1 PB474C, PB475C, PB476C Loop 2 PB484C, PB485C, PB486C Loop 3 PB494C, PB495C, PB496C	SETPOINT: 100 psid/sec (2 out of 3 logic) 100 psid/sec (2 out of 3 logic) 100 psid/sec (2 out of 3 logic)	LOOP A, B, C HI STEAM LINE PRESS RATE
REFLASH: NO		
OPERATOR ACTIONS:		
1. CONFIRM alarm using: a. PI-474.1 SB, PI-475 SA, and PI-476, Steam Pressure SG A b. PI-484.1 SB, PI-485 SA, and PI-486, Steam Pressure SG B c. PI-494 SB, PI-495 SA, and PI-496.1, Steam Pressure SG C		
2. VERIFY Automatic Functions: a. Main Steam Line Isolation when Low Steam Line Pressure SI is blocked		
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		1-1A
DEVICES: PB474B, PB475B, PB476B (2 out of 3 logic) PB494B, PB495B, PB496B (2 out of 3 logic)	SETPOINT: P1-P2 100 psid with Main Steam Isolation Signal present P1-P3 100 psid with Main Steam Isolation Signal present	LOOP A AFW LINE ISOL
REFLASH: NO		
OPERATOR ACTIONS:		
1. CONFIRM alarm using: a. PI-474.1 SB, PI-484.1 SB, PI-494 SB, Steam pressure indicators b. Valve position indication for SG A AFW isolation valves 1AF-55, 1AF-137, 1AF-49, 1AF-129 c. TSLB-1 status lights		
2. VERIFY Automatic Functions: a. SG A AFW isolation valves 1AF-55, 1AF-137, 1AF-49, 1AF-129 shut		
APP-ALB-014	Rev. 21	Page 3 of 45

Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 040 AA2.04

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

12. 2009B NRC RO 012

Given the following plant conditions:

- A Reactor Trip occurred due to a Loss of Offsite Power
- The 'A' EDG failed to start
- The crew is performing actions of EPP-004, Reactor Trip Response
- RCS temperature lowered to 552°F but is trending to 557°F

Which ONE of the following identifies (1) the required SG PORV controller setpoint to maintain 557°F IAW EPP-004 AND (2) the SG PORV(s) available to control RCS temperature?

- A. (1) 84%
(2) 'B' ONLY
- B✓ (1) 84%
(2) 'B' AND 'C'
- C. (1) 85%
(2) 'B' AND 'C'
- D. (1) 85%
(2) 'B' ONLY

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

84% setpoint is for 1092 psig SG press or 557°F RCS temperature. EPP-004 requires the steam dump controller to be set at 84% to maintain no load TAVG of 557. 85% is what the normal setpoint for the PORVs is IAW GP-005 which is 1106 psig. The setpoint must be reduced to control at 557°F

'B' and 'C' SG PORVs have power. 'B' receives power from the 'B' Safety Bus. 'C' receives power from Instrument Bus III. Therefore 'C' energized from inverter connected to 'A' DC Bus.

- A. Incorrect. First part is correct. Second part is plausible since power is lost to the 'A' Safety bus and the 'C' SG PORV is powered from 'A' train power.*
- B. Correct. Right Setpoint and PORVs*
- C. Incorrect. First part is incorrect but plausible since 84% is a setpoint utilized within GP-005, but not in EPP-004. Second part is correct.*
- D. Incorrect. First part is incorrect but plausible since 84% is a setpoint utilized within GP-005, but not in EPP-004. Second part is plausible since power is lost to the 'A' Safety bus and the 'C' SG PORV is powered from 'A' train power.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

056 AA1.01

056 Loss of Offsite Power

AA1. Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power:

(CFR 41.7 / 45.5 / 45.6)

AA1.01 Power relief controllers to maintain no-load Tav_g

Importance Rating: 4.0* 3.8*

Technical Reference: EPP-004 Note pp 30 Rev 18
AOP-024, pp 6 Rev 39

References to be provided: None

Learning Objective: EOP-LP-3.1 Obj 1

Question Origin: NEW

Comments: KA is met by having applicant identify required control conditions to maintain no-load TAVG conditions using the SG PORVs during a loss of off site power.

Tier/Group: T1G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

REACTOR TRIP RESPONSE		
Instructions	Response Not Obtained	
<p>NOTE: In automatic control, a setpoint of 84% corresponds to 1092 PSIG for the steam dump pressure controllers and the SG PORV controllers.</p>		
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3. Manually CONTROL the following based on the Instrument Bus lost:

PARAMETER	Instrument Bus Lost			
	SI	SII	SIII	SIV
Rod Control	x	x	x	x
PRZ level	x	x		
PRZ Master Pressure Controller	x	x		
PRZ heaters and sprays	x	x		
A SG PORV	x			
B SG PORV		x		
C SG PORV			x	
Main FW Reg Valves			x	
Main FW Reg Bypass Valves			x	

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Origin: NEW	Cog Level: HIGHER
Difficulty:	Reference:
Ref. Provided:	Key Words:
K/A 1: 056 AA1.01	K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

13. 2009B NRC RO 013

Given the following plant conditions:

- The plant is in Mode 6
- Core Alterations are in progress
- Source Range (SR) N32 is providing audible count rate in the MCR and CNMT
- Nuclear Flux Monitoring System (NFMS) N60 is being substituted for SR N31

Which ONE of the following identifies a condition that would require suspension of Core Alterations?

- A. RWST level lowers to 23%
- B. Instrument Bus IDP-1B-SII de-energizes
- C. Count rate increases by a factor of two on SR N32 ONLY
- D. The control power fuses for Power Range Nuclear Instrument N41 blow

Plausibility and Answer Analysis

GP-009 Rev 49 (pg 10) P&L #2 provides a list of times when Core Alts must be suspended.

- A. Incorrect. This is plausible because it would be correct if level lowered to 12%. Additionally, 23% is the required BAT level.*
- B. Correct. Loss of Instrument Bus II results in a loss of N32 and audible count rate.*
- C. Incorrect. Plausible because this would be a correct answer if both instruments had increased by a factor of two or one instrument increased by a factor of five.*
- D. Incorrect. This is plausible because if two PR instruments are removed from service, it results in P-10 and de-energizing the SR instrument.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

057 AG2.2.38

057 Loss of Vital AC Electrical Instrument Bus

2.2 Equipment Control

2.2.38 Knowledge of conditions and limitations in the facility license.

(CFR: 41.7 / 41.10 / 43.1 / 45.13)

Importance Rating: 3.6 4.5

Technical Reference: GP-009 Rev 49 Note on pg 10, Rev 49
Tech Spec 3.9.2 pp 3/4 9-3

References to be provided: None

Learning Objective: Student Text Nuclear Instrumentation Obj 11

Question Origin: NEW

Comments: KA Match because applicant must identify that it is the loss of instrument bus that has resulted in the need to suspend core alterations which is a condition in the Technical Specifications Section 3.9

Tier/Group: T1G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

NOTE: A Nuclear Flux Monitoring System (N50 or N51) Monitor may be used in place of an inoperable Source Range Monitor to satisfy Tech Spec 3.9.2. The substitute Monitor must be located on the opposite side of the core from the operable Source Range (N60 may substitute for N31 and N61 may substitute for N32). The operable Source Range Monitor must be able to provide audible indication in Containment and the MCR.

- Fewer than two Source Range Monitors are operable, or audible count rate indication is lost in the Main Control Room or in Containment. (Reference 2.2.14)

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REFUELING OPERATIONS

3/4.9.2 INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.9.2 As a minimum, two Source Range Neutron Flux Monitors shall be OPERABLE, each with continuous visual indication in the control room and one with audible indication in the containment and control room.

APPLICABILITY: MODE 6.

ACTION:

- a. ~~With one of the above required monitors inoperable or not operating, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes.~~
- b. With both of the above required monitors inoperable or not operating, in addition to Action a, above, immediately initiate actions to restore one source range neutron flux monitor to OPERABLE status and determine the boron concentration of the Reactor Coolant System within 4 hours and once per 12 hours thereafter.

SHEARON HARRIS - UNIT 1	3/4 9-3	Amendment No. 105
Origin: NEW		Cog Level: HIGHER
Difficulty:		Reference:
Ref. Provided:		Key Words:
K/A 1: 057 AG2.2.38		K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

14. 2009B NRC RO 014

The plant is at 100% power when a loss of DC Bus 1A-SA occurs.

Which ONE of the following choices regarding the 'A' EDG correctly completes the statement below?

The Governor and Generator Excitation circuits will be (1) and the EDG Output breaker (2) be closed from the MCB.

- A. (1) de-energized
(2) can
- B✓ (1) de-energized
(2) can NOT
- C. (1) energized
(2) can
- D. (1) energized
(2) can NOT

Plausibility and Answer Analysis

- A. *Incorrect. Plausible since the Governor and Excitation circuits will de-energize, however to operate the EDG Output breaker from the MCB requires DC Control Power.*
- B. *Correct*
- C. *Incorrect. Plausible if the candidate believes that the Governor, Excitation, and Control power circuits are supplied by the AC Electrical Distribution System.*
- D. *Incorrect. Plausible if the candidate believes that the Governor and Excitation circuits are supplied by the AC Electrical Distribution System.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

058 AA1.03

058 Loss of DC Power

AA1. Ability to operate and / or monitor the following as they apply to the Loss of DC Power:

(CFR 41.7 / 45.5 / 45.6)

AA1.03 Vital and battery bus components

Importance Rating: 3.1 3.3

Technical Reference: AOP-025 pp 49 Rev 25

References to be provided: None

Learning Objective: Diesel Text Obj 12, 6.9 KV Text Obj 7

Question Origin: Bank

Comments: KA is matched because question evaluates impact of loss of DC power to components supplied by DC power.

Original KA provided by NRC was 058 AA1.01. Replaced by KA 058 AA1.03.

Tier/Group: T1G1

LOSS OF ONE EMERGENCY AC BUS (6.9KV) OR ONE EMERGENCY DC BUS (125V)

Attachment 2 Sheet 1 of 3 Emergency DC Bus Loads 125V DC Power Panel DP-1A-SA	
<u>Circuit Number</u>	<u>Component Description</u>
1	Motoring Compartment
33	Aux Transfer Panel "SA" (App R)
34	Feed to DP-1A1-SA (125V DC Panel) (EDG A-SA Controls)
35	480V SWGR 1A1 (in series with Ckt No 36 Fuse)
36	480V SWGR 1A1 Instrumentation (Series Fuses)
37	DC to Transfer Panel 1A Sect SA (Train A)
38	Disconnect (No Fuses)
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QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: BANK

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 058 AA1.03

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

15. 2009B NRC RO 015

Given the following plant conditions:

- The plant is operating at 100% power
- 'B' Train Safety Equipment is in service
- Both ESW Pumps are running to support surveillance testing

The following indications and annunciators are observed:

- ALB-02-4-5, SERV WTR LEAKAGE
- ALB-02-5-5, SERV WTR HEADER A HIGH/LOW FLOW
- ALB-02-6-1, SERV WTR SUPPLY HEADER A LOW PRESS
- CNMT Sump level is increasing on ERFIS

The crew enters AOP-022, Loss of Service Water and secures the 'A' ESW Pump.

Which ONE of the following identifies (1) the ^{possible} location of the rupture AND (2) the condition required that provides for the earliest restart of the 'A' ESW Pump as a result of the rupture?

- A. (1) CNMT Fan Coil Units
(2) The rupture must be repaired
- B. (1) CNMT Fan Coil Units
(2) The CNMT Isolation Valves must be SHUT
- C✓ (1) CNMT Fan Coolers
(2) The CNMT Isolation Valves must be SHUT
- D. (1) CNMT Fan Coolers
(2) The rupture must be repaired

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

- A. *Incorrect. CNMT Fan Coil Units is plausible because they are in CNMT and cooled by SW but they are cooled by NSW. 'A' ESW Pump remaining OFF is plausible if loads were in series but the CNMT Isolations can be shut and the remaining portion of ESW placed in service*
- B. *Incorrect. CNMT Fan Coil Units is plausible because they are in CNMT and cooled by SW but they are cooled by NSW. Restart of ESW allowed after CNMT Isolation shut is correct*
- C. *Correct. CNMT Fan Coolers and Restart are correct.*
- D. *Incorrect. CNMT Fan Coolers is correct. 'A' ESW Pump remaining OFF is plausible if loads were in series but the CNMT Isolations can be shut and the remaining portion of ESW placed in service*

062 AA2.03

062 Loss of Nuclear Service Water

AA2. Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water:

(CFR: 43.5 / 45.13)

AA2.03 The valve lineups necessary to restart the SWS while bypassing the portion of the system causing the abnormal condition

Importance Rating: 2.6 2.9

Technical Reference: Simplified Flow Diagrams

References to be provided: None

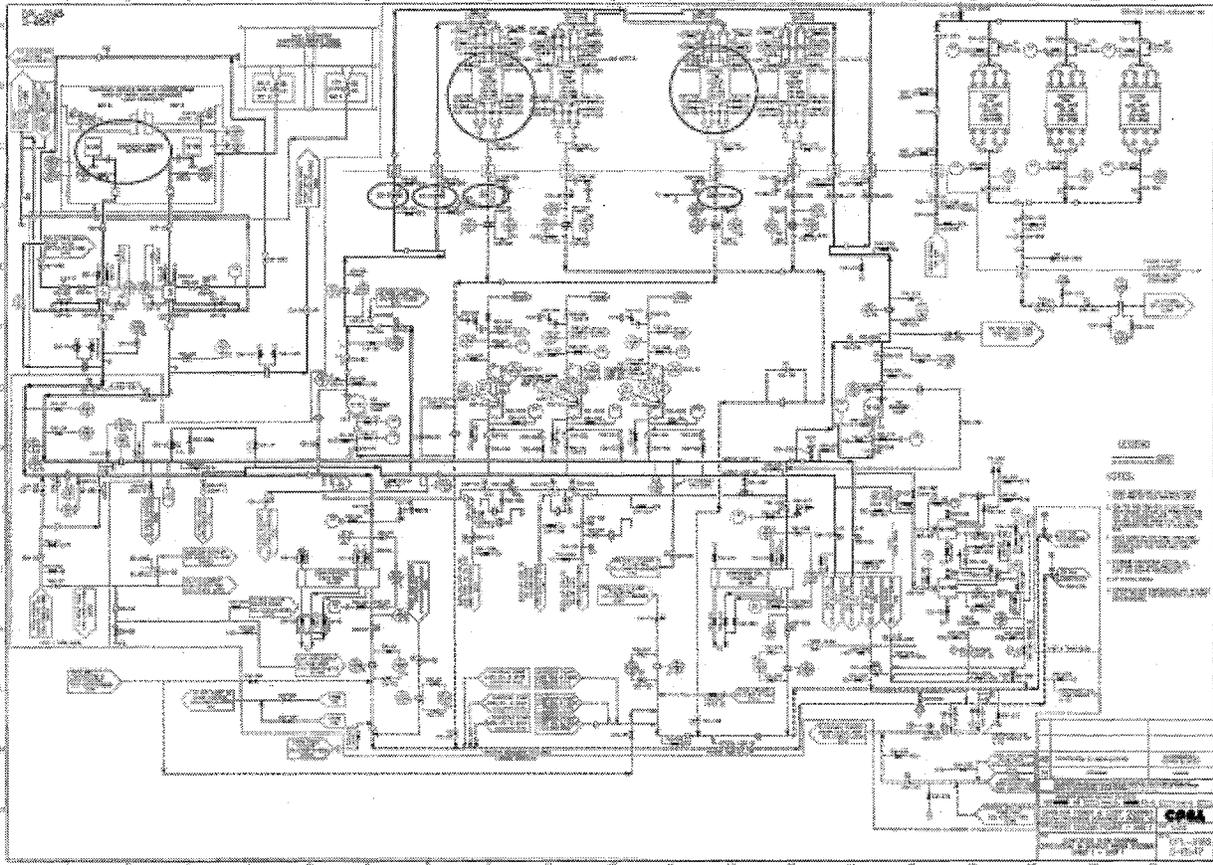
Learning Objective: AOP-LP-3.22 Obj. 2

Question Origin: NEW

Comments: KA is matched because applicant must evaluate plant conditions to determine when restart of the affected ESW pump can occur to restore system flow.

Tier/Group: T1G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS



Origin: NEW

Difficulty:

Ref. Provided:

K/A 1: 062 AA2.03

Cog Level: HIGHER

Reference:

Key Words:

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

16. 2009B NRC RO 016

Given the following plant conditions:

- The plant is in Mode 5
- The RCS is in solid plant operations
- An RCS pressure control malfunction has occurred resulting in LTOPS actuation
- The crew has entered AOP-019, Malfunction of RCS Pressure Control

Which ONE of the following identifies (1) the valve that has lost Instrument Air AND (2) the immediate action required by AOP-019?

- A✓ (1) HCV-142 (1CS-28), RHR Letdown Control Valve
(2) STOP the running Charging Pump
- B. (1) HCV-142 (1CS-28), RHR Letdown Control Valve
(2) STOP the running RCPs
- C. (1) PCV-145 (1CS-38), Letdown Pressure Control Valve
(2) STOP the running RCPs
- D. (1) PCV-145 (1CS-38), Letdown Pressure Control Valve
(2) STOP the running Charging Pump

Plausibility and Answer Analysis

- A. *Correct. Valve fails shut in the letdown path resulting in increasing pressure. With RCS pressure greater than 360 psig (LTOP actuation), the CSIP must be secured.*
- B. *Incorrect. Valve fails shut in the letdown path resulting in increasing pressure. RCPs is plausible because this action will also be completed for this malfunction.*
- C. *Incorrect. 1CS-38 is plausible because it is in the letdown path and controls RCS pressure but it fails open. RCPs is plausible because this action will also be completed for this malfunction.*
- D. *Incorrect. 1CS-38 is plausible because it is in the letdown path and controls RCS pressure but it fails open. With RCS pressure greater than 360 psig (LTOP actuation), the CSIP must be secured.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

065 AK3.03

065 Loss of Instrument Air

AK3. Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air:

(CFR 41.5,41.10 / 45.6 / 45.13)

AK3.03 Knowing effects on plant operation of isolating certain equipment from

Importance Rating: 2.9 3.4

Technical Reference: AOP-019 Rev 21 page 4

References to be provided: None

Learning Objective: AOP-LP-310 Obj. 5

Question Origin: NEW

Comments: The applicant must know which valve fails on loss of IA such that RCS pressure will increase during solid operations and the IAs to correct. The loss of air to the valve is equivalent operationally to isolating air to the valve.

Tier/Group: T1G1

LOSS OF INSTRUMENT AIR

Attachment 1 Sheet 1 of 5 Fail Positions for Major Valves Controlled by Instrument Air

ICS-28	RHR Letdown (HC-142.1)	Fail Shut
--------	------------------------	-----------

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- | | |
|---|--|
| <p><input type="checkbox"/> 1. CHECK that a bubble exists in the PRZ.</p> | <p>1. PERFORM the following:</p> <p><input type="checkbox"/> a. IF PRZ pressure is GREATER THAN 360 PSIG, THEN STOP the running charging pump.</p> |
|---|--|

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QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 065 AK3.03

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

17. 2009B NRC RO 017

Given the following plant conditions:

- A Reactor Trip and Safety Injection have occurred from 100% power
- The crew has transitioned to EPP-013, LOCA Outside Containment
- 1RH-1 and 1RH-2, RCS Loop A to RHR Pump A-SA, BOTH indicate partially OPEN

Which ONE of the following identifies (1) the action required to allow shutting 1RH-1 and 1RH-2 from the MCB AND (2) the parameter used in EPP-013 to determine if this action has isolated the break?

- A. (1) the control power switch must be turned ON
(2) RCS pressure increasing
- B. (1) the control power switch must be turned ON
(2) Pressurizer level increasing
- C. (1) the breakers for 1RH-1 and 1RH-2 must be CLOSED
(2) Pressurizer level increasing
- D✓ (1) the breakers for 1RH-1 and 1RH-2 must be CLOSED
(2) RCS pressure increasing

Plausibility and Answer Analysis

- A. *Incorrect. The control power switch is plausible because other valves have a control power switch to prevent operation. RCS pressure increasing is correct.*
- B. *Incorrect. The control power switch is plausible because other valves have a control power switch to prevent operation. PZR level increasing is plausible because with the leak isolated, inventory would be recovered but some leak locations will result in increasing level so the EOP network does not use level.*
- C. *Incorrect. The breakers are NOT normally powered. Closing breakers is correct. PZR level increasing is plausible because with the leak isolated, inventory would be recovered but some leak locations will result in increasing level so the EOP network does not use level*
- D. *Correct. The breakers are NOT normally powered. Closing breakers is correct. RCS pressure increasing is correct.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

E04 EK2.1

E04 LOCA Outside Containment

EK2. Knowledge of the interrelations between the (LOCA Outside Containment) and the following:

(CFR: 41.7 / 45.7)

EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Importance Rating: 3.5 3.9

Technical Reference: EPP-013 pp 3 and 5, Rev 8
 OP-111 pp 145 Rev 44

References to be provided: None

Learning Objective: LPEOP 2-3 Obj 2

Question Origin: NEW

Comments: KA is met by evaluating relationship between a LOCA outside containment and operations necessary to manually close RHR valves to isolate the leak.

Tier/Group: T1G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: NEW

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: E04 EK2.1

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

18. 2009B NRC RO 018

Given the following plant conditions:

- A Loss of Feedwater has occurred
- The crew is performing actions of FRP-H.1, Response to Loss of Secondary Heat Sink

Which ONE of the following indicates that a loss of secondary heat sink has occurred?

- A✓ A low core ΔT because T_{cold} is rising
- B. A high core ΔT because T_{cold} is lowering
- C. A low core ΔT because T_{hot} is lowering
- D. A high core ΔT because T_{hot} is rising

Plausibility and Answer Analysis

- A. *Correct. Low Core Delta T indicates heat is not being removed. Lack of Heat removal due to high T_c means SG no longer acting as a heat sink.*
- B. *Incorrect. High Delta T indicates natural circulation exists or is setting up. T_{cold} lowering would indicate heat removal does exist.*
- C. *Incorrect. Low core Delta T due to T_h lowering could mean that heat sink is adequate and decay heat load is low.*
- D. *Incorrect. Classic symptoms of natural circulation initiation*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

E05 EK2.2

E05 Loss of Secondary Heat Sink

EK2. Knowledge of the interrelations between the (Loss of Secondary Heat Sink) and the following:

(CFR: 41.7 / 45.7)

EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Importance Rating: 3.9 4.2

Technical Reference: FRP-H.1 Note on page 10, Rev 23

References to be provided: None

Learning Objective: LPEOP3.11 Obj 4

Question Origin: Bank

Comments: KA is met by evaluating applicant knowledge of Loss of Heat Sink event and expected plant conditions regarding establishing adequate heat sink using SGs.

Tier/Group: T1G1

WTSI Bank various - Modified C and D and added reasons to all 4 distractors

RESPONSE TO LOSS OF SECONDARY HEAT SINK	
Instructions	Response Not Obtained
<p>NOTE: After stopping all RFP and placing steam dump in the steam pressure mode, RFP pressure and temperature will increase as natural circulation is established. A large loop AT prior to RFP opening confirms natural circulation. This must be considered while evaluating bleed and feed criteria.</p>	
ZOP-FRP-H.1	Page 10 of 58

Origin:	BANK	Cog Level:	LOWER
Difficulty:		Reference:	
Ref. Provided:		Key Words:	
K/A 1:	E05 EK2.2	K/A 2:	

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

19. 2009B NRC RO 019

Given the following plant conditions :

- The plant is operating at 90% power for the last 24 hours
- Due to a malfunction in the Rod Control System Control Bank D is withdrawing

Which ONE of the following identifies the effects of the above conditions?

	<u>Reactor Power</u>	<u>OTΔT setpoint</u>
A.	decreases	decreases
B.	decreases	increases
C✓	increases	decreases
D.	increases	increases

Plausibility and Answer Analysis

- A. *Incorrect. Reactor Power response is incorrect; Control Rod withdrawal results in Hot leg temperature rise, reactor power increase due to the positive reactivity being added with no additional RCS heat removal . OT Δ T setpoint response is correct; OT and OP Δ T setpoints will lower as power and temperature rise.*
- B. *Incorrect. Reactor Power response is incorrect; Control Rod withdrawal results in Hot leg temperature rise, reactor power increase due to the positive reactivity being added with no additional RCS heat removal . OT Δ T setpoint response is incorrect; OT and OP Δ T setpoints will lower as power and temperature rise.*
- C. *Correct. Control Rod withdrawal results in Hot leg temperature rise and reactor power increase due to the positive reactivity being added with no additional RCS heat removal. OT Δ T setpoint response is correct; OT and OP Δ T setpoints will lower as power and temperature rise.*
- D. *Incorrect. Reactor Power response is correct; Control Rod withdrawal results in Hot leg temperature rise and reactor power increase due to the positive reactivity being added with no additional RCS heat removal. OT Δ T setpoint response is incorrect; OT and OP Δ T setpoints will/ower as power and temperature rise.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

001 AA2.04

001 Continuous Rod Withdrawal

AA2. Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal :

(CFR: 43.5 / 45.13)

AA2.04 Reactor power and its trend

Importance Rating: 4.2 4.3

Technical Reference: Tech Spec Table 2.2-1, pp 2-7

References to be provided: None

Learning Objective: OPL271CGFES Attachment 16 Objective 20

Question Origin: Bank

Comments: KA is met since the question evaluates recognition of power response due to continuous rod withdrawal accident.

Tier/Group: T1G2

TABLE 2.2-1 (Continued)
TABLE NOTATIONS

NOTE 1: OVERTEMPERATURE ΔT

$$\Delta T \frac{(1 + r_1 S)}{(1 + r_2 S)} \left[\frac{1}{1 + r_3 S} \right] \leq \Delta T_o \left\{ K_1 - K_2 \frac{(1 + r_4 S)}{(1 + r_5 S)} \left[r \left[\frac{1}{1 + r_6 S} \right] - T' \right] + K_3 (P - P') - r_7 (\Delta T) \right\}$$

SHEARON HARRIS - UNIT 1

2-7

Amendment No. 107

OVERTEMPERATURE ΔT TRIP

The trip provides protection against DNB in the core for transients that are slow with respect to piping transient delays from the core. This circuit trips the reactor if RCS ΔT equals the trip setpoint in two of the three reactor coolant loops. The base setpoint is variable based on plant conditions with a nominal value of 118.5% of full power ΔT . Since the boiling point is affected by many factors, the trip setpoint is varied (higher or lower) by PRZ pressure, T_{avg} , and the NIS axial flux difference. The setpoint decreases from its nominal value if PRZ pressure decreases from 2235 psig, T_{avg} increases from 588.8°F or AFD is excessively positive or negative. Refer to Tech Spec Table 2.2-1 for the OTAT equation. To reduce the possibility of this trip occurring, separate

Origin:	BANK	Cog Level:	HIGHER
Difficulty:		Reference:	
Ref. Provided:		Key Words:	
K/A 1:	001 AA2.04	K/A 2:	

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

20. 2009B NRC RO 020

Given the following plant conditions:

- The plant was operating at 90% power
- One rod has dropped into the core
- Axial Flux Difference (AFD) is outside the limits specified in curve F-16-2
- QPTR is determined to be 1.10

IAW Technical Specifications, which ONE of the following identifies (1) the power reduction required to be completed within 30 minutes AND (2) the reason for the action?

- A. (1) Reduce power to less than 50% of RTP
(2) Ensure minimum Shutdown Margin is maintained
- B✓ (1) Reduce power to less than 50% of RTP
(2) Ensure minimum Departure from Nucleate Boiling Ratio is maintained
- C. (1) Reduce power to less than 70% of RTP
(2) Ensure minimum Departure from Nucleate Boiling Ratio is maintained
- D. (1) Reduce power to less than 70% of RTP
(2) Ensure minimum Shutdown Margin is maintained

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

TS 3.2.1 for AFD requires the plant to be less than 50% within 30 minutes. This puts the plant in a condition where the AFD spec is no longer applicable. TS 3.2.4 for QPTR requires the plant to be less than 70 within 30 minutes ($100\% - 3\% \times 10 = 70\%$). 50% will be the overriding requirement.

Section 3.2 (power distribution limits) TS bases state that "The specifications of this section provide assurance of fuel integrity during Condition I (Normal Operation) and II (Incidents of Moderate Frequency) events by: (1) maintaining the minimum DNBR in the core greater than or equal to the design DNBR value during normal operation and in short-term transients, and".

A. Incorrect. 50% is correct. SDM is plausible because Control Rod TS ensure minimum SDM is maintained. But with the rod dropped, SDM has not changed.

B. Correct. 50% power reduction and DNBR are correct.

C. Incorrect. 70% is plausible because QPTR requires it but 50% is more limiting. DNBR is correct.

D. Incorrect. 70% is plausible because QPTR requires it but 50% is more limiting. SDM is plausible because Control Rod TS ensure minimum SDM is maintained. But with the rod dropped, SDM has not changed.

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

003 AK3.05

003 Dropped Control Rod

AK3. Knowledge of the reasons for the following responses as they apply to the Dropped Control Rod:

(CFR 41.5,41.10 / 45.6 / 45.13)

AK3.05 Tech-Spec limits for reduction of load to 50% power if flux cannot be brought back within specified target band

Importance Rating: 3.4* 4.1*

Technical Reference: Tech Spec Bases 3/4.2.1, pp B 3/4 2-1, Amend 44
Tech Spec 3.2.4 action b.2, pp 3/4 2-12

References to be provided: None

Learning Objective: Student Text Rod Control System Obj. 14

Question Origin: New

Comments: KA is met by evaluating applicants ability to identify operational limits associated with a dropped rod and the affect on AFD.

Tier/Group: T1G2

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

3/4.2 POWER DISTRIBUTION LIMITS

BASES

The specifications of this section provide assurance of fuel integrity during Condition I (Normal Operation) and II (Incidents of Moderate Frequency) events by: (1) maintaining the minimum DNBR in the core greater than or equal to the design DNBR value during normal operation and in short-term transients, and (2) limiting the fission gas release, fuel pellet temperature, and cladding mechanical properties to within assumed design criteria. In addition, limiting the peak linear power density during Condition I events provides assurance that the initial conditions assumed for the LOCA analyses are met and the ECCS acceptance criteria limit of 2200°F is not exceeded.

SHEARON HARRIS - UNIT 1

B 3/4 2-1

Amendment No. 44

POWER DISTRIBUTION LIMITS

LIMITING CONDITION FOR OPERATION

ACTION (Continued):

- b. With the QUADRANT POWER TILT RATIO determined to exceed 1.09 due to misalignment of either a shutdown or control rod:
 - 1. Calculate the QUADRANT POWER TILT RATIO at least once per hour until either:
 - a) The QUADRANT POWER TILT RATIO is reduced to within its limit, or
 - b) THERMAL POWER is reduced to less than 50% of RATED THERMAL POWER.
 - 2. Reduce THERMAL POWER at least 1% from RATED THERMAL POWER for each 1% of indicated QUADRANT POWER TILT RATIO in excess of 1.00, within 30 minutes;

SHEARON HARRIS - UNIT 1

3/4 2-12

Origin: NEW

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 003 AK3.05

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

21. 2009B NRC RO 021

Given the following conditions:

- The plant is operating at 100% power after completing a ramp to full power
- The RO reports that the DRPI indication for rod H14 indicates 196 steps and the group step counters indicate 218 steps
- The CRS has directed you to determine if there is a greater than 10°F difference between thermocouples adjacent to the misaligned rod and the average of the symmetric thermocouples.

For rod H14, one of it's ADJACENT thermocouples is (1). For this thermocouple, the SYMMETRIC thermocouple(s) to be used is/are (2).

(Reference provided)

- A. (1) G15
(2) G01, R07
- B✓ (1) H13
(2) C08, N08, H03
- C. (1) G15
(2) E14, E12, E08, E10
- D. (1) H13
(2) C12, H11, F11, F13, F09

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

(AOP-001 Attachment 2, sheet 1 of 3) Rod H14 has 3 adjacent TCs, H13, H15 and G15. The symmetric TCs for H13 are those in the same row C08, N08 and H03 (Attachment 2 NOTE on Sheet 2 of 3). There are no adjacent TCs for H15 (A08* is on the same row but has an *, where the * indicates thermocouples abandoned by EC 47997). The other adjacent TC - G15 has ONLY one symmetric thermocouple - R07.

- A. *Incorrect. Plausible if the applicant includes the thermocouple identified with a * which is abandoned (TC G01). This TC will not provide useful information and will read 50°F when inspected on the RVLIS panel.*
- B. *Correct. H13 is the adjacent TC and the symmetric locations (thermocouples in the same row) are C08, N08 and H03.*
- C. *Incorrect. Plausible since G15 is a adjacent TC but the TCs selected as symmetric locations are in the same column not the same row.*
- D. *Incorrect. Plausible since H13 is the correct adjacent TC but the TCs selected as symmetric locations are in the same column not the same row.*

005 AG2.1.20

005 Inoperable/Stuck Control Rod

2.1 Conduct of Operations

2.1.20 Ability to interpret and execute procedure steps.

(CFR: 41.10 / 43.5 / 45.12)

Importance Rating: 4.6 4.6

Technical Reference: AOP-001, Attachment 2 pages 41-43, Rev. 34

References to be provided: None

Learning Objective: AOP-LP-3.1 Obj 5

Question Origin: Bank

Comments: KA is met by evaluating applicant ability to perform determination of information IAW AOP-001 for a stuck rod.

Tier/Group: T1G2

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: NEW

Difficulty:

Ref. Provided: YES

K/A 1: 005 AG2.1.20

Cog Level: HIGHER

Reference: AOP-001 ATT. 2

Key Words:

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

22. 2009B NRC RO 022

Given the following plant conditions:

- The outdoor air temperature is 28°F
- The Reactor has tripped and 3 control rods are stuck at 218 steps
- The BAT temperature is 53°F
- The RWST temperature is 48°F
- An Emergency Boration is required to be performed

Which ONE of the following identifies the status of the BAT and RWST IAW Technical Specifications?

- A. BOTH the BAT and RWST are OPERABLE
- B. ONLY the BAT is OPERABLE
- C. ONLY the RWST is OPERABLE
- D. Neither the BAT or the RWST is OPERABLE

Plausibility and Answer Analysis

Tech Spec 3.1.2.6 BAT minimum solution temperature 65°F

Tech Spec 3.1.2.6 RWST minimum solution temperature 40°F (maximum of 125°F)

- A. *Incorrect - plausible if the applicant believes that both the BAT and RWST are the same minimum temperature and both are > 40°F but the BAT is <65°F and therefore inoperable.*
- B. *Incorrect - plausible if the applicant believes that both the BAT is above its minimum temperature and the RWST is below its minimum temperature but ONLY the RWST is above its minimum temperature.*
- C. *Correct ONLY the RWST is above its minimum temperature for operability.*
- D. *Incorrect the RWST is above its minimum temperature for operability and therefore can be used for the Emergency boration source.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

024 AK1.04

024 Emergency Boration

AK1. Knowledge of the operational implications of the following concepts as they apply to Emergency Boration:

(CFR 41.8 / 41.10 / 45.3)

AK1.04 Low temperature limits for born concentration

Importance Rating: 2.8 3.6

Technical Reference: Tech Spec 3.1.2.6 pp 3/4 1-12 Amen 59

References to be provided: None

Learning Objective: AOP-LP-3.2 Obj. 3

Question Origin: NEW

Comments: KA is met by having applicant evaluate the available borated water sources for emergency boration based on temperature.

Tier/Group: T1G2

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.6 As a minimum, the following borated water source(s) shall be OPERABLE as required by Specification 3.1.2.2:

- a. The boric acid tank with:
 1. A minimum contained borated water volume of 24,150 gallons, which is ensured by maintaining indicated level of greater than or equal to 74%.
 2. A boron concentration of between 7000 and 7750 ppm, and
 3. A minimum solution temperature of 65°F.
- b. The refueling water storage tank (RWST) with:
 1. A minimum contained borated water volume of 436,000 gallons, which is equivalent to 92% indicated level.
 2. A boron concentration of between 2400 and 2600 ppm.
 3. A minimum solution temperature of 40°F, and
 4. A maximum solution temperature of 125°F.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

- a. With the boric acid tank inoperable and being used as one of the above required borated water sources, restore the boric acid tank to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN specified in the CORE OPERATING LIMITS REPORT (COLR), plant procedure PLP-106 at 200°F; restore the boric acid tank to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.
- b. With the RWST inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SHEARON HARRIS - UNIT 1

3/4 1-12

Amendment No. 59

Origin: NEW

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 024 AK1.04

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

23. 2009B NRC RO 023

Given the following plant conditions:

- The plant is operating at 45% power
- Chemistry has notified the Control Room that RCS specific activity is 1.2 $\mu\text{Ci/gm}$ Dose Equivalent Iodine-131.
- The crew has implemented AOP-032, High RCS Activity
- The Shift Manager has directed that power be reduced to 15% IAW AOP-038, Rapid Downpower
- Core age is 161 EFPD

Which ONE of the following identifies the MINIMUM amount of boric acid required to support the power reduction to 15%?

(Reference provided)

- A✓ 462 gal
- B. 487.5 gal
- C. 613 gal
- D. 653 gal

Plausibility and Answer Analysis

- A. *Correct. $146/2 + 146 + 165 + 156/2 = 462$ BOL The calculation must include dividing the first volume and the last volume by 2 in order to accomplish the 5% power reduction increment.*
- B. *Incorrect. $165/2 + 148 + 174 + 166/2 = 487.5$ MOL Plausible if the calculation does not utilize the correct core age column.*
- C. *Incorrect. $146 + 146 + 165 + 156 = 613$ BOL Plausible if the calculation does not include dividing the first volume and the last volume by 2 in order to accomplish the 5% power reduction increment.*
- D. *Incorrect. $165 + 148 + 174 + 166 = 653$ MOL Plausible if the wrong core age is not utilized and if the calculation does not include dividing the first volume and the last volume by 2 in order to accomplish the 5% power reduction increment.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

076 AG2.1.25

076: High Reactor Coolant Activity

2.1 Conduct of Operations

2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc.

(CFR: 41.10 / 43.5 / 45.12)

Importance Rating: 3.9 4.2

Technical Reference: AOP-038, Attachment 2, pp 21 Rev 22

References to be provided: AOP-038, Attachment 2, pp 21 Rev 22

Learning Objective: AOP-LP-3.38 Obj. 3

Question Origin: New

Comments: The KA match is met by determining required boric acid addition in response to power reduction requirement delineated by AOP-032 section 3.0 step 9.

Tier/Group: T1G2

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

RAPID DOWNPOWER

Attachment 2
Sheet 1 of 1

Gallons of Boric Acid/Target Rod Height Required for Power Reduction

NOTE

- This Attachment serves as a reactivity plan. [C.3]
 - This table applies to Cycle 16 only.
 - Target rod heights correspond to the lower (target) power level in each row.
 - Gallons of boric acid in the table are for 10% power reduction increments. These are additive for power reductions of greater than 10%.
- Example: A power reduction from 90% to 60% at BOL would require [171 gal + 171 gal +145 gal = 487 gal]

• For purposes of this procedure, 5% increments can be obtained by dividing by two.

• As used in this table, the following times in core life are assumed:

BOL ($0 \leq \text{EFPD} \leq 161$) (3000 MWD/MTU)

MOL ($161 < \text{EFPD} \leq 333$) (10,000 MWD/MTU)

EOL ($333 < \text{EFPD} \leq 507$) (17,000 MWD/MTU)

Power Level (%)	Target Rod Height (D Bank)	Gallons of Boric Acid Required for Power Reduction		
		BOL $0 \leq \text{EFPD} \leq 161$	MOL $161 < \text{EFPD} \leq 333$	EOL $333 < \text{EFPD} \leq 507$
100 to 90	206	215	272	315
90 to 80	194	171	204	201
80 to 70	183	171	189	194
70 to 60	171	145	163	179
60 to 50	159	154	164	180
50 to 40	147	146	165	196
40 to 30	135	146	148	205
30 to 20	124	165	174	253
20 to 10	112	156	166	301

--END OF ATTACHMENT 2--

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Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference: AOP-038 ATT. 2

Ref. Provided: YES

Key Words:

K/A 1: 076 AG2.1.25

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

24. 2009B NRC RO 024

Given the following plant conditions:

- The crew is implementing EPP-009, Post-LOCA Cooldown and Depressurization, following a Small Break LOCA
- Steps have been taken to stop 'B' CSIP, align the normal Charging header, and isolate the BIT
- FK-122.1, Charging FCV, is at 100 percent demand
- RCS subcooling is 5°F
- PRZ level is 15%

Which ONE of the following (1) identifies the actions that should be taken AND (2) why should this action be taken?

- A✓ (1) Shut charging line isolation valves and open BIT valves, AND if necessary, start 'B' CSIP
- (2) Due to low subcooling
- B. (1) Start B CSIP, AND if necessary, shut charging line isolation valves and open BIT valves
- (2) Due to low subcooling
- C. (1) Shut charging line isolation valves and open BIT valves AND if necessary, start 'B' CSIP
- (2) Due to low PRZ level
- D. (1) Start B CSIP AND if necessary, shut charging line isolation valves and open BIT valves
- (2) Due to low PRZ level

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

- A. *Correct. Foldout criteria for SI reinitiation criteria is if any of the following occurs - RCS subcooling < 10°F (currently 5°F) or PRZ level can not be maintained > 10% (currently 15%). With low subcooling then perform a. Shut charging line isolation valves AND open BIT valves. b. Verify normal miniflow isolation valves - SHUT c. IF necessary to restore conditions, THEN restart standby CSIP.*
- B. *Incorrect. Plausible because the list of items is correct but not in the correct order. Shutting the charging line isolation valves and opening BIT valves is required. Starting the CSIP is only needed IF necessary to restore conditions.*
- C. *Incorrect. Plausible because the first part is correct but the action taken is due to low subcooling and not low PRZ level.*
- D. *Incorrect. Plausible because the list of items is correct but not in the correct order. Shutting the charging line isolation valves and opening BIT valves is required. Starting the CSIP is only needed IF necessary to restore conditions. The action taken is due to low subcooling and not low PRZ level.*

E03 EK1.1

E03 LOCA Cooldown and Depressurization

EK1. Knowledge of the operational implications of the following concepts as they apply to the (LOCA Cooldown and Depressurization)

(CFR: 41.8 / 41.10 / 45.3)

EK1.1 Components, capacity, and function of emergency systems.

Importance Rating: 3.4 4.0

Technical Reference: EOP EPP-009 Foldout for SI Reinitiation Criteria, Rev. 14

References to be provided: None

Learning Objective: EOP-LP-3.5 Obj. 4

Question Origin: Bank

Comments: KA is met by having applicant evaluate plant conditions and identify that the current plant configuration does not have the capacity to maintain plant parameters within desired limits.

Tier/Group: T1G2

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

FOLDDOUT

o **SI REINITIATION CRITERIA**

IF any of the following occurs:

o **RCS subcooling - LESS THAN 10°F [40°F] - C**
20°F [50°F] - M

o **PRE level - CAN NOT BE MAINTAINED GREATER THAN 10% [30%]**

THEN perform the following:

a. **Shut charging line isolation valves AND open BIT valves.**

b. **Verify normal miniflow isolation valves - SHUT**

c. **IF necessary to restore conditions. THEN restart standby CSIP.**

EOP-EPP-009

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Origin: BANK

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: E03 EK1.1

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

25. 2009B NRC RO 025

When performing EOP-FRP-C.1, Response to Inadequate Core Cooling a NOTE reminds you that normal conditions are desired but NOT required for starting RCPs.

What benefit do we gain by starting the RCPs under these conditions?

- A. Allows RCS pressure control using normal spray
- B. Refill the core
- C. Provide two phase flow through the SGs and core
- D. Sweep all voids from the core

Plausibility and Answer Analysis

- A. Incorrect. Plausible since Pressurizer sprays must have a running RCPs to provide the head necessary to work.*
- B. Incorrect. Plausible starting the RCPs per GP-001 sweeps voids from the Reactor vessel and fills the core but in this case the reason is to provide two phase flow.*
- C. Correct. WOG basis for starting RCPs is to provide forced two phase coolant flow through the core. If the RCPs are required, they will be started even if all of the support conditions are not available. Without proper support conditions, potential damage to the RCPs is possible. Therefore, the operator should attempt to establish the minimum support conditions required to operate the RCPs.*
- D. Incorrect. Plausible since the purpose of starting the first RCP in GP-001 is to sweep all voids from the core.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

E06 EK3.3

E06 Degraded Core Cooling

EK3. Knowledge of the reasons for the following responses as they apply to the (Degraded Core Cooling)

(CFR: 41.5 / 41.10, 45.6, 45.13)

EK3.3 Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.

Importance Rating: 4.0 3.9

Technical Reference: WOG step description table for FR-C.1 step 3 page 16

References to be provided: None

Learning Objective: EOP-LP-3.10 Obj 4.e

Question Origin: Bank

Comments: KA is met by measuring understanding of the reason for starting a RCP without meeting normal starting requirements during implementation of an emergency procedure.

Tier/Group: T1G2

STEP DESCRIPTION TABLE FOR FR-C.1

Step 3

STEP: Check RCP Support Conditions - AVAILABLE

PURPOSE: To ensure support conditions are available for running the RCPs

BASIS:

Subsequent actions in this guideline may involve starting RCPs to provide forced two phase coolant flow through the core. If the RCPs are required, they will be started even if all of the support conditions are not available. Without proper support conditions, potential damage to the RCPs is possible. Therefore, the operator should attempt to establish the minimum support conditions required to operate the RCPs.

FR-C.1
HFRC1

16

HP-Rev. 1C

Origin: BANK

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: E06 EK3.3

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

26. 2009B NRC RO 026

Given the following plant conditions:

- A Large Break LOCA occurred one hour ago
- EPP-010, Transfer to Cold Leg Recirc, has been completed
- The CRS is referencing FRP-J.2, Reponse to Containment Flooding, due to high Containment water level
- The CRS has directed the RO to check the RWST for normal depletion

Which ONE of the following identifies (1) the expected RWST level AND (2) the trend?

- A✓ (1) 19%
(2) Stable
- B. (1) 23.4%
(2) Stable
- C. (1) 19%
(2) Lowering
- D. (1) 23.4%
(2) Lowering

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

- A. *Correct. During a Large Break LOCA the RWST will deplete while the Containment Spray Pumps and RHR Pumps take a suction on the RWST during ECCS injection. At 23.4% RWST level the Containment Spray Pumps auto swap suction supplies to the Containment Recirc Sump. The Operators have to manually swap suction supplies for the RHR pumps from the RWST to the Containment Recirc sumps IAW EPP-010. The RWST will continue to deplete during this transfer. Therefore the expected RWST level will be a level less than 23.4%. Since the transfer would be completed the RWST level depletion is no longer occurring so RWST level will be stable.*
- B. *Incorrect. Plausible because the swap over to the RWST occurs at 23.4% but the Large Break LOCA will still be depleting the RWST while the crew is performing the swap over to the Containment sump. Therefore RWST must be lower than the setpoint for swap over to occur and cannot be the level reported for normal depletion. Stable would be the correct answer after the Containment Spray and RHR pumps have the suction sources swapped to the Containment Recirc sump.*
- C. *Incorrect. Plausible because the level would be correct but after the swap over is completed the RWST level will be stable since both the Containment Spray and RHR pumps suction will be on the Containment Recirc sump.*
- D. *Incorrect. Plausible because the swap over to the RWST occurs at 23.4% but the Large Break LOCA will still be depleting the RWST while the crew is performing the swap over to the Containment sump. Therefore RWST must be lower than the setpoint for swap over to occur and cannot be the level reported for normal depletion. After the swap over is completed the RWST level will be stable since both the Containment Spray and RHR pumps suction will be on the Containment Recirc sump.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

E15 EK2.1

E15 Containment Flooding

EK2. Knowledge of the interrelations between the (Containment Flooding) and the following:

(CFR: 41.7 / 45.7)

EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Importance Rating: 2.8 2.9

Technical Reference: EPP-009 Rev. 14, Foldout criteria for Cold Leg
Recirculation Switchover Criteria
EPP-010 page 20 Rev 24

References to be provided: None

Learning Objective: EOP-LP-3.13 Obj 3

Question Origin: New

Comments: KA is met by having applicant evaluate RWST level in order to ensure that the ESF systems are not contributing to the Containment Flooding issue. The RWST suction source to the ESF systems were manually isolated once EPP-010 was completed.

Tier/Group: T1G2

QUESTIONS REPORT for 2009B NRC RO QUESTIONS

abnormal radiation levels. THEN GO TO PATH-2, entry point J.

o COLD LEG RECIRCULATION SWITCHOVER CRITERIA

IF RWST level decreases to less than 23.4% (2/4 Low-Low alarm), THEN GO TO EPP-010, "TRANSFER TO COLD LEG RECIRCULATION", Step 1.

o AFW SUPPLY SWITCHOVER CRITERIA

IF CST level decreases to less than 10%, THEN switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

o RHR RESTART CRITERIA

IF RCS pressure decreases to less than 230 PSIG in an uncontrolled manner, THEN restart RHR pumps to supply water to the RCS.

EOP-EPP-009

Rev. 14

Page 3 of 57

10. Align CNMT Spray For Recirculation:

- | | |
|---|--------------------------|
| <p>a. Any CNMT spray pump -
RUNNING</p> <p>b. Verify CNMT sump to CNMT
spray suction valves - OPEN</p> <p style="margin-left: 20px;">1CT-105
1CT-102</p> <p>c. Verify RWST to CNMT spray
pump suction valves - SHUT</p> <p style="margin-left: 20px;">1CT-26
1CT-71</p> | <p>a. GO TO Step 11.</p> |
|---|--------------------------|

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Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: E15 EK2.1

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

27. 2009B NRC RO 027

The plant was operating at 100% power when a LOCA resulted in a high radiation condition inside containment

- All 4 Containment Ventilation Isolation radiation monitors are in high (RED) alarm
- Both Containment High Range Post-LOCA Radiation Monitors are in high (RED) alarm

Which ONE of the following identifies components that received an automatic STOP signal?

- A✓ AH-82 Normal Purge Supply Fans ONLY
- B. S-1 Airborne Radioactivity Removal Units ONLY
- C. BOTH AH-82 fans AND S-1 units
- D. NEITHER AH-82 fans OR S-1 units

Plausibility and Answer Analysis

- A. *Correct. Step 1 of FRP-J.3 Response to CNMT High Radiation directs the crew to verify CNMT Ventilation Isolation Valves shut in accordance with OMM-004 Attachment 7. Att. 7 lists AH-82 A and B as components that should STOP on the signal. The S-1 fans are not listed. Step 2 of FRP-J.3 directs that one S-1 unit be placed in service.*
- B. *Incorrect. Plausible since the S-1 units are ventilation fans located in CNMT and a CNMT Ventilation Isolation Signal has been received.*
- C. *Incorrect. Plausible since the the AH-82 fans do recive a STOP signal however the S-1 units do not but are ventilation fans located in CNMT and a CNMT Ventilation Isolation Signal has been received.*
- D. *Incorrect Plausible if the candidate believes that only valves are affected, as implied by step 1 of FRP-J3.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

E16 EA1.1

E16 High Containment Radiation

EA1. Ability to operate and / or monitor the following as they apply to the (High Containment Radiation)

(CFR: 41.7 / 45.5 / 45.6)

EA1.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Importance Rating: 3.1 3.2

Technical Reference: OWP-RM-02 pp 11 Rev 29 identifies affected components

References to be provided: None

Learning Objective: Student Text RMS Obj 6.a

Question Origin: Bank

Comments: KA is met by evaluating knowledge of high radiation condition initiating a containment isolation signal.

Tier/Group: T1G2

OWP-RM-02
Sheet 2 of 4

Component Lineups

CAUTION

The Control Switches for AH-82A and AH-82B must be taken to STOP momentarily to ensure they will not Auto Start.

Component ID or Number	Component Description	Position for Maintenance		Restored Position	
		Initial/Verified	Initial/Verified	Initial/Verified	Initial/Verified
AH-82A	Normal Containment Purge Supply Fan	STOP	<i>t</i>	STOP	<i>t</i>
AH-82B	Normal Containment Purge Supply Fan	STOP	<i>t</i>	STOP	<i>t</i>

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Origin: BANK

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: E16 EA1.1

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

28. 2009B NRC RO 028

Which ONE of the following identifies the power supplies for the Component Cooling Water Pumps?

1A

1B

- | | |
|-------------------------|----------------------|
| A. 6.9 kV Bus 1A-SA | 6.9 kV Bus 1B-SB |
| B. 6.9kV Aux Bus 1A | 6.9 kV Aux Bus 1B |
| C. 480V Aux Bus 1A2-SA | 480V Aux Bus 1B2-SB |
| D. Gen Service Bus 1-4A | Gen Service Bus 1-4B |

Plausibility and Answer Analysis

- A. *Correct.*
- B. *Incorrect. Plausible since several major pumps, including Condensate and Feedwater pumps are supplied from bus 1A*
- C. *Incorrect. Plausible since major pumps such as RHR and Containment Spray are supplied from 480V bus 1A2-Sa and 1B2-SB*
- D. *Incorrect. Plausible since the WPB CCW Pumps are powered from Gen Service Bus 1-4A and 1-4B*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

003 K2.02
003 Reactor Coolant Pump System (RCPS)
K2 Knowledge of bus power supplies to the following:
(CFR: 41.7)
K2.02 CCW pumps

Importance Rating: 2.5* 2.6*

Technical Reference: OP-145 pp 85 Rev 57

References to be provided: None

Learning Objective: Student Text CCW Obj. 2.a

Question Origin: Bank

Comments: KA is met by measuring knowledge of power supplies for the CCW pumps.

Tier/Group: T2G1

Attachment 1 - CCW System Electrical Lineup Checklist
Sheet 5 of 5

COMPONENT NUMBER	COMPONENT DESCRIPTION	POSITION	CHECK	VERIFY
	<u>1A-SA (1)</u>			
1A-SA-8	CCW PUMP 1A-SA	RACKED IN	_____	_____
1A-SA-8	MTR HTR DISCNT SWITCH (20A)	ON	_____	_____
1A-SA-3	COMPONENT COOLING WATER PUMP 1C-SAB	(2) Racked to Test or Out	_____	_____
1A-SA-3	MTR HTR DISCNT SWITCH (20A)	(2) ON or OFF	_____	_____
	<u>1B-SB (1)</u>			
1B-SB-8	COMPONENT COOLING WATER PUMP 1B-SB	RACKED IN	_____	_____

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: BANK

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 003 K2.02

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

29. 2009B NRC RO 029

The plant is operating at 100% power when LT-115, VCT Level, fails LOW.

Which ONE of the following describes how VCT level will be maintained IAW AOP-003, Malfunction of Reactor Makeup Control?

- (1) When level decreases to 20%, _____ (1) _____.
- (2) When level increases to 70%, _____ (2) _____.

- A. (1) automatic makeup will begin raising level
- (2) 1CS-120 (LCV-112A), Letdown VCT/Hold Up Tank, will begin diverting letdown to the Hold Up Tank
- B** (1) the operator must start a manual makeup to raise VCT level
- (2) 1CS-120 (LCV-112A), Letdown VCT/Hold Up Tank, will begin diverting letdown to the Hold Up Tank
- C. (1) automatic makeup will begin raising level
- (2) the operator must align 1CS-120 (LCV-112A), Letdown VCT/Hold Up Tank, to the Hold Up Tank
- D. (1) the operator must start a manual makeup to raise VCT level
- (2) the operator must align 1CS-120 (LCV-112A), Letdown VCT/Hold Up Tank, to the Hold Up Tank

Plausibility and Answer Analysis

- A. *Incorrect. Plausible since LT-112 will still control CS-120 properly, causing a divert to the HUT, but the operator must perform a manual blended flow due to the failure of LT-115.*
- B. *Correct. A low failure of LT-115 will disable auto makeup capabilities which will required the operator to perform a manual blended flow and the modulate divert to the HUT is controlled by LT-112.*
- C. *Incorrect. Plausible since operator action is required to perform one of the two evolutions, but the automatic makeup, not the divert, must be controlled by the operator.*
- D. *Incorrect. Plausible since a low failure of LT-115 will disable auto makeup capabilities which will required the operator to perform a manual blended flow, but the modulate divert to the HUT is controlled by LT-112.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

004 A1.11

004 Chemical and Volume Control System (CVCS)

A1 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CVCS controls including:

(CFR: 41.5 / 45.5)

A1.11 Letdown and charging flows

Importance Rating: 3.0 3.0

Technical Reference: AOP-003, pg 5-6, 16

References to be provided: None

Learning Objective: AOP-LP-3.3 Obj. 2

Question Origin: Bank

Comments: This question meets the K/A by requiring the applicant to have knowledge regarding automatic letdown divert controls and being able to monitor it for proper operation. If letdown flow is not diverted properly, it will result in an increase pressure in the VCT and lift relief valves.

Tier/Group: T2G1

QUESTIONS REPORT for 2009B NRC RO QUESTIONS

* 6. CONTROL VCT level as follows:

a. MAINTAIN level BELOW 70%.

a. Manually DIVERT to the RHT as needed to maintain level below 70%.

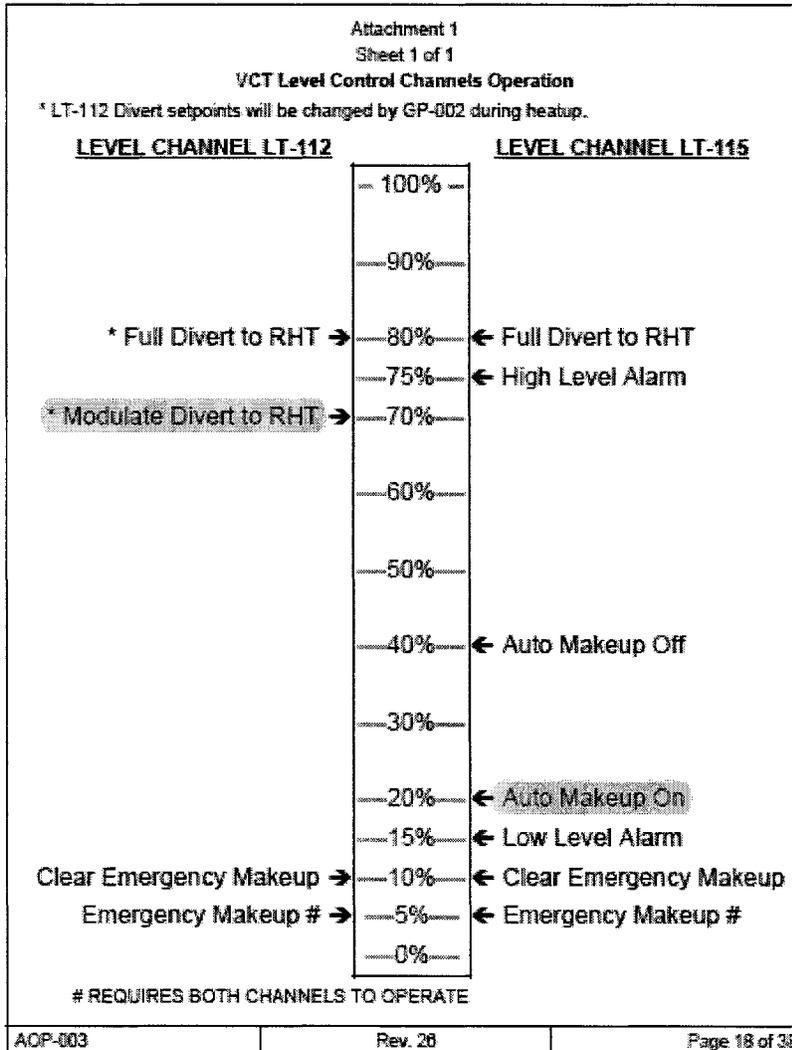
b. MAINTAIN level ABOVE 20% OR DESIRED MINIMUM.

b. REFER TO OP-107.01, Chemical and Volume Control System, AND PERFORM manual makeup as necessary using Section 8.4, Blender Manual Operation.

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AOP-003

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Origin: BANK

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 004 A1.11

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

30. 2009B NRC RO 030

Given the following plant conditions:

- The plant is in Mode 6 with refueling in progress
- A clearance order has been issued requiring de-energization of 1CS-214, CSIP Mini-Flow Isolation.

Which ONE of the following describes the MCC that the clearance will be applied to AND the location of this MCC?

	<u>MCC</u>	<u>Location</u>
A.	1A35-SA	RAB 236
B.	1B35-SB	RAB 236
C✓	1A35-SA	RAB 261
D.	1B35-SB	RAB 261

Plausibility and Answer Analysis

- A. Incorrect. This is distracter contains the correct MCC with the wrong location. RAB 236 elevation is plausible because, 236 is the location of the valve that is being placed under clearance.*
- B. Incorrect. This is plausible because 1B35-SB supplies power to the other Normal Mini-Flow Isolation valves and 236 is the location of the valve that is being placed under clearance.*
- C. Correct. Correct MCC and location.*
- D. Incorrect. This is plausible because 1B35-SB supplies power to the other Normal Mini-Flow Isolation valves and it contains the correct location*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

31. 2009B NRC RO 031

Given the following plant conditions:

- The plant is in Mode 4
- RHR Train 'A' is in service
- 1RH-20, RHR Heat Exchanger Bypass valve is in automatic with the setpoint at 55%
- 1RH-30, RHR Heat Exchanger Outlet valve demand position is set at 30%
- The RO reduces the setpoint of 1RH-20 to 50%

Which ONE of the following describes the RHR system parameter changes from the initial steady state condition to final steady state condition?

	<u>RHR HX Outlet Temp</u>	<u>Total RHR flow</u>
A.	Higher	Lower
B.	Higher	Higher
C.	Lower	Higher
D✓	Lower	Lower

Plausibility and Answer Analysis

- A. *Incorrect. First part is incorrect. 1RH-20 will throttle closed resulting in a lower heat exchanger outlet temperature. Plausible if applicant confuses the affect on actual flow from lowering the controller setpoint, ie believes lowering the setpoint will lower temperature instead of flow. The second part is correct. Overall flow will decrease because 1RH-30 remains in the same position and does not modulate to maintain flow*
- B: *Incorrect. First part is incorrect. 1RH-20 will throttle closed resulting in a lower heat exchanger outlet temperature. Plausible if applicant confuses the affect on actual flow from lowering the controller setpoint, ie believes lowering the setpoint will lower temperature instead of flow. The second part is incorrect. Total RHR flow will be lower. Plausible if applicant confuses which valve will modulate automatically to maintain constant flow.*
- C. *Incorrect. The first part is correct. The second part is incorrect. Total RHR flow will be lower. Plausible if applicant confuses which valve will modulate automatically to maintain constant flow.*
- D. *Correct. When the setpoint is reduced, 1RH-20 will throttle partially closed, resulting in slightly more flow through the heat exchanger which will result in a lower outlet temperature. Overall flow will decrease because 1RH-30 remains in the same position and does not modulate to maintain flow*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

005 A1.02

005 Residual Heat Removal System (RHRS)

A1 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHRS controls including:

(CFR: 41.5 / 45.5)

A1.02 RHR flow rate

Importance Rating: 3.3 3.4

Technical Reference: OP-111 pp 23 Rev 44

References to be provided: None

Learning Objective: Student Text RHR Obj. 4

Question Origin: 2008 NRC Exam

Comments: KA is met by evaluating ability to determine changes in RHR parameters (flow rate) while manipulating RHR controls.

Tier/Group: T2G1

5.1.2 Procedural Steps (continued)

NOTE: Due to RCP backpressure in the RCS Cold Legs, 1RH-20(1RH-58) may have to be opened to 70 or 80 % before RHR flow is observed.

- 36. **SLOWLY OPEN** 1RH-20 (1RH-58), RHR HEAT XCHG A (B) BYP FLOW CONT FK-605A1 (B1), to achieve a RHR Loop A (B) flow of 2000 to 3750 gpm. _____
- 37. **VERIFY** 1RH-31 (1RH-69), RHR PUMP A-SA (B-SB) MINI FLOW, shuts when loop flow increases to greater than 1400 gpm. _____

NOTE: The cooldown rate can be enhanced by placing 1RH-20 (1RH-58), RHR HEAT XCHG A (B) BYP FLOW CONT FK-605A1 (B1), in manual and slowly closing.

NOTE: Adjustment of 1RH-30 (1RH-66), RHR HEAT XCHG A (B) OUT FLOW CONT HC-603A1 (B1), may be necessary to maintain RHR system total flow.

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Origin: MODIFIED	Cog Level: LOWER
Difficulty:	Reference:
Ref. Provided:	Key Words:
K/A 1: 005 A1.02	K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

32. 2009B NRC RO 032

Given the following plant conditions:

- The plant is being cooled down to 135°F for maintenance which will NOT require the RCS to be opened.
- The crew is in the process of placing the first RHR train in service for RCS cooling.
- Current boron concentrations are as follows:

- RHR (train to be placed in service) boron	1121 ppm
- Required Shutdown Margin boron	1338 ppm
- RCS boron	1446 ppm
- Cold Shutdown boron	1682 ppm
- Refueling boron	2183 ppm

Before the RHR train can be placed in service for RCS cooling, RHR boron concentration must be increased by a MINIMUM of ...

- A✓ 217 ppm
- B. 325 ppm
- C. 561 ppm
- D. 1062 ppm

Plausibility and Answer Analysis

- A. *Correct. RHR boron must be greater than or equal to the required Shutdown Margin (SDM) or the required refueling concentration. The boron concentration requirements will be dependent on the intended use of the RHR System. Using the RHR system for cooldown purposes requires that the boron concentration be greater than or equal to the required SDM.*
- B. *Incorrect. Plausible since this is the difference between RHR and RCS boron concentration, but only the required SDM boron is needed.*
- C. *Incorrect. Plausible since this is the difference between RHR and Cold Shutdown boron concentration, but only the required SDM boron is needed.*
- D. *Incorrect. Plausible since this is the difference between RHR and refueling boron concentration, and refueling conditions occur at 140°F, but only the required SDM boron is needed.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

005 K5.03

005 Residual Heat Removal System (RHRS)

K5 Knowledge of the operational implications of the following concepts as they apply the RHRS:

(CFR: 41.5 / 45.7)

K5.03 Reactivity effects of RHR fill water

Importance Rating: 2.9* 3.1*

Technical Reference: OP-111 Rev. 44 P&L 2

References to be provided: None

Learning Objective: GO-LP-3.7 Obj 2

Question Origin: Bank

Comments: KA is met by having applicant evaluate operational implications when placing RHR inservice with boron concentration below that of the RCS.

Tier/Group: T2G1

Original question:

1. Given the following conditions:

- The plant is being cooled down to 140°F for maintenance which will NOT require the RCS be opened.
- The crew is in the process of placing the first Residual Heat Removal (RHR) train in service for RCS cooling.
- Current boron concentrations are as follows:
 - RHR (train to be placed in service) boron 1021 ppm
 - Required Shutdown Margin boron 1200 ppm
 - RCS boron 1341 ppm
 - Cold Shutdown boron 1750 ppm
 - Refueling boron 2261 ppm

Before the RHR train can be placed in service for RCS cooling, RHR boron concentration must be increased by a MINIMUM of ...

A. ✓ 179 ppm.

B. 320 ppm.

C. 729 ppm.

D. 1240 ppm.

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

3.0 PREREQUISITES

1. The AC Electrical Distribution System is energized and aligned for normal operation per OP-156.02.
2. The DC Electrical Distribution System is energized and aligned for normal operation per OP-156.01.
3. The Reactor Coolant System is aligned per OP-100 as necessary to support RHR System Operation.
4. The Component Cooling Water System is in operation and aligned per OP-145.
5. The Boron Recycle System is aligned per OP-109 as necessary to support RHR System Operation.
6. The Compressed Air System is pressurized and aligned per OP-151.01.
7. The Sampling System is aligned per OP-101.

4.0 PRECAUTIONS AND LIMITATIONS

1. The following conditions must be met before placing the RHR System in operation and during RHR System operation:
 - RCS temperature less than 350°F.
 - RCS pressure less than 360 psig as indicated by PI-402 and PI-403.
2. Before placing the RHR System in operation, the boron concentration in the RHR System should be greater than or equal to the required SDM or the required refueling concentrations per CRC-160. The boron concentration requirements will be dependent on the intended use of the RHR System. Using the RHR system for cooldown purposes requires that the boron concentration be greater than or equal to the required shutdown margin (SDM). Using the RHR system to support refueling operations requires that the boron concentration be greater than or equal to the refueling concentration. (Reference PLP-106)
3. To avoid thermal shock of the RHR Pumps during normal operations, flow through the RHR System must be initiated slowly and RHR Pump discharge temperature monitored closely per Attachment 6, Acceptable RHR Pump Temperature Transients. (Reference ESBU-TB-96-03)

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Origin:	MODIFIED	Cog Level:	HIGHER
Difficulty:		Reference:	
Ref. Provided:		Key Words:	
K/A 1:	005 K5.03	K/A 2:	

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

33. 2009B NRC RO 033

Given the following plant conditions:

- A Large Break LOCA occurred 2 hours ago
- EPP-010 Transfer to Cold Leg Recirculation has been completed
- The 'A' CSIP has just tripped

Which ONE of the following correctly identifies the flow rates AFTER the 'A' CSIP trip occurs?

The flow rate through FI-940, Alternate Header Flow will (1) and flow rate through FI-943, Normal Header Flow will (2) .

- A. (1) decrease to zero
 (2) decrease to zero
- B. (1) decrease to half the previous value
 (2) decrease to half the previous value
- C✓ (1) decrease to zero
 (2) remain constant
- D. (1) remain constant
 (2) decrease to zero

Plausibility and Answer Analysis

- A. *Incorrect. Plausible if the applicant believes that only one CSIP is available below 325°F as is the case during normal operations per Technical Specifications but recognizes that flow is normally supplied to both headers*
- B. *Incorrect. Plausible if the applicant doesn't recognize that the CSIP discharge cross connect valves are shut per EPP-010. This would be the response if both CSIPs were supplying both headers.*
- C. *Correct. EPP-010 splits the recirc injection flow path into two headers by closing CSIP discharge cross connect valves. Loss of one pump will result in loss of flow on only that header. The A train CSIP supplies the alternate header through FI-940 while the B train CSIP supplies the normal header through FI-943.*
- D. *Incorrect. Plausible if the applicant understands that the header is split but believes A train supplies the normal header and B train supplies the alternate header.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

006 K6.13

006 Emergency Core Cooling System (ECCS)

K6 Knowledge of the effect of a loss or malfunction on the following will have on the ECCS:

(CFR: 41.7 / 45.7)

K6.13 Pumps

Importance Rating: 2.8 3.1

Technical Reference: EPP-010, pp 10 and 12, Rev 24

References to be provided: None

Learning Objective: LP EOP3-5, Obj 5.b

Question Origin: Bank

Comments: KA is met by evaluating the effects of a loss of a CSIP on ECCS injection rate.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

4. Establish Recirculation Injection Flowpath:

- a. Open alternate high head SI to cold leg valve: a. Observe NOTE prior to Step 6 AND GO TO Step 6.
15I-52

NOTE: Two valves are specified to be SHUT for each pump combination for redundancy; however, a single valve provides satisfactory isolation in the event one or more of the specified valves can NOT be SHUT.

CSIPs Running	Discharge Cross Connect Valves To Be Shut
A AND B	Any 2: ICS-217, ICS-218 ICS-219, ICS-220
A AND C	ICS-217, ICS-219
B AND C	ICS-218, ICS-220

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TRANSFER TO COLD LEG RECIRCULATION

Instructions

Response Not Obtained

5. Verify High Head SI Flow:

- Alternate header flow (Train A):
FI-940
- Normal header flow (Train B):
FI-943

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Origin: BANK

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 006 K6.13

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

34. 2009B NRC RO 034

Given the following plant conditions:

- A Pressurizer steam space LOCA has occurred
- PRT pressure is currently 28 psig and increasing
- PRT level is 72% and increasing

IF the present conditions continue, (1) when will the PRT high level alarm first occur AND (2) IAW OP-100, Reactor Coolant System, in order to prevent the PRT from going water solid, where will the operator transfer the PRT to?

- A. (1) 78%
(2) the Reactor Coolant Drain Tank
- B✓ (1) 83%
(2) the Recycle Hold Up Tank
- C. (1) 78%
(2) the Recycle Hold Up Tank
- D. (1) 83%
(2) the Reactor Coolant Drain Tank

Plausibility and Answer Analysis

- A. *Incorrect. Plausible if the applicant confuses the PRT high level setpoint with another level similar to the PRT high level (SG high level is 78%). The second part is plausible because the RCDT pumps are used to pump the PRT but the discharge is directed to the Recycle Holdup Tank not the RCDT.*
- B. *Correct. Per ALB-009-8-1 the PRT high level setpoint is 83%. When high level is reached in the PRT ALB-009-8-1 directs the operator to drain the PRT to normal level using OP-100. IAW OP-100 the PRT is pumped using the RCDT pumps to the Recycle Hold Up Tank.*
- C. *Incorrect. Plausible because 78% is the high level setpoint for Steam Generator water level and is a common level for applicant to remember and close to the actual setpoint for PRT high level. The second part is correct, when high level is reached in the PRT ALB-009-8-1 directs the operator to drain the PRT to normal level using OP-100. IAW OP-100 the PRT is pumped using the RCDT pumps to the Recycle Hold Up Tank not the RCDT.*
- D. *Incorrect. The level setpoint correct. The second part is incorrect but plausible if the applicant confuses the PRT high level setpoint with another level similar to the PRT high level (SG high level is 78%).*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

007 A1.01

007 Pressurizer Relief Tank/Quench Tank System (PRTS)

A1 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including:

(CFR: 41.5 / 45.5)

A1.01 Maintaining quench tank water level within limits

Importance Rating: 2.9 3.1

Technical Reference: APP ALB-009-8-1 Rev. 12
 OP-100 Rev. 31

References to be provided: None

Learning Objective: Student Text PZR Obj. 5

Question Origin: New

Comments: KA is met by identifying paramter that is outside the normal band and requires operation to correct to appropriate value.

Original KA provided by NRC was 007 A1.03. New KA is 007 A1.01

Tier/Group: T2G1

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

- (1) VENT the PRT using OP-100.
- (2) DIRECT an Operator to verify N₂ Regulator is set at 0 psig.
 IF regulator setting is correct,
 THEN PERFORM Step 3.e.
- R d. IF temperature is high,
 THEN REDUCE PRT temperature by recirculation through the RCDT Heat exchanger, AND
 PERFORM Step 3.e.
- e. DETERMINE source of inleakage. REFER to CAUSES Section for potential sources.

CAUSES

1. PRZ PORVs and/or Safeties lifting or leaking
2. Relief valve actuation from RHR or CVCS systems
3. Leak or rupture of PRT or associated piping
4. Alarm circuit or instrumentation malfunction

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8.4. Draining The Pressurizer Relief Tank

8.4.1. Initial Conditions

1. Attachment 1 is complete. _____
2. Attachment 2 is complete. _____
3. The Main Control Room has requested lowering PRT level or draining the PRT with RCDT Pumps. _____
4. Recycle Holdup Tank should be available to receive effluent from the PRT. _____

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Origin: NEW

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 007 A1.01

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

35. 2009B NRC RO 035

The plant is operating at 100% power

- ALB-005-6-1, CCW SURGE TANK HIGH-LOW LEVEL just actuated
- The RO confirms level at 40%, lowering slowly

Which ONE of the following automatic actions must be verified?

- A. CCW Drain Tank pump has tripped
- B. Holdup Tank pump has tripped
- C. CCW Makeup valve, DW-15, has opened
- D. GFFD and Primary Sample Panel have isolated

Plausibility and Answer Analysis

- A. *Plausible since this pump has an auto trip feature but trips on high CCW Surge Tank level (75%) not at 40%.*
- B. *Plausible since this pump has an auto trip feature but trips on high CCW Surge Tank level (75%) not at 40%.*
- C. *Plausible since this would be opened but is not automatic.*
- D. *Correct. Automatic interlock.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

008 K4.02

008 Component Cooling Water System (CCWS)

K4 Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following:

(CFR: 41.7)

K4.02 Operation of the surge tank, including the associated valves and controls

Importance Rating: 2.9 2.7

Technical Reference: ALB-005-6-1, AOP-014 Note pg 14

References to be provided: None

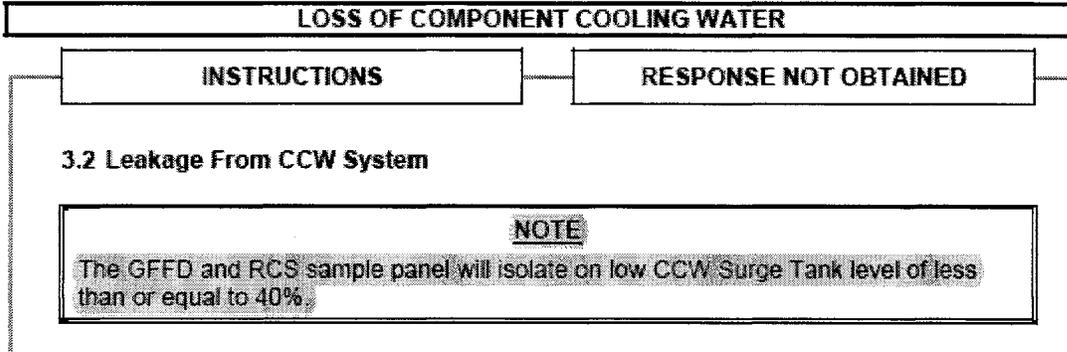
Learning Objective: Student Text CCW Obj. 7.c

Question Origin: Bank

Comments: KA is met by evaluating applicant recognition of high CCW surge tank level and interlock affecting components supplied by the CCW system.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS



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CCWS Student Text page 10

Both trains of CCW surge tank level indication are available on the MCB (LI-670A1-SA and LI-676A1-SB, 0-100% scale), MCR Recorder Panel LR-670 (LI-670A1-SA and LI-676A1-SB, 0-100% scale), ACP, and locally. The CCW surge tank high-low level alarm setpoints are 75% and 40% (ALB-005 6-1). Surge Tank low level of 40% isolates GFFD and the primary sample panel. Surge Tank high level of 75% trips the CCW drain tank pump and holdup tank pump. The normal makeup from demineralized water (1DW-15) is controlled from the MCB and is located west of 'B' CCW HX. The emergency make-up is from the RMWST. The manual valve is located west of 'A' CCW HX in the overhead.

Origin:	BANK	Cog Level:	LOWER
Difficulty:		Reference:	
Ref. Provided:		Key Words:	
K/A 1:	008 K4.02	K/A 2:	

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

36. 2009B NRC RO 036

Given the following plant conditions:

- The plant is in Mode 3
- OST-1117, Pressurizer PORV Operability Quarterly Interval Modes 3 - 6 is in progress
- One minute after opening 1RC-118, PRZ PORV PCV-445A SA, the following annunciator is received:

ALB-009-8-1, PRESSURIZER RELIEF TANK HIGH-LOW LEVEL PRESS OR TEMP

- The RO determines the annunciator is caused by high temperature in the PRT
- Attempts to close 1RC-118 are unsuccessful

Assuming no operator actions, which ONE of the following correctly completes the statement below?

On decreasing PRZ pressure, the Group 'C' heaters will FIRST receive a "full on" signal when pressure reduces to (1) AND when PRT pressure is \geq (2) the PRT rupture discs will rupture.

A. (1) 2220 psig

(2) 50 psig

B. (1) 2210 psig

(2) 100 psig

C. (1) 2210 psig

(2) 50 psig

D. (1) 2220 psig

(2) 100 psig

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

- A. *Incorrect. Plausible because the Group C heaters will be full on when PRZ pressure is 2220 psig or lower. The PRT rupture discs will rupture at 100 psig rupture, 50 psig was selected as a distracter because it is the approximate maximum PRT pressure expected during a design PZR safety valve discharge.*
- B. *Incorrect. Plausible because the PRZ backup heaters will be on at 2210 psig and also cause a low pressure alarm. 100 psig PRT pressure will cause the PRT rupture discs to rupture.*
- C. *Incorrect. Plausible because the PRZ backup heaters will be on at 2210 psig and also cause a low pressure alarm. The PRT rupture discs will rupture at 100 psig, 50 psig was selected as a distracter because it is the approximate maximum PRT pressure expected during a design PZR safety valve discharge*
- D. *Correct. The PRZ Group C heaters will be full on at 2220 psig and the PRT rupture discs will rupture at 100 psig.*

010 A3.01

010 Pressurizer Pressure Control System

(PZR PCS)

A3 Ability to monitor automatic operation of the PZR PCS, including:

(CFR: 41.7 / 45.5)

A3.01 PRT temperature and pressure during PORV testing

Importance Rating: 3.0 3.2

Technical Reference: AOP-019 Rev. 21 page 19, APP-ALB-009-8-1 Rev. 12, DBD-100 pp5 Rev 22

References to be provided: None

Learning Objective: Student Text PZR Obj. 3.b

Question Origin: Bank

Comments: KA is met by evaluating PRT response during PORV testing and the response of the PRT automatic over pressure protection.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

MALFUNCTION OF RCS PRESSURE CONTROL

Attachment 1
Sheet 2 of 2
Pressurizer Pressure Control System Operation

<u>Increasing Pressure</u>	↑	↓	<u>Decreasing Pressure</u>
Safety Relief Valves	2485		
High pressure Reactor trip	2385		
PORVs open and high pressure alarms (ALB-9-3-1 and 9-3-2)	2335		
		2315	PORVs shut
Spray valves full open and high pressure alarm (ALB-9-5-1)	2310	2310	Spray valve start to shut
Spray valves start to open	2260	2260	Spray valves fully shut
Group C heaters full off	2250		
PRZ Master Controller setpoint	2235		
		2220	Group C heaters full on

2.1.5 The PRT is sized to condense and cool a pressurizer steam volume equal to 110% of the steam in the pressurizer at an RCS Tavg of 598.8°F. Steam from the pressurizer is sparged into the liquid in the PRT where it condenses. The liquid in the PRT may be recirculated and cooled by the use of the reactor coolant drain pumps and heat exchanger. The PRT gas space is initially filled with nitrogen at 3 psig. Excessive and/or continuous steam flow to the PRT will result in failure of the rupture discs on the tank when tank pressure reaches 95 to 100 psig. The excess steam will be released into the containment atmosphere.

Origin: NEW
 Difficulty:
 Ref. Provided:
 K/A 1: 010 A3.01

Cog Level: LOWER
 Reference:
 Key Words:
 K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

37. 2009B NRC RO 037

The plant is operating at 100% power when the following occurs:
- PRZ Pressure Channel (PT-445) fails high

Which ONE of the following describes the response of the PRZ Pressure Control System?

- A. ONE PRZ PORV will OPEN and remain OPEN until P-11, PRZ High Pressure actuates
- B. TWO PRZ PORVs will OPEN and remain OPEN until P-11, PRZ High Pressure actuates
- C. TWO PRZ PORVs will OPEN AND remain OPEN until Safety Injection actuates
- D. ONE PRZ PORV will OPEN AND remain OPEN until Safety Injection actuates

Plausibility and Answer Analysis

- A. Incorrect. This is plausible because PT-444 controls one Pressurizer PORV. The P-11 part is correct because 2/3 protection channels < 2000 psig (P-11) closes PORVs that are open in auto.*
- B. Correct. Two PORVs are controlled by PT-445 and P-11 closes PORVs that are open in auto.*
- C. Incorrect. Two PORVs are controlled by PT-445 but P-11 will close PORVs that are open in auto.*
- D. Incorrect. This is plausible because PT-444 controls one Pressurizer PORV but P-11 will close PORVs that are open in auto.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

010 K3.03

010 Pressurizer Pressure Control System
(PZR PCS)

K3 Knowledge of the effect that a loss or malfunction of the PZR PCS will have on the following:

(CFR: 41.7 / 45.6)

K3.03 ESFAS

Importance Rating: 4.0 4.2

Technical Reference: APP-ALB-009-5-5, pp 22 Rev 12

References to be provided: None

Learning Objective: Student Text PZRPC Obj. 8.i

Question Origin: NEW

Comments: Question meets the K/A because the applicant must understand the change that takes place for the P-11 ESFAS Signal as RCS pressure lowers in response to a PZR PCS malfunction (PT failed high)

Tier/Group: T2G1

DEVICES: PS-01RC-0445 SETPOINT: 2335 psig	3-1	<div style="border: 2px solid black; padding: 5px; margin: 0 auto;"> PRESSURIZER CONTROL HIGH PRESS </div>
REFLASH: NO		
NOTE PS-01RC-0445 AW Ckt. 1 feeds both this alarm and the opening signal to 1RC-118. PT-01RC-0445 feeds both 1RC-118 and 1RC-118. If pressure is actually greater than 2335, all three PORVs will be open.		
OPERATOR ACTIONS:		
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Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 010 K3.03

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

38. 2009B NRC RO 038

Given the following plant conditions:

- The plant is operating at 8% power
- Intermediate Range (IR) N35 is inoperable
- N35 Level Trip Switch is in BYPASS IAW OWP-RP-21

The following occur:

- The power supply for N35 is operating erratically
- N35 Instrument Power fuses blow
- Two minutes later N35 Control Power fuses blow

Which ONE of the following identifies the expected result of these conditions?

- A. The Reactor Trip Breakers OPENED when N35 Instrument Power fuses blew
- B. The Reactor Trip Breakers OPENED when N35 Control Power fuses blew
- C. The Reactor Trip Breakers remain CLOSED because the N35 Level Trip Switch is in BYPASS
- D. The Reactor Trip Breakers remain CLOSED because the IR Level Trip is BLOCKED in SSPS

Plausibility and Answer Analysis

- A. *Incorrect. This is plausible because it would be the correct answer if the Level Trip Switch was in NORMAL.*
- B. *Correct. When the Control Power fuses blew this actuated the 1/2 IR trip and resulted in the RTBs opening. (This function is de-energize to actuate and control power supplies the bistables)*
- C. *Incorrect. This is plausible because it would be the correct answer if the Control Power fuses never blew.*
- D. *Incorrect. This is plausible because it would be the correct answer if the plant were operating greater than 10% power with the IR trips blocked. (NOTE that the status of blocks is not provided. The student must use knowledge of plant operation to determine.)*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

012 A2.04

012 Reactor Protection System

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:

(CFR: 41.5 / 43.5 / 45.3 / 45.5)

A2.04 Erratic power supply operation

Importance Rating: 3.1 3.2

Technical Reference: OWP-RP-21 pp 84 Rev 15

References to be provided: None

Learning Objective: Student Text Nuclear Instrumentation Obj. 8.a

Question Origin: NEW

Comments: K/A MATCH because erratic power supply action has occurred and the applicant must use knowledge to determine the effects on RPS/Reactor Trip Breakers

Tier/Group: T2G1

OWP-RP-21
Sheet 1 of 2

- | | | |
|----|--|-------------------------|
| | | EIR Number: _____ |
| | | W/O Number: _____ |
| 1. | OWP - RP-21 | Clearance Number: _____ |
| 2. | System: Nuclear Instrumentation | |
| 3. | Component: INTERMEDIATE RANGE N-35 | |
| 4. | Scope: LCO action required due to inoperable Channel 1 Intermediate Range Nuclear Instrumentation | |
| 5. | Applicable Requirements: 3.3.1 (Mode 1 below P-10 and Mode 2) | |
| 6. | Precautions: IA Rx Trip is 1 of 2 coincidence. If control power fuses are pulled when the channel is NOT SHUTTED (NCS), a Rx trip will occur. If instrument power fuses are pulled when the channel is NOT SHUTTED (NCS) or NOT SHUTTED (NCS), a Rx trip will occur. The NCS trip bypass function requires control power fuses to be installed. | |

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Origin: NEW	Cog Level: LOWER
Difficulty:	Reference:
Ref. Provided:	Key Words:
K/A 1: 012 A2.04	K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

39. 2009B NRC RO 039

Given the following plant conditions:

- The plant is operating at 100% power
- A loss of Instrument Bus SIII has just occurred

Which ONE of the following describes (1) how power to the SSPS Channel III input relays are affected AND (2) what will occur due to this failure?

- A. (1) All channel III input relays will be de-energized
(2) A loss of all ESF actuations from Train A
- B. (1) All channel III energize to actuate input relays will change state
(2) A General Warning on Train A
- C✓ (1) All channel III input relays will be de-energized
(2) A General Warning on Train A
- D. (1) All channel III energize to actuate input relays will change state
(2) A loss of all ESF actuations from Train A

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

- A. *Incorrect. Plausible because the input relays will de-energize. The second part is plausible because the loss of all ESF actuations from Train A occurs on a loss of an Instrument Bus but it is Instrument Bus I for A Train or Instrument Bus IV for Train B.*
- B. *Incorrect. Plausible if the applicant believes that all relays will go to their opposite state on loss of the power to SSPS. Most relays go to the opposite state (from on to off). There are energize to actuate input relays such as Containment Spray, RWST low level and channel 4 of Aux Feedwater Isolation. These relays energize when their setpoint is exceeded and the input relay has power to it. Since there was nothing that would have caused these relays to change state and there is on power the relays remain in the same status they were in before the power loss (off). The second part is correct, a General Warning will occur if ANY Instrument Bus is lost due to each Instrument Bus supplying one 15 VDC and one 48 VDC power sources to SSPS. If any of these power supplies to SSPS is lost then a General Warning will occur.*
- C. *Correct. All channel III input relays will de-energize and a General Warning will occur if ANY Instrument Bus is lost.*
- D. *Incorrect. Plausible if the applicant believes that all relays will go to their opposite state on loss of the power to SSPS. Most relays go to the opposite state (from on to off). There are energize to actuate input relays such as Containment Spray, RWST low level and channel 4 of Aux Feedwater Isolation. These relays energize when their setpoint is exceeded and the input relay has power to it. Since there was nothing that would have caused these relays to change state and there is on power the relays remain in the same status they were in before the power loss (off). The second part is incorrect but plausible because the loss of all ESF actuations from Train A occurs on a loss of an Instrument Bus but it is Instrument Bus I for A Train or Instrument Bus IV for Train B).*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

013 K2.01

013 Engineered Safety Features Actuation System (ESFAS)

K2 Knowledge of bus power supplies to the following:

(CFR: 41.7)

K2.01 ESFAS/safeguards equipment control

Importance Rating: 3.6* 3.8

Technical Reference: AOP-024-BD Rev. 11, page 2 Discussion #5
ALB-011 Rev. 7, page 12

References to be provided: None

Learning Objective: Student Text ESFAS Obj. 2

Question Origin: New

Comments: KA is met by requiring the applicant to identify the impact of a loss of power on the affected portion of the ESFAS system.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

DEVICES: SSPS Gen Warning Relay K524 SSPS Gen Warning Relay K537	SETPOINT: de-energized de-energized	S-2 <div style="border: 2px solid black; padding: 10px; display: inline-block;"> REACTOR TRIP PROTECTION SYS A AND B TROUBLE </div>
REFLASH: NO		
OPERATOR ACTIONS:		
1. CONFIRM alarm using one of the following: a. REACTOR TRIP PROTECTION SYSTEM A AND B TROUBLE alarm flashing RED b. Reactor trip breakers open 2. VERIFY Automatic Functions: a. Reactor trip 3. PERFORM Corrective Actions: a. GO TO EOP-PATH-1.		
CAUSES:		
1. SSPS General Warning Alarm Trains A AND B caused by: a. In Logic Cabinet: (1) INPUT ERROR INHIBIT switch not in NORMAL (2) MULTIPLEXER TEST switch not in NORMAL (3) LOGIC A switch not in OFF (4) MEMORIES switch not in OFF (5) PERMISSIVES switch not in OFF b. On Output Relay Test Panel in Output Cabinet No. 1: (1) MODE SELECTOR switch not in OPERATE (2) MASTER RELAY SELECTOR switch not in OFF c. A printed circuit card removed or not fully inserted d. Loss of any 15 volt or 48 volt power supply e. Both Reactor trip bypass breakers racked in and shut f. Blown AC power fuse in the Output Relay Cabinet 2. Alarm circuit malfunction		
REFERENCES:		
1. Technical Specifications 3.3.1 2. 6-B-001 Sheet 0535 3. Interconnection Diagram 1364-000865 4. Westinghouse Technical Manual, "Solid State Protection System," Volumes 1 and 2 5. EOP-PATH-1		
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Origin: NEW

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 013 K2.01

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

40. 2009B NRC RO 040

The plant is operating at 100% power

- Instrument Bus SIII, is de-energized and actions are being taken in accordance with AOP-024, Loss of Uninterruptible Power Supply
- PT-953, Containment Pressure Channel IV, then fails high

Which ONE of the following describes the effect on the Safety Injection (SI) AND Containment Spray Actuation Signal (CSAS) systems?

<u>SI</u>	<u>CSAS</u>
A. Not actuated	Not actuated
B. Actuated	Not actuated
C. Not actuated	Actuated
D. Actuated	Actuated

Plausibility and Answer Analysis

A. Incorrect. Plausible since CSAS is energized to actuate and 1 channel is in a deenergized condition so CSAS will not occur, but the 2 failed channels will cause an SI actuation.

B. Correct. An SI actuation (deenergized to actuate) will occur, but a CSAS (energized to actuate) will not occur unless another energized channel senses a high pressure condition.

C. Incorrect. Plausible since one of the two signals is energized to actuate and the other is deenergized to actuate, but SI is deenergize to actuate and CSAS is energized to actuate.

D. Incorrect. Plausible since the 2 failed channels will cause an SI actuation, but CSAS is energized to actuate and 1 channel is in a deenergized condition so CSAS will not occur.

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

013 K6.01

013 Engineered Safety Features Actuation System (ESFAS)

K6 Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS:

(CFR: 41.7 / 45.5 to 45.8)

K6.01 Sensors and detectors

Importance Rating: 2.7* 3.1*

Technical Reference: Plant Drawing 1364-000871

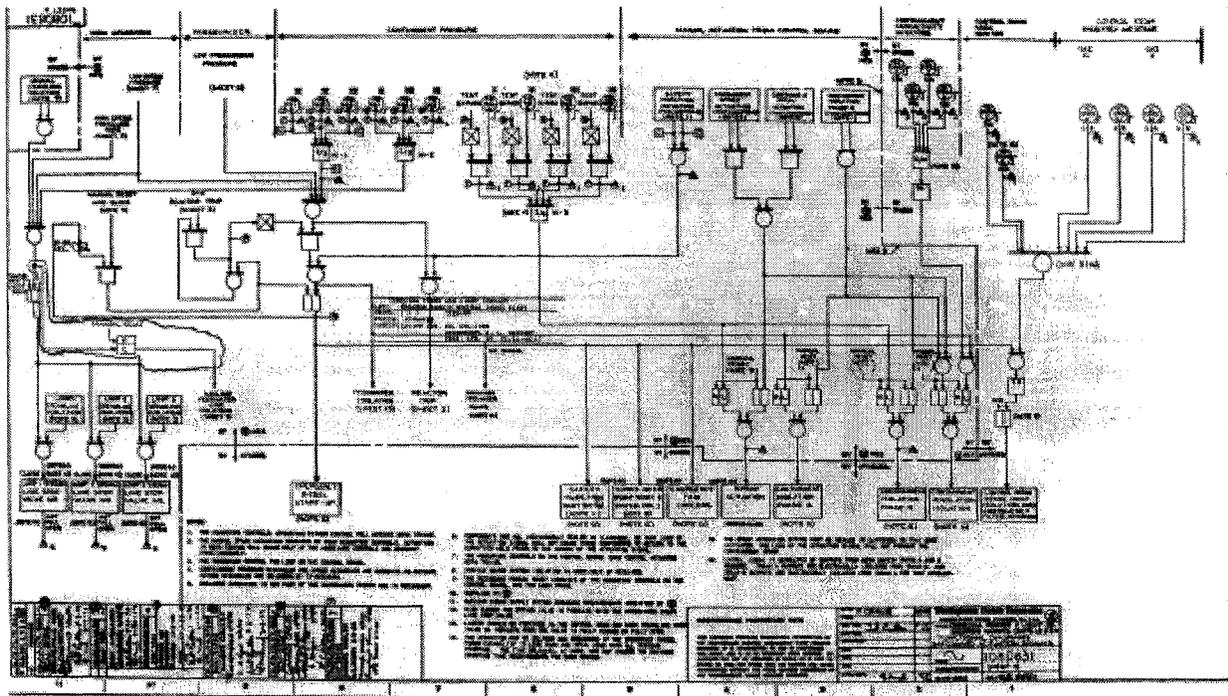
References to be provided: None

Learning Objective: Student Text ESFAS Obj. 8

Question Origin: Bank

Comments: KA is met by evaluating loss of detectors and impact on the ESFAS system

Tier/Group: T2G1



Origin: BANK

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 013 K6.01

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

41. 2009B NRC RO 041

Given the following plant conditions:

- The plant experiences a Reactor Trip and SI from 100% power
- During the performance of PATH-1 Guide Attachment 6, the BOP notes the following alignment for Containment Fan Coolers:
 - 'A' Train - one fan per unit running in fast speed
 - 'B' Train - one fan per unit running in slow speed

Based on these conditions, the BOP should. . .

- A✓ shift the two 'A' Train fans from fast to slow speed.
- B. shift the two 'B' Train fans from slow to fast speed.
- C. start two additional 'A' Train fans in fast speed and secure the 'B' Train fans
- D. start two additional 'B' Train fans in slow speed and secure the 'A' Train fans

Plausibility and Answer Analysis

- A. *Correct. During an SI all fans operating in high speed trip and one fan in each Fan Cooler will receive an automatic LOW speed start signal through the Sequencer at load block 2. If this signal fails IAW PATH-1 Attachment 6 step 16, the BOP should secure the fast speed fans and shift them to slow speed so that one fan per unit is running in slow speed.*
- B. *Incorrect. Plausible since this alignment would be used following a loss of offsite power, but the SI alignment requires that the fans operate in low speed.*
- C. *Incorrect. This is plausible because the normal fan alignment is to have all fans in one train running.*
- D. *Incorrect. This is plausible because the normal fan alignment is to have all fans in a train running.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

022 A3.01

022 Containment Cooling System (CCS)

A3 Ability to monitor automatic operation of the CCS, including:
(CFR: 41.7 / 45.5)

A3.01 Initiation of safeguards mode of operation

Importance Rating: 4.1 4.3

Technical Reference: PATH-1 Attachment 6 pp 85 Rev 26

References to be provided: NONE

Learning Objective: LPCCS3-0, R2

Question Origin: Bank

Comments: KA is met by evaluating expected automatic response to
a SI for the Containment Cooling System.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

PATH-1 GUIDE		
Attachment 6 Sheet 3 of 5 Safeguards Actuation Verification		
10.	Verify Both Main FW Pumps - TRIPPED	
11.	Verify FW Isolation Valves - SHUT (Refer to OMM-004, "POST TRIP/SAFEGUARDS REVIEW", Attachment 6.)	
12.	Verify both MDAFW pumps - RUNNING	
13.	IF any of the following conditions exists, THEN verify the TDAFW pump - RUNNING <ul style="list-style-type: none"> o Undervoltage on either 6.9 KV emergency bus o Level in two SGs - LESS THAN 25% o Manual actuation to control SG level 	
14.	Verify AFW Valves - PROPERLY ALIGNED	
15.	Verify Both EDGs - RUNNING	
16.	Verify CHMT Fan Coolers - ONE FAN PER UNIT RUNNING IN SLOW SPEED	
17.	Verify CHMT Ventilation Isolation Valves - SHUT (Refer to OMM-004, "POST TRIP/SAFEGUARDS REVIEW", Attachment 7.)	
18.	Verify Control Room Ventilation - ALIGNED FOR EMERGENCY RECIRCULATION (Refer to OMM-004, "POST TRIP/SAFEGUARDS REVIEW", Attachment 5.)	
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Origin: BANK

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 022 A3.01

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

42. 2009B NRC RO 042

Given the following plant conditions:

- The plant was operating at 100% power when a LOCA occurred
- The crew is currently in EPP-012, Loss of Emergency Coolant Recirculation
- Containment Spray Pump 'A' tripped when Containment Spray actuated
- Containment pressure is 12 psig and rising
- RWST level is 32% and lowering

Which ONE of the following identifies the MINIMUM number of Containment Fan Coolers required to be in operation under these plant conditions?

- A. 0
- B. 2
- C. 3
- D. 4

Plausibility and Answer Analysis

- A. Incorrect. Plausible since this would be selected if there were 2 CT pumps in operation.*
- B. Correct.*
- C. Incorrect. Plausible since 3 units would be required if there were no CT pumps in operation and RWST level was less than 23.4% with containment pressure between 10 and 45 psig.*
- D. Incorrect. Plausible if no containment spray pumps were in operation..*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

026 K3.01

026 Containment Spray System (CSS)

K3 Knowledge of the effect that a loss or malfunction of the CSS will have on the following:

(CFR: 41.7 / 45.6)

K3.01 CCS

Importance Rating: 3.9 4.1

Technical Reference: EPP-012, step 12, pp 14, Rev 21

References to be provided: None

Learning Objective: Student Text CSS Obj 7

Question Origin: NEW

Comments: KA is met by evaluating required number of Containment Fan Coolers required to be in operation with a loss of a Containment Spray Pump.

Tier/Group: T2G1

QUESTIONS REPORT for 2009B NRC RO QUESTIONS

LOSS OF EMERGENCY COOLANT RECIRCULATION

Instructions

Response Not Obtained

12. Determine CNMT Spray Requirements:

- | | |
|--|--------------------------|
| <p>a. Spray pump suction -
ALIGNED TO RWST</p> <p>b. Determine required number
of CNMT spray pumps from
Table 1:</p> | <p>a. GO TO Step 14.</p> |
|--|--------------------------|

TABLE 1: CONTAINMENT SPRAY REQUIREMENTS			
RWST LEVEL	CONTAINMENT PRESSURE	MINIMUM # OF FAN COOLER UNITS RUNNING	REQUIRED # OF CNMT SPRAY PUMPS
GREATER THAN 23.4%	GREATER THAN 45 PSIG	N/A	2
	BETWEEN 10 PSIG AND 45 PSIG	0	2
		2	1
		4	0
	LESS THAN 10 PSIG	N/A	0
BETWEEN 3% AND 23.4%	GREATER THAN 45 PSIG	N/A	2
	BETWEEN 10 PSIG AND 45 PSIG	2	1
		3	0
LESS THAN 3%	N/A	N/A	0

- c. Verify spray pumps -
REQUIRED NUMBER RUNNING
- d. Shut CNMT spray pump discharge valve(s) for the pump(s) stopped in Step 12c:
- 1CT-50 (A CT Pump)
1CT-88 (B CT Pump)

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Origin: NEW

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 026 K3.01

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

43. 2009B NRC RO 043

Given the following plant conditions:

- A Reactor Trip and Safety Injection have occurred
- Steam Generator parameters have decreased to the following values:

SG	LEVEL	PRESSURE
A	32%	870 psig
B	12%	420 psig
C	34%	830 psig

- NO operator actions have been taken.

Which ONE of the following is the expected position of (1) 1AF-143 STM TURB AUX FW B ISOLATION AND (2) 1MS-70, 'B' SG to AFW Turbine?

- A. (1) OPEN
(2) OPEN
- B. (1) OPEN
(2) CLOSED
- C. (1) CLOSED
(2) OPEN
- D✓ (1) CLOSED
(2) CLOSED

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

- A. *Incorrect. Plausible since the valve controller is set at 100% per OP-137, and a MDAFWP start signal has been generated which would open the FCVs from the MDAFW pumps (not TDAFW), however it received an AFW isolation signal due to the Main Steam Isolation signal coincident with high differential steam pressure. Second half is plausible since this valve would open on low-low level in 2 SGs.*
- B. *Incorrect. Plausible since the valve controller is set at 100% per OP-137, and a MDAFWP start signal has been generated which would open the FCVs from the MDAFW pumps (not TDAFW), however it received an AFW isolation signal due to the Main Steam Isolation signal coincident with high differential steam pressure. Second half is correct since no automatic start signal has been generated for the TDAFW pump (only 1 SG low-low level has occurred) so the steam supply valves should be closed.*
- C. *Incorrect. First half is correct since the FCV received an AFW isolation signal due to the Main Steam Isolation signal coincident with high differential steam pressure. Second half is plausible since this valve would open on low-low level in 2 SGs.*
- D. *Correct. FCV-2071B has received an AFW isolation signal due to the Main Steam Isolation signal coincident with high differential steam pressure. No automatic start signal has been generated for the TDAFW pump (only 1 SG low-low level has occurred) so the steam supply valves should be closed.*

039 A4.04

039 Main and Reheat Steam System (MRSS)

A4 Ability to manually operate and/or monitor in the control room:

(CFR: 41.7 / 45.5 to 45.8)

A4.04 Emergency feedwater pump turbines

Importance Rating: 3.8 3.9

Technical Reference: APP-ALB-014-2-1A, pp 9 Rev 21
DWG 1364-000877

References to be provided: None

Learning Objective: Student Text AFW Obj. 4

Question Origin: Bank

Comments: KA is met by having applicant evaluate plant conditions and identify expected plant response of the Emergency feedwater pump turbines.

Tier/Group: T2G1

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

2-1A

DEVICES:
PB474B, PB475B, PB476B
(2 out of 3 logic)

SETPOINT:
P1-P2 100 psid with Main Steam
Isolation Signal present

**LOOP B
AFW LINE ISOL**

PB484B, PB485B, PB486B
(2 out of 3 logic)

P2-P3 100 psid with Main Steam
Isolation Signal present

REFLASH: NO

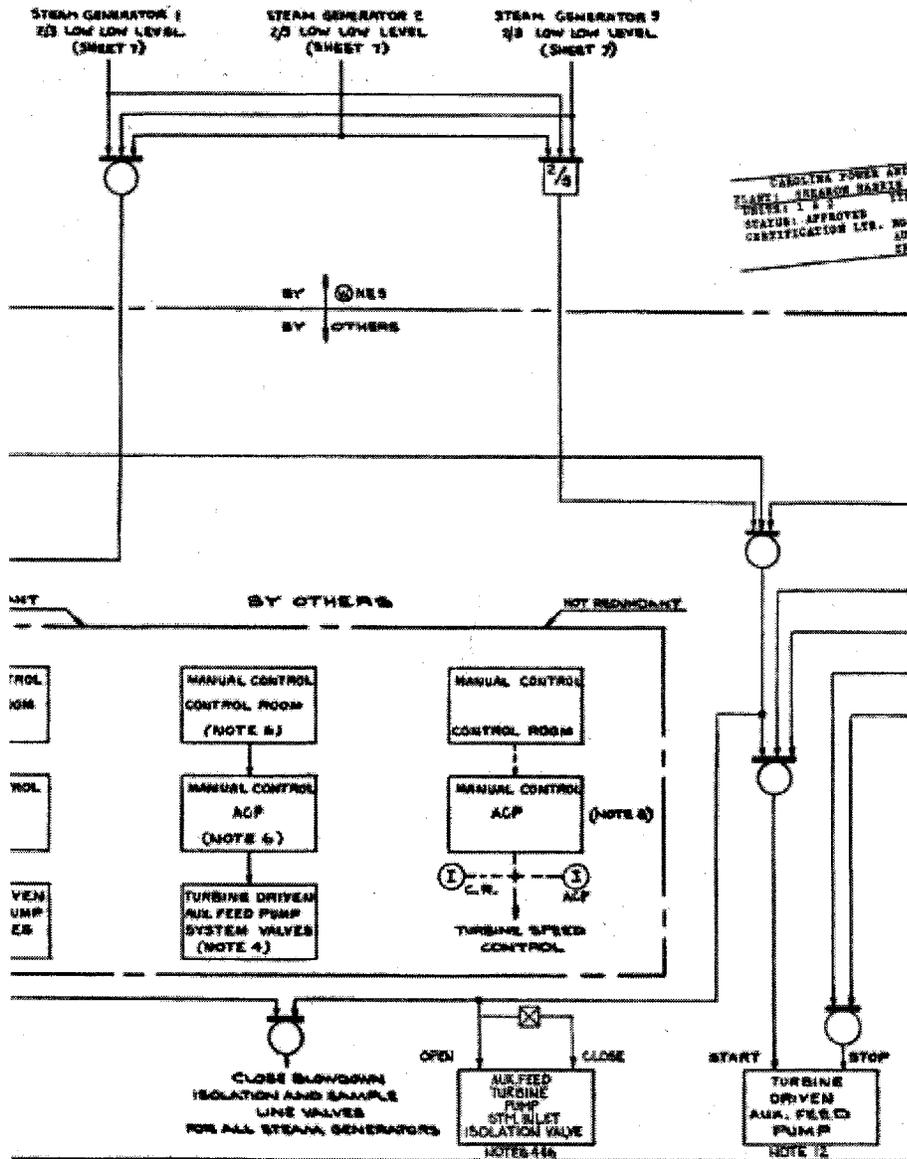
OPERATOR ACTIONS:

1. CONFIRM alarm using:
 - a. PI-474.1 SB, PI-484.1 SB, PI-494.1 SB, Steam Pressure indicators
 - b. Valve position indication for SG B AFW isolation valves 1AF-93, 1AF-143, 1AF-51, 1AF-130
 - c. TSLB-1 status lights
2. VERIFY Automatic Functions:
 - a. SG B AFW isolation valves 1AF-93, 1AF-143, 1AF-51, 1AF-130 shut

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QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: BANK

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 039 A4.04

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

44. 2009B NRC RO 044

Given the following plant conditions:

- The plant is operating at 9% power
- The Main Turbine is at 1800 RPM with the plant preparing for synch to the grid
- The 'A' Main Feedwater Regulating Valve fails open

Which ONE of the following identifies the 'A' SG level at which a Feedwater Isolation Signal will be generated AND the effect on the plant?

	<u>'A' SG Level</u>	<u>Plant Effect</u>
A.	73%	Reactor Trip AND Turbine Trip
B.	73%	Turbine Trip ONLY
C.	78%	Reactor Trip AND Turbine Trip
D✓	78%	Turbine Trip ONLY

Plausibility and Answer Analysis

- A. Incorrect. 73% is incorrect but plausible since this is the trip limit established in OMM-001 Attachment 13. Reactor Trip is incorrect but plausible as this would occur if the plant power was greater than P-7 (10% power).*
- B. Incorrect. 73% is incorrect but plausible since this is the trip limit established in OMM-001 Attachment 13. Turbine Trip is correct.*
- C. Incorrect. 78% is correct. Reactor Trip is incorrect but plausible as this would occur if the plant power was greater than P-7 (10% power).*
- D. Correct. 78% is correct. Turbine Trip is correct.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

059 A3.06

059 Main Feedwater (MFW) System

A3 Ability to monitor automatic operation of the MFW, including:
(CFR: 41.7 / 45.5)

A3.06 Feedwater isolation

Importance Rating: 3.2* 3.3

Technical Reference: ALB-014-4-3B

References to be provided: None

Learning Objective: Reactor Protection System Obj 7

Question Origin: NEW

Comments: Original KA supplied by NRC was 059 A3.02. KA replaced with 059 A3.06.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

DEVICES: LB-473A LB-474C LB-475C LB-476C	SETPOINT: 78% (1 out of 4 logic) 78% (1 out of 4 logic) 78% (1 out of 4 logic) 78% (1 out of 4 logic)	4-3B <div style="border: 2px solid black; padding: 5px; text-align: center; margin: 10px auto; width: fit-content;"> STEAM GEN A HIGH-HIGH LVL </div>
REFLASH: NO		
OPERATOR ACTIONS:		
1. CONFIRM alarm using: <ol style="list-style-type: none"> a. LI-473, LI-474 SA, LI-475 SB, LI-476 SA, Steam Generator A Narrow Range level indicators b. LI-477.1 SA, Steam Generator A Wide Range level indicator 		
2. VERIFY Automatic Functions: <ol style="list-style-type: none"> a. With any SG level above 73% (2 out of 4 NR detectors), the following occurs: <ol style="list-style-type: none"> (1) Turbine trip (2) Main Feed Pump trip (3) Feedwater isolation 		
3. PERFORM Corrective Actions: <ol style="list-style-type: none"> a. IF the Reactor trips, THEN GO TO EOP-PATH-1. b. OBSERVE SG level, steam flow, and feed flow. c. IF auto controller can NOT adequately return level to normal, THEN: <ol style="list-style-type: none"> (1) SWITCH FCV-478, A SG Feedwater Regulator Valve, to MANUAL. (2) RESTORE level to normal (57% NR). d. IF Turbine DEH Control is malfunctioning, THEN PLACE in MANUAL AND STABILIZE transient. e. IF maintenance is to be performed, THEN REFER TO OWP-RP, Reactor Protection. 		
CAUSES:		
1. SG Water Level Control System failure 2. Rapid rise in steam demand 3. Filling to wet layup conditions 4. Alarm circuit or instrument malfunction		
REFERENCES:		
1. Technical Specifications 3.3.2 and 3.3.3.6 2. EOP-PATH-1 3. 1364-00870, 02778 sheets 38, 44 4. 8-B-401 0638 5. OWP-RP, Reactor Protection		
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Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 059 A3.06

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

45. 2009B NRC RO 045

Given the following plant conditions:

- The plant was operating at 100% power when a Reactor Trip occurred
- The 'B' Reactor Trip Breaker failed to OPEN

Which ONE of the following choices correctly completes the statement below?

As RCS temperature lowers to 557°F, (1) P-4 (Reactor Trip) with Low TAVG signal will be generated AND the Main Feedwater Regulating Valves will (2).

- A. (1) BOTH the Train 'A' AND 'B'
(2) remain OPEN
- B. (1) ONLY the Train 'A'
(2) remain OPEN
- C✓ (1) ONLY the Train 'A'
(2) SHUT
- D. (1) BOTH the Train 'A' AND 'B'
(2) SHUT

Plausibility and Answer Analysis

- A. *Incorrect. This is plausible since the 1 out of 2 coincidence is similar to IR trips for P-4 but P-4 is train specific.*
- B. *Incorrect. RTB 'B' remaining shut prevents a 'B' Train P-4 (Reactor Trip) with Low TAVG signal. Therefore, ONLY 'A' Train is generated but the MFRVs will shut.*
- C. *Correct. RTB 'B' remaining shut prevents a 'B' Train P-4 (Reactor Trip) with Low TAVG signal. Therefore, ONLY 'A' Train is generated but the MFRVs will shut.*
- D. *Incorrect. This is plausible since the 1 out of 2 coincidence is similar to IR trips for P-4 but P-4 is train specific.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

059 A4.12

059 Main Feedwater (MFW) System

A4 Ability to manually operate and monitor in the control room:
(CFR: 41.7 / 45.5 to 45.8)

A4.12 Initiation of automatic feedwater isolation

Importance Rating: 3.4 3.5

Technical Reference: EOP-EPP-004 page 10 Rev. 18

References to be provided: None

Learning Objective: Reactor Protection System Obj 7

Question Origin: NEW

Comments: The KA is met by providing changing plant conditions requiring identification of whether or not an automatic FWI signal will actuate.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

REACTOR TRIP RESPONSE	
Instructions	Response Not Obtained
<p>5. <u>Check Feed System Status</u></p> <p>a. <u>RCS Temperature LESS THAN 564°F</u></p> <p>b. <u>Verify feed reg valves SHUT</u></p> <p>c. <u>Check feed flow to SGs - GREATER THAN 210 KPPH</u></p>	<p>a. <u>WHEN</u> RCS temperature less than 564°F, <u>THEN</u> do Steps 5b AND c.</p> <p style="padding-left: 40px;">Continue with Step 6.</p> <p>c. Perform the following:</p> <p style="padding-left: 20px;">1) Establish feed flow to SGs using any of the following:</p> <ul style="list-style-type: none"> o AFW <li style="padding-left: 20px;">(Refer to OP-137. "AUXILIARY FEEDWATER SYSTEM" operation.) o Main feed flow using the feed reg bypass valves in MANUAL. <p style="padding-left: 20px;">2) Maintain total feed flow greater than 210 KPPH until level greater than 25% in at least one SG.</p>
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Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 059 A4.12

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

46. 2009B NRC RO 046

Given the following plant conditions:

- The plant was operating at 100% power when a loss of both MFW pumps occurred
- The crew implemented PATH-1
- Both Motor Driven AFW pumps are tripped
- A loss of DP-1B-SB occurred after entry into EPP-004, Reactor Trip Response

Which ONE of the following would be the MINIMUM action required IAW EPP-004 in order to establish the required feedwater flow to the SGs using the TDAFW pump?

Start the TDAFW pump (1) AND establish control of the TDAFW FCVs (2).

- A. (1) locally
(2) locally
- B. (1) locally
(2) at the MCB
- C. (1) at the MCB
(2) locally
- D. (1) at the MCB
(2) at the MCB

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

Plausibility and distractor analysis

- A. *Incorrect. First part is correct. Second part is plausible if applicant does not recognize that control power for the TDAFW FCVs comes from Instrument Bus SII (vital AC). DC supply to Instrument Bus SII inverter comes from DP-1B-SB.*
- B. *Correct. On a loss of B Train DC power, the TDAFW pump control circuit loses power, the TDAFW pump would start and trip on overspeed. The TDAFW pump must be started and controlled locally IAW OP-137 Section 8.7.1. The second part is correct because control of the TDAFW FCVs is still available. Instrument BUs SII provides control power to the FCVs.*
- C. *Incorrect. Plausible since applicant may not recognize that DC control power is provided to the TDAFW only from the B train DC power. Second part is plausible if applicant does not recognize that control power for the TDAFW FCVs comes from Instrument Bus SII (vital AC). DC supply to Instrument Bus SII inverter comes from DP-1B-SB.*
- D. *Incorrect. First part is plausible since applicant may not recognize that DC control power is provided to the TDAFW only from the B Train DC power. The second part is correct because control of the TDAFW FCVs is still available. Instrument BUs SII provides control power to the FCVs.*

061 A2.03

061 Auxiliary / Emergency Feedwater (AFW) System

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the AFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:

(CFR: 41.5 / 43.5 / 45.3 / 45.13)

A2.03 Loss of dc power

Importance Rating: 3.1 3.4

Technical Reference: EPP-004, step 5.c RNO, pp 10, rev 18,
OP-137 section 8.7.2, pp 46,47 Rev 26

References to be provided: None

Learning Objective: AOP-PL-3.25 Obj. 3.d

Question Origin: New

Comments: KA measures prediction of how the TDAFW pump will be affected by a loss of DC and how the TDAFW and AFW flow will be controlled with the loss of DC.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

REACTOR TRIP RESPONSE	
Instructions	Response Not Obtained
<p>5. Check Feed System Status:</p> <p>a. RCS Temperature - LESS THAN 564°F</p> <p>b. Verify feed reg valves - SHUT</p> <p>c. Check feed flow to SGs - GREATER THAN 210 KPPH</p>	<p>a. <u>WHEN</u> RCS temperature less than 564°F, <u>THEN</u> do Steps 5b AND c.</p> <p style="padding-left: 40px;">Continue with Step 6.</p> <p>c. Perform the following:</p> <p style="padding-left: 20px;">1) Establish feed flow to SGs using any of the following:</p> <p style="padding-left: 40px;">a. AFW</p> <p style="padding-left: 40px;">(Refer to OP-137, "AUXILIARY FEEDWATER SYSTEM" operation.)</p>
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Additional reference OP-137 is provided with reference documents. Multiple pages are required for the reference and will not fit in the space allowed for this section.

Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 061 A2.03

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

47. 2009B NRC RO 047

Given the following plant conditions:

- A loss of Instrument Bus Inverter SI has occurred
- The crew is performing action contained in AOP-024, Loss of Uninterruptible Power Supply
- Transfer of Bus SI to the alternate supply is required in accordance with OP-156.02, AC Electrical Distribution

Which ONE of the following describes how improper sequencing of the Instrument Bus is prevented for this transfer?

- A. The inverter will not allow transfer to the alternate supply if it is out of synch with the normal supply
- B. The transfer requires a kirk key to be used to ensure the primary supply is not paralleled with the alternate supply.
- C. The normal and alternate supply breakers are electrically interlocked so that only one may be closed at a time
- D. The transfer control switch is a 'break before make' contactor that will not allow two power sources to simultaneously supply the bus

Plausibility and Answer Analysis

In accordance with OP-156.02, B is correct.

- A. Incorrect. Plausible since the applicant may confuse this operation with the 60 KVA inverter which does utilize this feature.*
- B. Correct.*
- C. Incorrect. Plausible since there are electrical interlocks utilized in the plant that prevent simultaneous energization of a bus.*
- D. Incorrect. Plausible since the applicant may confuse this operation with the NSW Automatic Transfer Switch.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

062 A2.03

062 A.C. Electrical Distribution

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:

(CFR: 41.5 / 43.5 / 45.3 / 45.13)

A2.03 Consequences of improper sequencing when transferring to or from an inverter

Importance Rating: 2.9 3.4

Technical Reference: OP-156.02, Pg 125-130 (see provided reference)

References to be provided: None

Learning Objective: LPAOP3-24 Obj 5

Question Origin: Bank

Comments: Improper sequencing is prevented through a mechanical interlock. Question written to describe how improper sequencing is prevented.

Tier/Group: T2G1

Origin: BANK

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 062 A2.03

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

48. 2009B NRC RO 048

The plant is operating at 100% power

- Irradiated fuel is being shuffled in the Fuel Handling Building
- Maintenance needs to be performed on the following breakers
 - BKR 101, START-UP TRANSFORMER A TO AUXILIARY BUS 1D
 - BKR 102, UNIT AUX TRANSFORMER A TO AUXILIARY BUS 1D
- The breakers will be worked on one at a time
- The maintenance activity will require removing the breakers from their respective cubicles and will require 16 hours to complete each activity

Which ONE of the following choices completes the statement below?

Technical Specification entry will be required when maintenance begins on breaker (1) AND will require (2).

A✓ (1) 101

- (2) performance of OST-1023, OFF SITE POWER AVAILABILITY VERIFICATION WEEKLY INTERVAL MODES 1, 2, 3, 4, 5, 6, within 1 hour

B. (1) 101

- (2) immediate suspension of the movement of irradiated fuel in the Fuel Handling Building

C. (1) 102

- (2) performance of OST 1023, OFF SITE POWER AVAILABILITY VERIFICATION WEEKLY INTERVAL MODES 1, 2, 3, 4, 5, 6, within 1 hour

D. (1) 102

- (2) immediate suspension of the movement of irradiated fuel in the Fuel Handling Building

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

A. Correct. The first part is correct since BKR 101 is required to be available to support T.S. 3.8.1.1 requirements to have "Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system." The second part is correct since if the LCO is not met, action a.1 is "Perform Surveillance Requirement 4.8.1.1.1.a (OST 0123) within 1 hour and once per 8 hours thereafter."

B. Incorrect. The first part is correct (see answer A) The second part is incorrect but plausible since this is the required action in modes 5 and 6 if the minimum AC electrical power sources are not operable. Fuel movement does periodically occur in the FHB in mode 1.

C. Incorrect. The first part is incorrect since BKR 102 supplies power from the UAT and would not meet the offsite requirement while operating in Mode 1. Plausible since when the plant is offline, backfeed could be utilized through BKR 102 to meet the T.S. The second part is correct (see answer A).

D. Incorrect. The first part is incorrect, see answer C. The second part is incorrect, see answer B.

062 G2.2.36

062 A.C. Electrical Distribution

G2.2.36 Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.

(CFR: 41.10 / 43.2 / 45.13)

Importance Rating: 3.1 4.2

Technical Reference: TS 3.8.1.1 Action (a), pp 3/4 8-1, ammend 111.

References to be provided: NONE

Learning Objective: Off-Site Power Obj 11

Question Origin: NEW

Comments: KA is matched by having applicant identify Tech Spec LCO applicability associated with the AC Distribution System.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system and
- b. Two separate and independent diesel generators, each with:
 - 1. A separate day tank containing a minimum of 1457 gallons of fuel,
 - 2. A separate main fuel oil storage tank containing a minimum of 100,000 gallons of fuel, and
 - 3. A separate fuel oil transfer pump.
- c. Automatic Load Sequencers for Train A and Train B.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With one offsite circuit of 3.8.1.1.a inoperable:
 - 1. Perform Surveillance Requirement 4.8.1.1.1.a within 1 hour and once per 8 hours thereafter; and

SHEARON HARRIS - UNIT 1 3/4 8-1 Amendment No. 111

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignment and power availability, and

SHEARON HARRIS - UNIT 1 3/4 8-4 Amendment No. 51

Origin:	NEW	Cog Level:	HIGHER
Difficulty:		Reference:	
Ref. Provided:		Key Words:	
K/A 1:	062 G2.2.36	K/A 2:	

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

49. 2009B NRC RO 049

Given the following plant conditions:

- Plant is shutdown with a cooldown is in progress
- RCS temperature is 195°F

For the current plant conditions, the Technical Specification for DC electrical sources requires that (1) 125 volt emergency battery bank(s) be operable AND (2) associated full capacity battery charger(s) shall be operable.

	<u> (1) </u>	<u> (2) </u>
A✓	ONE	ONE
B.	ONE	TWO
C.	TWO	ONE
D.	TWO	TWO

Plausibility and Answer Analysis

A. *Correct.*

B. *Incorrect. First part is correct. Second part is plausible since two chargers are available per battery.*

C. *Incorrect. First part is plausible since two battery banks are required in other modes. Second part is correct.*

D. *Incorrect. First part is plausible since two battery banks are required in other modes. Second part is plausible since two chargers are available per battery.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

063 G2.2.22
063 D.C. Electrical Distribution
2.2 Equipment Control
2.2.22 Knowledge of limiting conditions for operations and safety limits.
| (CFR: 41.5 / 43.2 / 45.2)

Importance Rating: 4.0 4.7

Technical Reference: TS 3.8.2.2, p 3/4 8-15

References to be provided: None

Learning Objective: Student Text DC Power Obj. 10

Question Origin: NEW

Comments: Meets KA by evaluating the LCO for DC systems in
 Mode 5.

Tier/Group: T2G1

ELECTRICAL POWER SYSTEMS

D.C. SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.2 As a minimum, one 125-volt Emergency Battery (either 1A-SA or 1B-SB)
and at least one associated full-capacity charger shall be OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION

SHEARON HARRIS - UNIT 1 3/4 8-15

Origin:	NEW	Cog Level:	LOWER
Difficulty:		Reference:	
Ref. Provided:		Key Words:	
K/A 1:	063 G2.2.22	K/A 2:	

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

50. 2009B NRC RO 050

Given the following plant conditions:

- With the plant operating at 100% power, a loss of power to 6.9kV bus 1A-SA occurred
- EDG 1A-SA has been started but the output breaker has not been closed
- Annunciator ALB-015-4-4 125VDC EMER BUS A TROUBLE is lit
- The ERFIS point for Emer Bus DP-1ASA voltage indicates 128 volts and is decreasing

In order to restore bus voltage to normal, 480V bus (1) must be energized and DC bus DP-1A-SA voltage will indicate normal (2).

- A. (1) 1A1
(2) as soon as the charger is placed in service
- B. (1) 1A1
(2) ONLY after the battery has been adequately recharged
- C✓ (1) 1A3-SA
(2) as soon as the charger is placed in service
- D. (1) 1A3-SA
(2) ONLY after the battery has been adequately recharged

Plausibility and Answer Analysis

- A. *Incorrect. The second part is correct. The first part is plausible because 480V bus 1A1 is powered from 1A-SA, which also powers 1A2-SA.*
- B. *Incorrect. The first part is plausible because 480V bus 1A1 is powered from 1A-SA, which also powers 1A2-SA. The second part is plausible since the battery has been discharged as indicated in the stem.*
- C. *Correct. 480V bus 1A2-SA supplies the battery charger. The second part is correct since when the charger is put in service the DC bus will be supplied by the battery charger with output voltage at 135.5v.*
- D. *Incorrect. The first part is correct. The second part is plausible since the battery has been discharged as indicated in the stem.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

063 K1.03

063 D.C. Electrical Distribution

K1 Knowledge of the physical connections and/or cause effect relationships between the DC electrical system and the following systems:

(CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.03 Battery charger and battery

Importance Rating: 2.9 3.5

Technical Reference: FSAR section 8.3.2.1.2, pp 8.3.2-2, Amend. 48
OP-156.01 pp 88 Rev 22
OP-156.02 pp 286 Rev 78

References to be provided: None

Learning Objective: DCP Obj 9

Question Origin: NEW

Comments: KA is matched because question evaluates cause effect relationship between the battery charger and associated battery following a discharge.

Tier/Group: T2G1

QUESTIONS REPORT for 2009B NRC RO QUESTIONS

SHNPP FSAR

8.3.2.1.2 Battery chargers. Four safety-related battery chargers (1A-SA, 1B-SA, 1A-SB and 1B-SB) are provided; two for each safety-related battery (1A-SA and 1B-SB). Each battery charger is rated 150A continuous capacity. Each individual safety-related charger is capable of maintaining the connected battery in a fully charged condition by supplying a float charge at 133.5V on an equalizing charge at 138.6V, and has the capability to restore sufficient battery capacity to successfully perform the design basis duty cycle in 24 hours after an emergency discharge while supplying 100 percent of the continuous load on the D.C. bus. This configuration is used to enhance the reliability and availability of each safety DC division. In the event of malfunction of one charger, the redundant charger is capable of maintaining the DC system in a fully operable condition. The battery charger typically maintains a regulated float voltage of 2.20 to 2.25 volts per cell so that no recharging/equalizing charge is required under normal plant operation.

8.3.2-2

Amendment No. 48

480V EMERGENCY 1A3-SA

1A3-SA-1A	480V MCC-1A31-SA	CLOSED	_____	_____
1A3-SA-1C	480V MCC-1A36-SA	CLOSED	_____	_____
1A3-SA-1D	480V MCC-1A35-SA	CLOSED	_____	_____
<u>1A3-SA-2A</u>	<u>480V MCC-1A21-SA</u>	<u>CLOSED</u>	_____	_____
1A3-SA-4A	480V MCC-1A34-SA	CLOSED	_____	_____
1A3-SA-4B	480V MCC-1A22-SA	CLOSED	_____	_____
1A3-SA-4C	480V MCC 1A23-SA	CLOSED	_____	_____
1A3-SA-5A	SWGR Htr 2,4,6	ON	_____	_____
1A3-SA-5A	SWGR Htr 1,5	ON	_____	_____
1A3-SA-5B	480V MCC-1&4A33-SA	CLOSED	_____	_____
1A3-SA-5C	480V MCC-1A32-SA	CLOSED	_____	_____
1A3-SA-5A	125 VDC Control Power	ON	_____	_____

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MCC-1A21-SA

1A21-SA-3BL Battery Charger 1A-SA 125 Volt ON _____

MCC-1A31-SA

1A31-SA-1BL Battery Charger 1B-SA 125 Volt ON _____

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Origin:	NEW	Cog Level:	LOWER
Difficulty:		Reference:	
Ref. Provided:		Key Words:	
K/A 1:	063 K1.03	K/A 2:	

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

51. 2009B NRC RO 051

Given the following plant conditions:

- The plant is operating at 100% power
- 'A' EDG has been just been secured after running IAW OP-155, Diesel Generator Emergency Power System
- 'A' EDG Fuel Oil Storage Tank indicates 102,500 gallons
- 'A' EDG Fuel Oil Day Tank indicated level is 47.8% and rising
- Specific gravity of the fuel oil in 'A' Fuel Oil Day Tank is 0.862

- 'B' EDG is now running IAW OP-155
- 'B' EDG Fuel Oil Storage Tank indicates 104,300 gallons
- 'B' EDG Fuel Oil Day Tank indicated level is 47.1% and lowering
- Specific gravity of the fuel oil in 'B' Fuel Oil Day Tank is 0.884

Which ONE of the following is the CURRENT status of the Emergency Diesel Generators IAW Tech Specs?

(Reference provided)

	<u>'A' EDG</u>	<u>'B' EDG</u>
A.	OPERABLE	OPERABLE
B✓	OPERABLE	INOPERABLE
C.	INOPERABLE	OPERABLE
D.	INOPERABLE	INOPERABLE

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

Tech Spec 3.8.1.1

- b.1. A separate day tank containing a minimum of 1457 gallons of fuel, (IAW Curve D-X-20, the minimum MCB level indication for the 'A' EDG a specific gravity of .862 is ~44.7% and for the 'B' EDG a specific gravity of .884 is ~47.4)*
- b.2. A separate main fuel oil storage tank containing a minimum of 100,000 gallons of fuel*
- b.3. A separate fuel oil transfer pump*

The 'A' EDG is operable. With the day tank level at 47.8% and the specific gravity of .862 the tank level meets the minimum level of 1457 gallons and the DFOST level is >100,000 gallons. The fuel oil transfer pump is running by indications that the Fuel Oil Day Tank level is above 47% and increasing. (The pump auto starts when level is \leq 47% or when the EDG is secured).

The 'B' EDG is inoperable due to the Fuel Oil Day Tank level greater than the alarm setpoint (45.4%), but below the Tech Spec Limit of Curve D-X-20. The DFOST transfer pump should auto start at 47% which it will shortly, but the day tank level is below the TS minimum level at this time.

- A. Incorrect*
- B. Correct*
- C. Incorrect*
- D. Incorrect*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

064 K6.08

064 Emergency Diesel Generators (ED/G)

K6 Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system:

(CFR: 41.7 / 45.7)

K6.08 Fuel oil storage tanks

Importance Rating: 3.2 3.3

Technical Reference: Curve D-X-20 Rev 1 (provided to students)
T.S. 3.8.1.1 page 3/4 8-1 (page 331)
APP-ALB-025 Rev. 11, Window 4-3

References to be provided: Provide curve D-X-20 Rev 1

Learning Objective: DE, Obj. 13a

Question Origin: Modified - 2009A HNP NRC RO Exam Q#51 (see below)

Comments: KA is met by evaluating the impact that the loss of fuel oil storage tank level would have on EDG operability.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009A NRC RO ONLY QUESTIONS FINAL

1. 2009A NRC RO 051/NEW/H/3/T.S. 3.8.1.1/YES/2009A NRC RO/064K6.08/

The Main Control Room receives the following reports from the field:

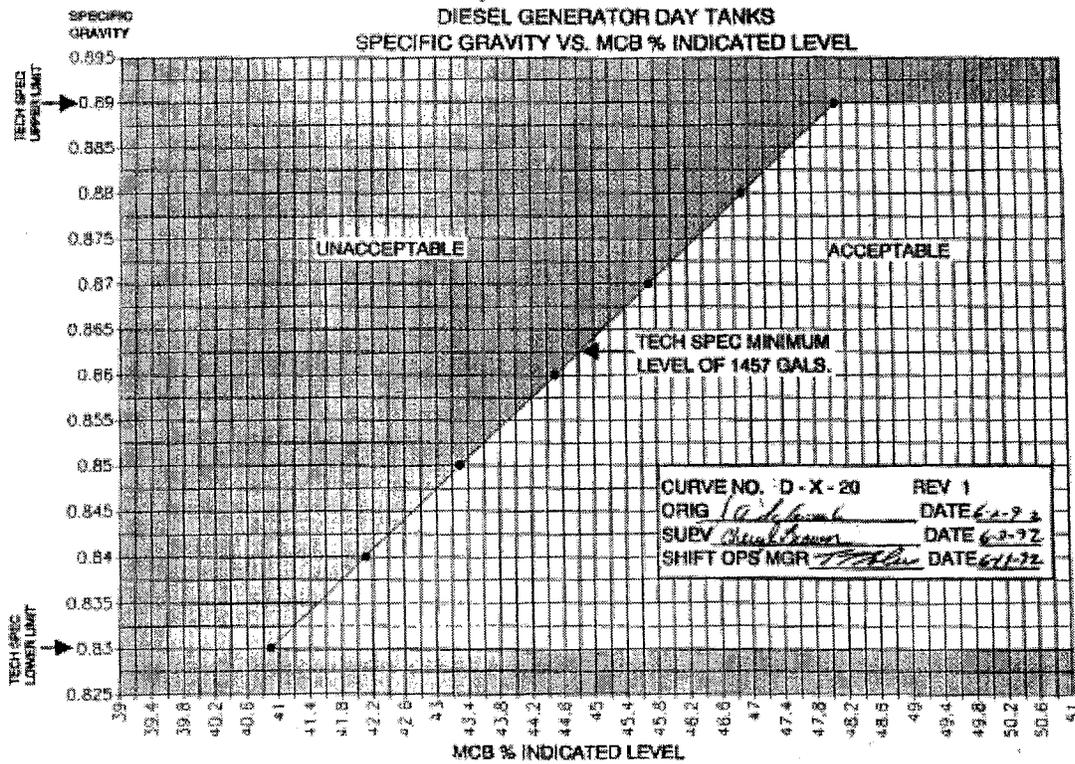
- Specific gravity of the fuel oil in both Fuel Oil Day Tanks is .835
- 'A' EDG Fuel Oil Day Tank indicated level is 47%
- 'A' EDG Fuel Oil Storage Tank indicates 90,000 gallons
- 'B' EDG Fuel Oil Day Tank indicated level is 42%
- 'B' EDG Fuel Oil Storage Tank indicates 110,000 gallons

Which ONE of the following is the current OPERABILITY status of the Emergency Diesel Generators? (Reference provided)

- | <u>'A' EDG</u> | <u>'B' EDG</u> |
|--|----------------|
| A. OPERABLE | OPERABLE |
| B. OPERABLE | INOPERABLE |
| <input checked="" type="radio"/> C. INOPERABLE | OPERABLE |
| D. INOPERABLE | INOPERABLE |

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS



QUESTIONS REPORT

for 2009A NRC RO ONLY QUESTIONS FINAL

51. 2009A NRC RO 051

The Main Control Room receives the following reports from the field:

- Specific gravity of the fuel oil in both Fuel Oil Day Tanks is .835
- 'A' EDG Fuel Oil Day Tank indicated level is 47%
- 'A' EDG Fuel Oil Storage Tank indicates 90,000 gallons
- 'B' EDG Fuel Oil Day Tank indicated level is 42%
- 'B' EDG Fuel Oil Storage Tank indicates 110,000 gallons

Which ONE of the following is the current OPERABILITY status of the Emergency Diesel Generators? (Reference provided)

- | <u>'A' EDG</u> | <u>'B' EDG</u> |
|---|----------------|
| A. OPERABLE | OPERABLE |
| B. OPERABLE | INOPERABLE |
| <input checked="" type="checkbox"/> C. INOPERABLE | OPERABLE |
| D. INOPERABLE | INOPERABLE |

Origin: MODIFIED
 Difficulty:
 Ref. Provided: CURVE D-X-20
 K/A 1: 064 K6.08

Cog Level: HIGHER
 Reference:
 Key Words:
 K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

52. 2009B NRC RO 052

The Treated Laundry and Hot Shower Tank Pump Discharge radiation monitor uses a (1) detector because of the detector's ability to detect (2) radiation.

- | | <u> (1) </u> | <u> (2) </u> |
|----|----------------|----------------|
| A. | Scintillation | beta |
| B✓ | Scintillation | gamma |
| C. | G-M Tube | beta |
| D. | G-M Tube | gamma |

Plausibility and Answer Analysis

- A. *Incorrect. Scintillation is correct. Beta is incorrect but plausible since some scintillation detectors detect beta. Beta detection would not be utilized for water systems. Beta scintillation detectors are used in the plant for gas systems.*
- B. *Correct.*
- C. *Incorrect. G-M Tube is incorrect but plausible since it is used primarily in area radiation monitors not process monitors (scintillation). Beta is incorrect but plausible since some scintillation detectors detect beta. Beta detection would not be utilized for water systems. Beta scintillation detectors are used in the plant for gas systems.*
- D. *Incorrect. G-M Tube is incorrect but plausible since it is used primarily in area radiation monitors not process monitors (scintillation). Gamma is correct for G-M Tube.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

073 K5.01

073 Process Radiation Monitoring (PRM) System

K5 Knowledge of the operational implications as they apply to concepts as they apply to the PRM system:

(CFR: 41.5 / 45.7)

K5.01 Radiation theory, including sources, types, units, and effects

Importance Rating: 2.5 3.0

Technical Reference: Student Text Radiation Monitors pp 9, 34, Rev 4

References to be provided: None

Learning Objective: Student Text Radiation Monitors Obj. 2

Question Origin: NEW

Comments: KA met since question discriminates the type of radiation that the detector is monitoring.

Tier/Group: T2G1

MAJOR COMPONENTS

depressing the C/S button on an RM-11, RM-23P, RM-23L (if applicable), or an RM-23 (if applicable).

Scintillation Detector Assemblies

Scintillation detectors are typically used in airborne or gaseous effluent process monitors. Some liquid process monitors also utilize scintillation detectors. Scintillation Detectors, dependent on the monitor, can detect gamma and/or beta radiation. Most gas applications use the beta scintillation detectors. The liquid applications will typically use the gamma scintillation detectors because liquid's self shielding makes beta detectors less effective.

9



34

Origin: NEW

Difficulty:

Ref. Provided:

K/A 1: 073 K5.01

Cog Level: LOWER

Reference:

Key Words:

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

53. 2009B NRC RO 053

Given the following plant conditions:

- The plant was in Mode 4 when a Loss of Off-site power occurred
- The 'A' EDG failed to start
- The 'B' NSW pump is tagged out for maintenance

Which ONE of the following choices correctly completes the statement below?

ESW is providing flow to CCW Heat Exchanger(s) (1) with ESW return header flow aligned to the (2).

- A✓ (1) 'B' ONLY
(2) Auxiliary Reservoir
- B. (1) 'B' ONLY
(2) Cooling Tower Basin
- C. (1) 'A' AND 'B'
(2) Auxiliary Reservoir
- D. (1) 'A' AND 'B'
(2) Cooling Tower Basin

Plausibility and Answer Analysis

- A. *Correct. When ESW pump 1B starts, 1SW-40 closes automatically to isolate the A ESW header supplying CCW cooler 'A' to ensure flow is provided to the 'B' header only, which supplies the 'B' CCW heat exchanger. 1SW-271 opens to align return header flow to the aux reservoir, and 1SW-274 closes to isolate header return to the cooling tower basin which is the normal return header flow path.*
- B. *Incorrect. The first part is correct (see A above). The second part is incorrect since 1SW-271 opens to align return header flow to the aux reservoir, and 1SW-274 closes to isolate header return to the cooling tower basin*
- C. *Incorrect. The first part is incorrect. The ESW headers are initially cross connected. Under these conditions, 1SW-40 closes automatically to isolate the A ESW header supplying CCW cooler 'A'. The second part is correct (see A above).*
- D. *Incorrect. The ESW headers are initially cross connected. Under these conditions, 1SW-40 closes automatically to isolate the A ESW header supplying CCW cooler 'A'. The second part is incorrect since 1SW-271 opens to align return header flow to the aux reservoir, and 1SW-274 closes to isolate header return to the cooling tower basin*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

076 K1.01

076 Service Water System (SWS)

K1 Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems:

(CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.01 CCW system

Importance Rating: 3.4 3.3

Technical Reference: AOP-022, section 3.0 step 5, Rev 29

References to be provided: None

Learning Objective: SWS Obj 5

Question Origin: New

Comments: KA is met by evaluating the cause-effect relationship when NSW is lost due to the loss of off site power with the subsequent restart of the 'B' ESW pump, resulting in isolation of the 'A' CCW cooling supply.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

LOSS OF SERVICE WATER																											
INSTRUCTIONS	RESPONSE NOT OBTAINED																										
<p>3.0 OPERATOR ACTIONS</p> <p>4. ALIGN NSW to ESW, as follows:</p> <table style="width:100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;"> <input type="checkbox"/> a. VERIFY OPEN 1SW-276, Headers A & B Return To Normal SW Header. </td> <td style="width: 50%; vertical-align: top; padding: 5px;"> <input type="checkbox"/> b. CHECK ESW Header B affected. </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> b. CHECK ESW Header A affected. </td> <td style="padding: 5px;"> <input type="checkbox"/> (1) VERIFY B ESW Pump - OFF. </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> (1) VERIFY A ESW Pump - OFF. </td> <td style="padding: 5px;"> <input type="checkbox"/> (2) VERIFY SHUT 1SW-271, Header B To Auxiliary Reservoir. </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> (2) VERIFY SHUT 1SW-270, Header A To Auxiliary Reservoir. </td> <td style="padding: 5px;"> <input type="checkbox"/> (3) OPEN 1SW-40, Normal SW Supply To Header B. </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> (3) OPEN 1SW-39, Normal SW Supply To Header A. </td> <td style="padding: 5px;"> <input type="checkbox"/> (4) OPEN 1SW-274, Header B Return To Normal Header. </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> (4) OPEN 1SW-275, Header A Return To Normal Header. </td> <td></td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> c. GO TO Section 3.1 (page 21). </td> <td></td> </tr> </table> <p>5. RESTORE ESW Header with ESW Pump(s), as follows:</p> <table style="width:100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;"> <input type="checkbox"/> a. CHECK ESW Header A affected. </td> <td style="width: 50%; vertical-align: top; padding: 5px;"> <input type="checkbox"/> a. CHECK ESW Header B affected. </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> (1) VERIFY ESW Pump A - STARTED. </td> <td style="padding: 5px;"> <input type="checkbox"/> (1) VERIFY ESW Pump B - STARTED. </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> (2) VERIFY OPEN 1SW-270, Header A To Auxiliary Reservoir. </td> <td style="padding: 5px;"> <input type="checkbox"/> (2) VERIFY OPEN 1SW-271, Header B To Auxiliary Reservoir. </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> (3) VERIFY SHUT 1SW-275, Header A Return To Normal Header. </td> <td style="padding: 5px;"> <input type="checkbox"/> (3) VERIFY SHUT 1SW-274, Header B Return To Normal Header. </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> (4) VERIFY SHUT 1SW-39, Normal SW Supply To Header A. </td> <td style="padding: 5px;"> <input type="checkbox"/> (4) VERIFY SHUT 1SW-40, Normal SW Supply To Header B. </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> b. GO TO Section 3.2 (page 30). </td> <td></td> </tr> </table>		<input type="checkbox"/> a. VERIFY OPEN 1SW-276, Headers A & B Return To Normal SW Header.	<input type="checkbox"/> b. CHECK ESW Header B affected.	<input type="checkbox"/> b. CHECK ESW Header A affected.	<input type="checkbox"/> (1) VERIFY B ESW Pump - OFF.	<input type="checkbox"/> (1) VERIFY A ESW Pump - OFF.	<input type="checkbox"/> (2) VERIFY SHUT 1SW-271, Header B To Auxiliary Reservoir.	<input type="checkbox"/> (2) VERIFY SHUT 1SW-270, Header A To Auxiliary Reservoir.	<input type="checkbox"/> (3) OPEN 1SW-40, Normal SW Supply To Header B.	<input type="checkbox"/> (3) OPEN 1SW-39, Normal SW Supply To Header A.	<input type="checkbox"/> (4) OPEN 1SW-274, Header B Return To Normal Header.	<input type="checkbox"/> (4) OPEN 1SW-275, Header A Return To Normal Header.		<input type="checkbox"/> c. GO TO Section 3.1 (page 21).		<input type="checkbox"/> a. CHECK ESW Header A affected.	<input type="checkbox"/> a. CHECK ESW Header B affected.	<input type="checkbox"/> (1) VERIFY ESW Pump A - STARTED.	<input type="checkbox"/> (1) VERIFY ESW Pump B - STARTED.	<input type="checkbox"/> (2) VERIFY OPEN 1SW-270, Header A To Auxiliary Reservoir.	<input type="checkbox"/> (2) VERIFY OPEN 1SW-271, Header B To Auxiliary Reservoir.	<input type="checkbox"/> (3) VERIFY SHUT 1SW-275, Header A Return To Normal Header.	<input type="checkbox"/> (3) VERIFY SHUT 1SW-274, Header B Return To Normal Header.	<input type="checkbox"/> (4) VERIFY SHUT 1SW-39, Normal SW Supply To Header A.	<input type="checkbox"/> (4) VERIFY SHUT 1SW-40, Normal SW Supply To Header B.	<input type="checkbox"/> b. GO TO Section 3.2 (page 30).	
<input type="checkbox"/> a. VERIFY OPEN 1SW-276, Headers A & B Return To Normal SW Header.	<input type="checkbox"/> b. CHECK ESW Header B affected.																										
<input type="checkbox"/> b. CHECK ESW Header A affected.	<input type="checkbox"/> (1) VERIFY B ESW Pump - OFF.																										
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<input type="checkbox"/> (2) VERIFY SHUT 1SW-270, Header A To Auxiliary Reservoir.	<input type="checkbox"/> (3) OPEN 1SW-40, Normal SW Supply To Header B.																										
<input type="checkbox"/> (3) OPEN 1SW-39, Normal SW Supply To Header A.	<input type="checkbox"/> (4) OPEN 1SW-274, Header B Return To Normal Header.																										
<input type="checkbox"/> (4) OPEN 1SW-275, Header A Return To Normal Header.																											
<input type="checkbox"/> c. GO TO Section 3.1 (page 21).																											
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<input type="checkbox"/> (1) VERIFY ESW Pump A - STARTED.	<input type="checkbox"/> (1) VERIFY ESW Pump B - STARTED.																										
<input type="checkbox"/> (2) VERIFY OPEN 1SW-270, Header A To Auxiliary Reservoir.	<input type="checkbox"/> (2) VERIFY OPEN 1SW-271, Header B To Auxiliary Reservoir.																										
<input type="checkbox"/> (3) VERIFY SHUT 1SW-275, Header A Return To Normal Header.	<input type="checkbox"/> (3) VERIFY SHUT 1SW-274, Header B Return To Normal Header.																										
<input type="checkbox"/> (4) VERIFY SHUT 1SW-39, Normal SW Supply To Header A.	<input type="checkbox"/> (4) VERIFY SHUT 1SW-40, Normal SW Supply To Header B.																										
<input type="checkbox"/> b. GO TO Section 3.2 (page 30).																											
AOP-022	Rev. 29																										
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Origin: NEW

Difficulty:

Ref. Provided:

K/A 1: 076 K1.01

Cog Level: HIGHER

Reference:

Key Words:

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

54. 2009B NRC RO 054

Given the following plant conditions:

- The plant is operating at 100% power
- A loss of Instrument Air is in progress
- At 1015, the crew implemented AOP-017, Loss of Instrument Air
- Instrument Air pressure continues to lower as follows:

<u>Time</u>	<u>IA Pressure</u>
1020	89 psig
1030	83 psig
1050	58 psig
1110	34 psig

Which ONE of the following identifies the FIRST time at which tripping the reactor is required IAW AOP-017?

- A. 1020
- B. 1030
- C✓ 1050
- D. 1110

Plausibility and Answer Analysis

- A. *Incorrect. Plausible since 90 psig is identified in AOP-017 Attachment 7 as the point where Service Air is isolated from Instrument Air.*
- B. *Incorrect. Plausible since 85 psig is identified in AOP-017 Attachment 7 as the point where RCS letdown valves start to go to mid-position.*
- C. *Correct. FW flow control valves auto close when IA pressure reaches 60 psig, continuous action step 1 requires maintaining MFW flow to ALL SGs and trip the reactor if above the POAH and not maintained.*
- D. *Incorrect. Plausible since AOP-017 step 2 directs tripping the reactor if IA pressure is not maintained above 35 psig.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

078 G2.4.47

078 Instrument Air System (IAS)

2.4 Emergency Procedures / Plan

2.4.47 Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.

| (CFR: 41.10 / 43.5 / 45.12)

Importance Rating: 4.2 4.2

Technical Reference: AOP-017 Attachment 7, pg 57 Rev 30
AOP-017, step 1, pg 4 Rev 30

References to be provided: NONE

Learning Objective: ISA Text Obj 2

Question Origin: NEW

Comments: KA is met by evaluating IA trends and determining appropriate time to trip the reactor as defined by AOP-017.

Tier/Group: T2G1

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

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Origin:	NEW	Cog Level:	HIGHER
Difficulty:		Reference:	
Ref. Provided:		Key Words:	
K/A 1:	078 G2.4.47	K/A 2:	

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

55. 2009B NRC RO 055

Which ONE of the following describes the automatic operation of Containment Normal Purge Damper, CP-D6-1, Fan Suction Damper to AH-82-1A?

CP-D6-1 modulates to maintain _____.

- A. flow at a programmed setpoint.
- B. differential pressure at a programmed setpoint.
- C. flow at a setpoint established using a 10 turn potentiometer.
- D. differential pressure at a setpoint established using a 10 turn potentiometer.

Plausibility and Answer Analysis

- A. Incorrect. Plausible since the controller does influence flow but flow is controlled based on differential pressure, not a constant flow.*
- B. Incorrect. Plausible since the controller does control differential pressure, but the differential pressure is based on a variable setpoint input by the operator.*
- C. Incorrect. Plausible since a 10 turn potentiometer is used to control parameters, but a constant flow rate is not maintained by the controller.*
- D. Correct. Differential pressure is maintained by a variable setpoint input by the operator using a 10 turn potentiometer.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

103 A4.01

103 Containment System

A4 Ability to manually operate and/or monitor in the control room:

(CFR: 41.7 / 45.5 to 45.8)

A4.01 Flow control, pressure control, and temperature control valves, including pneumatic valve controller

Importance Rating: 3.2* 3.3

Technical Reference: OP-168, Rev 31, section 5.1.2 step 3 pp 8

References to be provided: None

Learning Objective: CVS Obj 5

Question Origin: NEW

Comments: KA is met by measuring ability to monitor proper operation pressure control valves.

Tier/Group: T2G1

QUESTIONS REPORT for 2009B NRC RO QUESTIONS

5.1.2. Procedure Steps

NOTE: The controllers in the following steps will normally be operated in AUTO. If MANUAL operation of a controller is desired, the output of the controller should be adjusted to achieve the required flow and differential pressure.

NOTE: If continuous cleanup of the Containment atmosphere is desired, it is permissible to run an ARR Fan without the Normal Containment Purge System in service.

1. **START** S-1A (1B), Air Radioactivity Removal Fan. _____
2. **VERIFY** ARR to CP AR-D3 (AR-D4) on SLB-7, Window 3-4 (4-4) opens. _____
3. **SET** PDK-7692, Norm Purge Inlet Flow CP-D6 & CP-D7, potentiometer to 6.25 to maintain -0.375 INWG. _____
4. **VERIFY** FK-7624, Norm Purge Exh Flow CP-B9, in AUTO. _____
5. **OPEN** the following valves:
 - a. Normal Purge Inlet/Discharge 1CP-6 & 3 SB _____
 - b. Normal Purge Inlet/Discharge 1CP-9 & 5 SA _____

NOTE: Normal Purge Supply Fan AH-82A (B) will start when containment ΔP reaches -0.400 INWG per computer point PCP7611.)

6. **PLACE** control switch for Normal Purge Supply Fan AH-82A (B) to START. _____
7. **VERIFY** CP-D6 (CP-D7) on SLB-7, Window 3-3 (4-3), modulates open. _____

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Origin: NEW	Cog Level: LOWER
Difficulty:	Reference:
Ref. Provided:	Key Words:
K/A 1: 103 A4.01	K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

56. 2009B NRC RO 056

Which ONE of the following identifies the power supplies to the 'A' and 'B' Rod Drive Motor Generator (MG) sets?

	<u>'A' MG set</u>	<u>'B' MG set</u>
A✓	1D2	1E2
B.	1E2	1D2
C.	1D3	1E3
D.	1E3	1D3

Plausibility and Answer Analysis

- A Correct. Power for the MG sets 1A and 1B is supplied by 480 V AC auxiliary buses 1D2 and 1E2.*
- B Incorrect. This is plausible because it represents the correct power supplies but reversed*
- C Incorrect. Plausible since the RDMG sets are supplied by 480V power supplies downstream of the 6.9KV Aux Buses D and E but it is 1D2 and 1E2 supplying power, not 1D3 and 1E3.*
- D Incorrect. Plausible since the RDMG sets are supplied by 480V power supplies downstream of the 6.9KV Aux Buses D and E but it is 1D2 and 1E2 supplying power, not 1D3 and 1E3.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

001 K2.05

001 Control Rod Drive System

K2 Knowledge of bus power supplies to the following:

(CFR: 41.7)

K2.05 M/G sets

Importance Rating: 3.1* 3.5

Technical Reference: OP-104 Rev. 28, Page 46

References to be provided: None

Learning Objective: LP-EOP-3.15, Obj. 5b

Question Origin: New

Comments: KA is met by asking applicant to identify the power supplies associated with the M/G sets

Tier/Group: T2G2

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: NEW

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 001 K2.05

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

57. 2009B NRC RO 057

Given the following plant conditions:

- The plant is operating at 90% power
- Automatic PRZ level control failed and PRZ level control is now in MANUAL
- PRZ level is stable at 50%

Which ONE of the following choices correctly completes the statements below?

Based on these conditions PRZ level should be returned to (1).

Per the FSAR the basis for this level is to (2) following a Reactor trip.

- A✓ (1) 56.5%
- (2) ensure PRZ heaters remain covered
- B. (1) 56.5%
- (2) prevent letdown isolation
- C. (1) 54%
- (2) ensure PRZ heaters remain covered
- D. (1) 54%
- (2) prevent letdown isolation

Plausibility and Answer Analysis

From FSAR, section 7.7.2-6, page 7.7.2-7, amendment 51: The pressurizer pressure and level fall rapidly during the transient because of coolant contraction. The pressurizer water level is programmed so that the level following the turbine and reactor trip is above the heaters.

A Correct. Program level should be $(0.90 \times 35\%) + 25\% = 56.5\%$. Per the FSAR, the reason for maintaining pressurizer program level is to maintain the pressurizer heaters covered during a post trip condition.

B Incorrect. First part is correct. The second part is plausible because the PZR heaters and letdown isolation are both interlocked at 17% PZR level.

C Incorrect. First part is plausible since an error could be made in calculating required pressurizer level $0.90 \times 60 = 54\%$. Second part is correct.

D Incorrect. Correct. First part is plausible since an error could be made in calculating required pressurizer level $0.90 \times 60 = 54\%$. The second part is plausible because the PZR heaters and letdown isolation are both interlocked at 17% PZR level.

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

011 K5.09

011 Pressurizer Level Control System (PZR LCS)

K5 Knowledge of the operational implications of the following concepts as they apply to the PZR LCS:

(CFR: 41.5 / 45.7)

K5.09 Reason for manually controlling PZR level

Importance Rating: 2.6 2.7*

Technical Reference: FSAR section 7.7.2-6, pp 7.7.2-7, Amendment 51

References to be provided: None

Learning Objective: PZRLC Obj 3

Question Origin: NEW

Comments: KA is met by asking for basis for manually controlling to within program level

Tier/Group: T2G2

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

SHNPP FSAR

The feedwater flow is cut off following a reactor trip when the average coolant temperature decreases below a given temperature or when the steam generator water level reaches a given high level.

Additional feedwater makeup is then controlled manually to restore and maintain steam generator water level while assuring that the reactor coolant temperature is at the desired value. Residual heat removal is maintained by the steam header pressure controller (manually selected) which controls the amount of steam flow to the condensers. This controller operates a portion of the same steam dump valves to the condensers which are used during the initial transient following turbine and reactor trip.

The pressurizer pressure and level fall rapidly during the transient because of coolant contraction. The pressurizer water level is programmed so that the level following the turbine and reactor trip is above the heaters. However, if the heaters become uncovered following the trip, the CVCS will provide full charging flow to restore water level in the pressurizer. Heaters are then turned on to restore pressurizer pressure to normal.

The Steam Dump and Feedwater Control Systems are designed to prevent the average coolant temperature from falling below the programmed no-load temperature following the trip to ensure adequate reactivity shutdown margin.

7.7.2-7

Origin: NEW

Difficulty:

Ref. Provided:

K/A 1: 011 K5.09

Cog Level: HIGHER

Reference:

Key Words:

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

58. 2009B NRC RO 058

Given the following plant conditions:

- At 1000

An automatic Reactor Trip occurred

Multiple rods are stuck out

- At 1005

Power Range channels indicate 3% power

Intermediate Range SUR channels are at 0 DPM and stable

Which ONE of the following choices correctly completes the statement below?

The current condition of the Reactor IAW FRP-S.1 is (1) AND the preferred source of water IAW with AOP-002, Emergency Boration is from the (2).

A. (1) subcritical

(2) RWST

B. (1) subcritical

(2) BAT

C. (1) critical

(2) RWST

D. (1) critical

(2) BAT

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

- A. *Incorrect. The first part is incorrect. It is plausible since the power level is <5% as defined by FRP-S.1 foldout page, but with SUR at 0 DPM, the reactor is not shutdown. The second part is correct. Per AOP-002, the preferred source sequence is from the BAT then the RWST. It is plausible since the RWST is an identified source of boric acid in FRP-S.1.*
- B. *Incorrect. The first part is incorrect. It is plausible since the power level is <5% as defined by FRP-S.1 foldout page, but with SUR at 0 DPM, the reactor is not shutdown. The second part is incorrect. Per AOP-002, the preferred source sequence is from the BAT then the RWST. It is plausible since the RWST is an identified source of boric acid in FRP-S.1.*
- C. *Incorrect. The first part is correct. The reactor is not shutdown. The foldout page for FRP-S.1 defines the reactor shutdown as power range channels less than 5% AND IR SURs negative. The second part is incorrect. Per AOP-002, the preferred source sequence is from the BAT then the RWST.*
- D. *Correct. The reactor is not shutdown. The foldout page for FRP-S.1 defines the reactor shutdown as power range channels less than 5% AND IR SURs negative. The second part is correct. Per AOP-002, the preferred source sequence is from the BAT then the RWST.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

014 G2.4.21

014 Rod Position Indication System (RPIS)

2.4 Emergency Procedures / Plan

2.4.21 Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.

(CFR: 41.7 / 43.5 / 45.12)

Importance Rating: 4.0 4.6

Technical Reference: FRP-S.1 Foldout Page (page 9), Rev 15 and FRP-S.1 step 6 and 7 on pages 5/6.

References to be provided: NONE

Learning Objective: AOP-LP-3.1 Obj. 2

Question Origin: NEW

Comments: KA is matched since RPI (> 2 rods dropped) is utilized to assess the status of reactivity conditions and determining the required reactivity condition to be established.

Tier/Group: T2G2

FOLDOUT

REACTOR SUBCRITICALITY CRITERIA

IF both of the following occur:

Power range channels - LESS THAN 5%

Intermediate range startup rate channels - NEGATIVE

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6. Initiate Emergency Boration of RCS:

a. Check SI flow - GREATER THAN 200 GPM

a. GO TO Step 6c.

b. GO TO Step 6d.

c. Emergency borate from the HAT:

c. Observe CAUTION prior to Step 7 AND GO TO Step 7.

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7. Emergency borate from the RWST:

a. Emergency borate from the RWST:

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QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 014 G2.4.21

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

59. 2009B NRC RO 059

Given the following plant conditions:

- The plant was operating at 100% power when the Reactor Tripped
- IR NI-35 did not respond as expected due to a total loss of compensating voltage
- IR NI-36 responded normally

Which ONE of the following describes Source Range instrument response to these conditions?

- A. BOTH SR NIs will automatically energize
- B. ONLY SR channel NI-31 will automatically energize
- C. ONLY SR channel NI-32 will automatically energize
- D. NEITHER SR NI will automatically energize

Plausibility and Answer Analysis

- A. Incorrect. Plausible since one IR channel is below P-6 and SR NIs reset automatically when IR below P-6, but must have 2/2 IR channels <P-6*
- B. Incorrect. Plausible since one IR channel is below P-6 and SR NIs reset automatically when IR below P-6, but must have 2/2 IR channels <P-6 and SR resets are not train-related*
- C. Incorrect. Plausible since one IR channel is below P-6 and SR NIs reset automatically when IR below P-6, but must have 2/2 IR channels <P-6 and SR resets are not train-related*
- D. Correct. Both IR channels must be below the reset for P-6 for the SR NIs to automatically energize.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

015 A1.03

015 Nuclear Instrumentation System

A1 Ability to predict and/or monitor changes in parameters to prevent exceeding design limits associated with operating the NIS controls including:

(CFR: 41.5 . 45.5)

A1.03 NIS power indication

Importance Rating: 3.7 3.7

Technical Reference: OP-105 section 7.1.2, pp9 Rev 25

References to be provided: None

Learning Objective: Student Text NIs Obj. 8

Question Origin: Bank

Comments: KA met by measuring expected response for IR instrumentation to automatically energize SR instrumentation to allow monitoring of Reactor behavior during shutdown conditions.

Tier/Group: T2G2

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS
REFERENCE USE

6.0 NORMAL OPERATION

NR-45 is normally selected to record the highest Power Range channel on one pen. The other pen may be selected to an Intermediate Range channel or a ΔF channel.

7.0 SHUTDOWN

7.1. Normal Plant Shutdown (MODE 1 to MODE 3)

7.1.1. Initial Conditions

1. The Plant is in MODE 1 and a shutdown is in progress. _____

7.1.2. Procedure Steps

CAUTION

Both Intermediate Range channels must be below the P-6 reset of 5×10^{-11} amps for Source Range high voltage to automatically re-energize. If one Intermediate Range channel fails to drop below the P-6 reset when core conditions indicate that the channel should have, the Source Range high voltage will have to be manually energized.

1. **WHEN** Intermediate Range Power is less than 5×10^{-11} amps on both channels,
THEN CHECK the following:
 - At the Source Range Drawers, both Source Range Detectors are energized. _____
 - ALB-13-2-3, SOURCE RANGE LOSS OF DETECTOR VOLTAGE, not lit. _____
 - At the Bypass Permissive Light Panel, the following lights are de-energized:
 - SOURCE RANGE TRAIN A TRIP BLOCKED HI VOLT OFF (Window 1-2) _____
 - SOURCE RANGE TRAIN B TRIP BLOCKED HI VOLT OFF (Window 2-2) _____
 - IR PWR > P-6 SOURCE RANGE BLOCK PERMISSIVE (Window 1-5) _____

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Origin: BANK	Cog Level: HIGHER
Difficulty:	Reference:
Ref. Provided:	Key Words:
K/A 1: 015 A1.03	K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

60. 2009B NRC RO 060

Given the following plant conditions:

- The plant is operating at 90% power
- PT-446 fails low and AOP-001, Malfunction of Rod Control and Indication System, immediate actions are completed
- TURBINE FIRST STAGE PRESSURE CONTROL SELECTOR switch is taken to the CHAN 447 position

Which ONE of the following identifies (1) the status of the C-5, Low Power Block of Automatic Rod Withdrawal, light on the Bypass Permissive Light Panel AND (2) how automatic outward rod motion is currently affected?

- A. (1) illuminated
(2) blocked
- B. (1) illuminated
(2) unaffected
- C✓ (1) extinguished
(2) unaffected
- D. (1) extinguished
(2) blocked

Plausibility and Answer Analysis

C-5 is the Low Power Block of Automatic Rod Withdrawal. This is a 1 out of 1 Selected Interlock.

A. Incorrect. This is plausible as a two out of two coincidence but once 447 is selected the failed input is removed.

B. Incorrect. The light being illuminated is plausible as a two out of two coincidence but once 447 is selected the failed input is removed. Unaffected is plausible because C-5 does not affect manual rod withdrawal or automatic inward motion.

C. Correct. C-5 cleared once the failed input was selected out and outward rod motion was no longer affected

D. Incorrect. This is plausible as a two out of two coincidence but once 447 is selected the failed input is removed.

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

016 A4.01

016 Non-Nuclear Instrumentation System (NNIS)

A4 Ability to manually operate and/or monitor in the control room:
(CFR: 41.7 / 45.5 to 45.8)

A4.01 NNI channel select controls

Importance Rating: 2.9* 2.8*

Technical Reference: 1364-00872

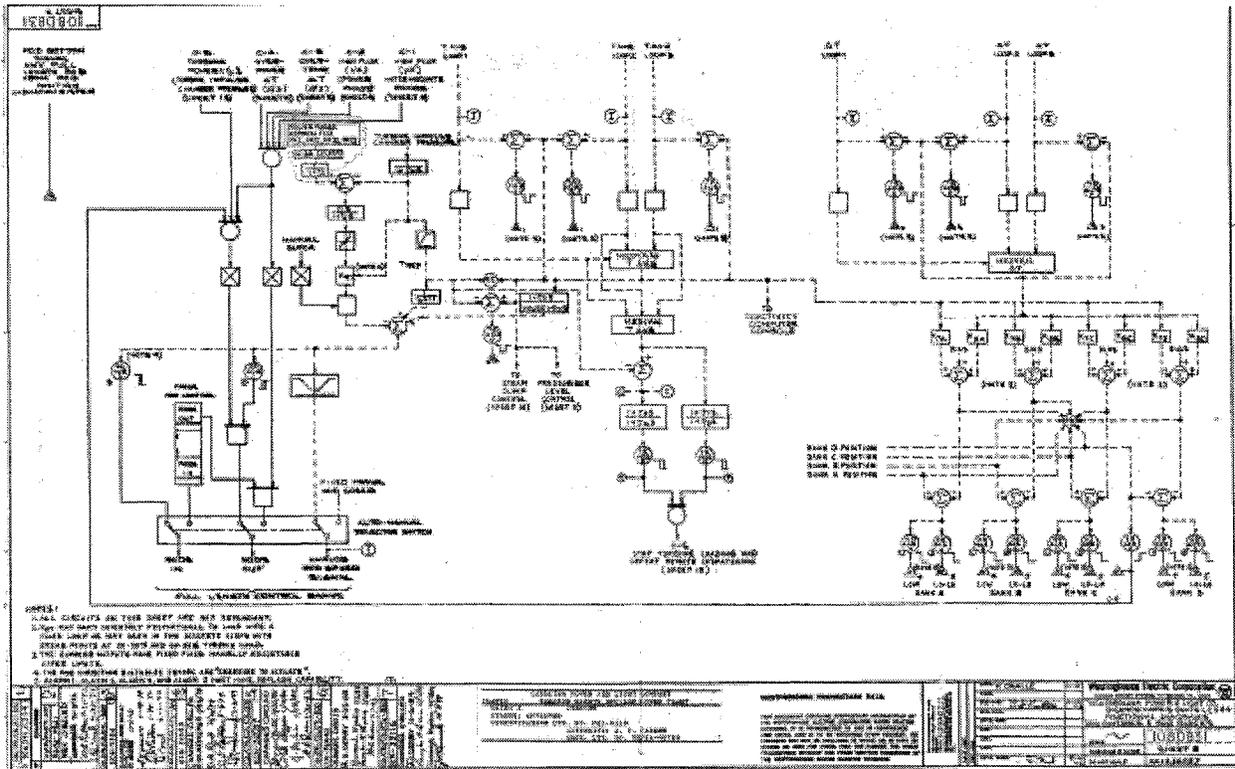
References to be provided: None

Learning Objective: Rod Control System Student Text Objective 8.e

Question Origin: NEW

Comments: KA is matched because question evaluates the effect of selected NNI controls on the Rod Control System.

Tier/Group: T2G2



Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 016 A4.01

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

61. 2009B NRC RO 061

Given the following plant conditions:

- An electrical fire in the MCR has resulted in the evacuation of the MCR to the ACP
- You have been directed to monitor in core thermocouple temperatures from outside the MCR per AOP-004, Remote Shutdown

Which ONE of the following identifies the location of the Inadequate Core Cooling Monitor local microprocessor panel AND the method of obtaining readings at the panel?

- A. PIC Room C-17/19 RAB 286' using CRT monitor and keyboard.
- B. PIC Room C-17/19 RAB 286' using thumbwheels set to specific points identified by a legend.
- C. PIC Room RAB 305' using CRT monitor and keyboard.
- D. PIC Room RAB 305' using thumbwheels set to specific points identified by a legend.

Plausibility and Answer Analysis

*A is incorrect, although location is correct. CRT is at the remote ICCM panel, not local
B is correct.
C is incorrect. Location is incorrect and display is incorrect
D is incorrect. Location is incorrect but display is correct.*

Lower cognitive level item requires applicant to know location and equipment available at the location

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

017 A3.02

017 In-Core Temperature Monitor System (ITM)

A3 Ability to monitor automatic operation of the ITM system including:

(CFR: 41.7 / 45.5)

A3.02 Measurement of in-core thermocouple temperatures at panel outside control room

Importance Rating: 3.4* 3.1*

Technical Reference: AOP-004, rev 46, section 3.1 step 43.c, pp 50

References to be provided: None

Learning Objective: Inadequate Core Cooling Monitor Text Obj 5

Question Origin: Bank

Comments: KA met by evaluating how in-core thermocouple temperatures are obtained outside the control room.

Tier/Group: T2G2

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

REMOTE SHUTDOWN		
INSTRUCTIONS	RESPONSE NOT OBTAINED	
<p>3.1 Remote Shutdown Due To Fire</p> <p>43. (continued)</p> <p><u>ACP / Unit SCO</u></p> <p>* <input type="checkbox"/> b. CONTROL the following to maintain RHR flow rate 2000 to 3750 GPM:</p> <ul style="list-style-type: none"> • FK-605B2 RHR Heat Xchg B Byp Flow Cont-1RH-58 • HC-603B2 RHR Heat Xchg B Out Flow Cont-1RH-66 <p><u>286' RAB / EXTRA</u></p> <p>* <input type="checkbox"/> c. MONITOR RCS cooldown rate using the following:</p> <ul style="list-style-type: none"> • A Train Core Exit Thermocouples read on RVUIS cabinet in PIC C17 Room (if available) <p>OR</p> <ul style="list-style-type: none"> • Local temperature indicator TI-5551B on the outlet of RHR Heat Exchanger B <p><u>286' RAB / EXTRA</u></p> <p>* <input type="checkbox"/> d. RECORD cooldown rate using Attachment 6, Plant Cooldown Data Sheet.</p> <p><u>ACP / Unit SCO</u></p> <p>* <input type="checkbox"/> e. OPERATE SG PORVs to dump steam from all available SGs, to cool U-tubes.</p> <p><u>ACP / STA AND Unit SCO</u></p> <p><input type="checkbox"/> 44. CONSULT with Plant Operations staff concerning long term plant status and additional recovery actions.</p>		
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Origin: BANK

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 017 A3.02

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

62. 2009B NRC RO 062

Given the following plant conditions:

- A LOCA has occurred
- Current containment conditions are as follows:
 - Containment Pressure is 3.5 psig
 - Containment temperature is 120°F
 - Hydrogen concentration is 2.0%
- Containment temperature prior to the LOCA was 90°F

IAW OP-125, Post Accident Hydrogen System, which ONE of the following identifies

(1) the power setting for the "B" Hydrogen Recombiner

AND

(2) the hydrogen concentration maximum limit for Hydrogen Recombiner operation?

(Reference provided)

A. (1) 46.3 KW

(2) 3.0%

B. (1) 46.3 KW

(2) 4.0%

C. (1) 48.3 KW

(2) 4.0%

D. (1) 48.3 KW

(2) 3.0%

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

A. Incorrect. The first part is plausible if the candidate were to use the post loca temperature of 120 instead of the pre-loca temperature of 90. Using a 1.15 correction factor and the B power correction factor, the required KW is $40.24 \text{ kw} \times 1.15 = 46.3 \text{ kw}$. The second part is incorrect but plausible since 3.0 % is the procedural guidance to place the second recombiner in service.

B. Incorrect. The first part is plausible if the candidate were to use the post loca temperature of 120 instead of the pre-loca temperature of 90. Using a 1.15 correction factor and the B power correction factor, the required KW is $40.24 \text{ kw} \times 1.15 = 46.3 \text{ kw}$. The second part is correct. OP-125 precaution and limitations #1 states that the recombiners should not be operated if containment H2 concentration is greater than or equal to 4%.

C. Correct. Using a 1.2 correction factor and the B power correction factor, the required KW is $40.24 \text{ kw} \times 1.2 = 48.3 \text{ kw}$. OP-125 precaution and limitations #1 states that the recombiners should not be operated if containment H2 concentration is greater than or equal to 4%.

D. Incorrect. Using a 1.2 correction factor and the B power correction factor, the required KW is $40.24 \text{ kw} \times 1.2 = 48.3 \text{ kw}$. The second part is incorrect but plausible since 3.0 % is the procedural guidance to place the second recombiner in service.

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

028 A2.02

028 Hydrogen Recombiner and Purge Control System (HRPS)

A2 Malfunctions or operations on the HRPS; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations:

(CFR: 41.5 / 43.5 / 45.3 / 45.13)

A2.02 LOCA condition and related concern over hydrogen

Importance Rating: 3.5 3.9

Technical Reference: OP-125, Attachment 6, pp. 51, Rev 22

References to be provided: OP-125, Attachment 6, Pressure Factor Determination

Learning Objective: Post Accident Hydrogen Control Student Text Objective
3.a

Question Origin: New

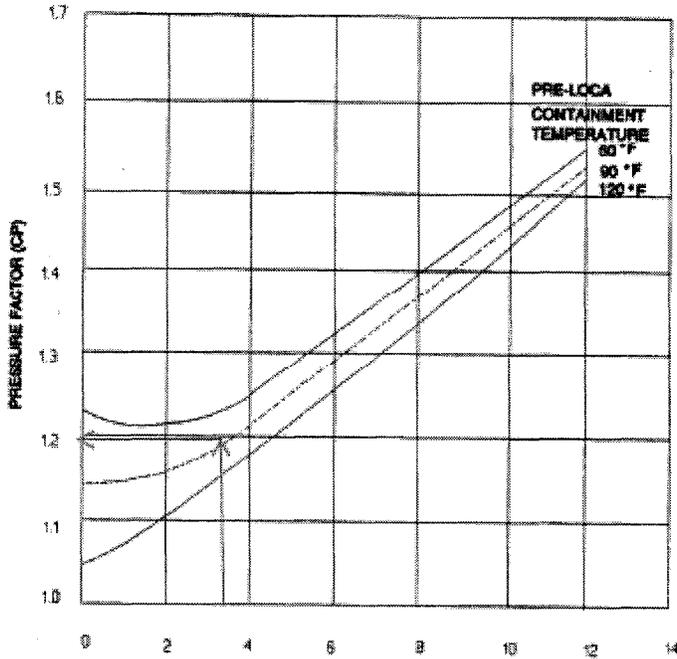
Comments: KA met by evaluating use of procedures to determine
operation requirements of the HRPS during LOCA
conditions with hydrogen in containment.

Tier/Group: T2G2

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

Attachment 6 - Pressure Factor Determination
Sheet 1 of 1



Post-LoCa Containment Pressure (PSIG)

Reference Power X CP = Required Power

'A' Recombiner 41.28 KW X ___ =

'B' Recombiner 40.24 KW X ___ =

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Origin: NEW

Difficulty:

Ref. Provided: OP-125 ATT. 6

K/A 1: 028 A2.02

Cog Level: HIGHER

Reference:

Key Words:

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

63. 2009B NRC RO 063

What is the initial impact of the 'B' Steam Generator MSIV closing when the plant is operating at 30% power on the following parameters?

	<u>'A' SG Steam Flow</u>	<u>'B' SG Level</u>
A.	rises	rises
B✓	rises	lowers
C.	lowers	rises
D.	lowers	lowers

Plausibility and Answer Analysis

Steam flow would rise on the 'A' and 'C' SGs as they pick up the additional load from the 'B' SG. The 'B' SG level would initially shrink because it is basically a down power for the 'B' SG.

A. Incorrect. 'A' SG steam flow response is correct. 'B' SG level response is incorrect.

B. Correct. 'A' SG steam flow response is correct. 'B' SG level response is correct.

C. Incorrect. 'A' SG steam flow response is incorrect. 'B' SG level response is incorrect.

D. Incorrect. 'A' SG steam flow response is incorrect. 'B' SG level response is correct.

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

035 K6.01

035 Steam Generator System (S/GS)

K6 Knowledge of the effect of a loss or malfunction on the following will have on the S/GS:

(CFR: 41.7 / 45.7)

K6.01 MSIVs

Importance Rating: 3.2 3.6

Technical Reference: Operator Fundamentals

References to be provided: None

Learning Objective: Steam Generator Student Text Objective 9

Question Origin: Bank

Comments: KA is matched by measuring ability to determine impact on SG levels and flow when a MSIV closes.

Tier/Group: T2G2

Origin: BANK

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 035 K6.01

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

64. 2009B NRC RO 064

Given the following plant conditions:

- A plant shutdown and cooldown to Cold Shutdown is in progress
- Tavg is 551°F and stabilizing
- The BOP identifies the Steam Dumps have closed
- Both steam dump interlock selector switches are taken to BYPASS and then back to ON
- The Bypass Permissive light "Low-Low Tavg Steam Dump Block (P-12) Bypassed" light is ON
- The 'B' train P-12 did NOT bypass

Which ONE of the following choices identifies how Steam Dumps will operate during these conditions?

- A. Three condenser Steam Dump valves can still be opened
- B. All six condenser Steam Dump valves can be opened
- C. Only the atmospheric Steam Dump valves can be opened
- D. None of the Steam Dumps can be opened

Plausibility and Answer Analysis

- A. *Incorrect. Plausible because the bypass permissive light is ON. But with only one train bypassed control air cannot get to any of the steam dumps due to the in series P-12 solenoid valves. Therefore none of the steam dumps can be opened.*
- B. *Incorrect. Plausible because during a cooldown below 553°F all 6 condenser steam dumps can be opened but only after the plant is in MODE 4 and I&C lift the P-12 leads. (GP-007 Section 5.2 step 16 NOTE p. 39)*
- C. *Incorrect. Plausible because the cooldown steam dumps exhaust to the condenser while the atmospheric dumps exhaust to the environment similar to the SG PORV's. If the applicant believes that the atmospheric dumps can operate at any time then it will not matter if P-12 was bypassed or not.*
- D. *Correct P-12 ($T_{avg} < 553^\circ F$ interlock) blocks the operation of all condenser and atmospheric steam dump valves. The permissive is met when RCS Tavg has decreased below 553°F with the STEAM DUMP INTERLOCK BYPASS TRAIN switches in ON. INTERLOCK BYPASS switch to INTLK BYP reenergizes the permissive solenoids on the three Group 1 condenser dump valves (cooldown dumps), allowing them to be modulated for continued cooldown. the permissive solenoid valves are in series. If one train does not reenergize air will not be supplied to any of the steam dumps therefore none of the steam dumps will be able to be opened.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

041 K4.09

041 Steam Dump System (SDS) and Turbine Bypass Control

K4 Knowledge of SDS design feature(s) and/or interlock(s) which provide for the following:

(CFR: 41.7)

K4.09 Relationship of low/low Tave setpoint in SDS to primary cooldown

Importance Rating: 3.0 3.3*

Technical Reference: Westinghouse logic drawing 1364-873 sheet 10

References to be provided: None

Learning Objective: Steam Dump System Student Text Objective 6.b

Question Origin: New

Comments: KA is matched by measuring recognition of Tavg interlock impact on Steam Dumps while conducting a plant cooldown.

Tier/Group: T2G2

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

65. 2009B NRC RO 065

The plant is operating at 75% power when the 'B' Condensate Pump trips.

Which ONE of the following identifies the expected response of the Condensate Booster Pumps (CBP) and Main Feedwater Pumps (MFPs)?

- A. ONLY 'B' CBP will trip
- B. ONLY 'B' MFP will trip
- C. 'B' CBP and 'B' MFP will trip
- D. No CBPs or MFPs will trip

Plausibility and Answer Analysis

- A. Incorrect. Plausible since the CBP trips, but the MFW pump trips also.*
- B. Incorrect. Plausible because the MFW pump does trip, but the CBP trips also.*
- C. Correct. The CBP and MFW pump trip under these conditions.*
- D. Incorrect. Plausible since one condensate train can support this power level.*

056 K1.03

056 Condensate System

K1 Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the following systems:

(CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.03 MFW

Importance Rating: 2.6* 2.6

Technical Reference: APP-ALB-019-5-3B and 3-4B, Rev 29

References to be provided: None

Learning Objective: Condensate and Feedwater Student Text Objective 9.c

Question Origin: NEW

Comments: KA is matched because question evaluates knowledge of the effect that a loss of a condensate pump has on the MFW system.

Tier/Group: T2G2

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

3-4B

DEVICES:
PS-2330B
PS-2330B1

SETPOINT:
LO - 195 psig (5 sec TD)
LO-LO 155 psig (5 sec TD)

**CNDST PUMP B
DISCH LO/LO-LO
PRESS**

REFLASH: YES

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
 - a. PI-2320, Cnds Pumps Disch Hdr Press
 - b. Pump status lights
2. **VERIFY** Automatic Functions:
 - a. Condensate Pump B trips at 155 psig low discharge pressure after 5 second time delay.
3. **PERFORM** Corrective Actions:
 - a. **CHECK** 1CE-122 (FCV-2320B), Condensate Pmp B Recirc, modulating as indicated by dual lights on valves MCB control switch module.
 - b. **VERIFY** sufficient Hotwell level.
 - c. **IF** needed,
THEN START Condensate Pump A.
 - d. **DISPATCH** an Operator to perform the following:
 - (1) **CHECK** 1CE-122 (FCV-2320B) is modulating and there is no indication of valve binding or any other condition that would affect operation of the valve.
 - (2) **VERIFY** pumps are running properly.
 - (3) **CHECK** system for leaks.
 - e. **IF** necessary,
THEN GO TO AOP-010, Feedwater Malfunctions.

CAUSES:

1. Excessive flow/leak
2. Low Hotwell level
3. Condensate Pump A not running
4. Alarm circuit or instrumentation malfunction

REFERENCES:

1. AOP-010, Feedwater Malfunctions
2. 2165-S-0545
3. 2166-B-401 2069
4. 2166-G-421 S01

APP-ALB-019

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QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

protective relays

BKR TRIP/TRBL

REFLASH: YES

OPERATOR ACTIONS:

NOTE

If this alarm is present due to a trip or failure to start, the alarm will not reset until the pump is started.

1. **CONFIRM** alarm using:
 - a. Condensate Booster Pump A and B status lights
 - b. PI-2306B1, Condensate Booster Pump B Disch Press
2. **VERIFY** Automatic Functions:
 - a. FW Pump trip if Condensate Booster Pump B trips and Condensate Booster Pump A was NOT running.
 - b. FW Pump B trips if all FW Pumps and Condensate Booster Pumps were running.

Origin: NEW

Cog Level: HIGHER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: 056 K1.03

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

66. 2009B NRC RO 066

Given the following plant conditions:

- A Reactor Trip and Safety Injection have occurred from 100% power
- The crew is performing PATH-1
- Containment pressure is 0.3 psig
- 'A' SG NR level is increasing in an uncontrolled manner

Which ONE of the following identifies (1) the required 'A' SG NR level to isolate AFW to the 'A' SG AND (2) the preferred valves to SHUT?

- A✓ (1) 25% NR level
(2) 1AF-55 and 1AF-137, Aux FW 'A' Isolations
- B. (1) 25% NR level
(2) 1AF-49 and 1AF-129, Aux FW 'A' Flow Control Valves
- C. (1) 40% NR level
(2) 1AF-49 and 1AF-129, Aux FW 'A' Flow Control Valves
- D. (1) 40% NR level
(2) 1AF-55 and 1AF-137, Aux FW 'A' Isolations

Plausibility and Answer Analysis

A Correct. 25% is the required NR level. The Isolation Valves are the preferred valves.

B Incorrect. 25% is the required NR level. The FCV are plausible because they are shut if the Isolations cannot be shut as part of the RNO Action.

C Correct. 40% is plausible because this level would be required if CNMT conditions were adverse. The FCV are plausible because they are shut if the Isolations cannot be shut as part of the RNO Action.

D Incorrect. 40% is plausible because this level would be required if CNMT conditions were adverse. The Isolation Valves are the preferred valves.

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

G2.1.20

2.1 Conduct of Operations

2.1.20 Ability to interpret and execute procedure steps.

(CFR: 41.10 / 43.5 / 45.12)

Importance Rating: 4.6 4.6

Technical Reference: PATH-1 Guide step 16, pp27 Rev 26

References to be provided: None

Learning Objective: EOP-LP-3.1 Objective 1.a

Question Origin: Bank

Comments: KA is matched because the applicant must be able to determine when AFW should be secured to the ruptured SG based on guidance in the procedure.

Tier/Group: T3

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

PATH-2 GUIDE

Instructions

Response Not Obtained

CAUTION

IF ruptured SG is faulted AND is NOT need for RCS cooldown. THEN feed flow to that SG should remain isolated.

8. Monitor Ruptured SG Level:

- | | |
|--|---|
| <p>a. Ruptured SG - FAULTED</p> <p>b. Ruptured SG - NEED FOR RCS COOLDOWN</p> <p>c. Level GREATER THAN 25% [40%]</p> <p>d. Stop feed flow by shutting the TDAFW AND TDAFW isolation valves to ruptured SG.</p> | <p>a. GO TO Step 8c.</p> <p>b. Verify feed flow isolated to ruptured SG.

Observe CAUTION prior to Step 9 AND GO TO Step 9.</p> <p>c. Maintain feed flow to ruptured SG.

WHEN level greater than 25% [40%], THEN do Step 8d.

Observe CAUTION prior to Step 9 AND GO TO Step 9.</p> <p>d. IF any isolation valve will NOT shut, THEN shut the associated AFM flow control valve.</p> |
|--|---|

CAUTION

The steam supply valve from the ruptured SG to the TDAFW pump should be shut OR isolated before continuing.

- | | |
|--|--|
| <p>9. Check Ruptured SG(s) Pressure - GREATER THAN 260 PSIG [350 PSIG]</p> | <p>GO TO EPP-020. "SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY", Step 1.</p> |
|--|--|

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Origin: BANK
Difficulty:
Ref. Provided:
K/A 1: G2.1.20

Cog Level: HIGHER
Reference:
Key Words:
K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

67. 2009B NRC RO 067

The plant is operating at 100% power.

Which ONE of the following will result in annunciators being communicated using Transient Annunciator Response without further direction from the CRS/SM IAW OPS-NGGC-1000, Fleet Conduct of Operations?

- A. Power Range N-43 failing high
- B. 'A' SG Channel 1 Level Indication failing low
- C. Pressurizer LT-459 failing low with PZR Level Selector in 459/460
- D. 'A' EDG tripping during the performance of OP-155, Diesel Generator Emergency Power System

Plausibility and Answer Analysis

- A. *Correct. N-43 failing high would require entry into AOP-001 allowing use of Transient Annunciator Response without direction from the CRS/SM due to entry into an Event Procedure.*
- B. *Incorrect. There is no required entry into an Event Procedure for this occurrence. Plausible since the CRS/SM may direct Transient Annunciator Response.*
- C. *Incorrect. There is no required entry into an Event Procedure for this occurrence. Plausible since the CRS/SM may direct Transient Annunciator Response.*
- D. *Incorrect. There is no required entry into an Event Procedure for this occurrence. Plausible since the CRS/SM may direct Transient Annunciator Response.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

G2.1.38

2.1 Conduct of Operations

2.1.38 Knowledge of the station's requirements for verbal communications when implementing procedures.

(CFR: 41.10 / 45.13)

Importance Rating: 3.7* 3.8

Technical Reference: OPS-NGGC-1000, section 9.14.1.5.b, pp 85 Rev 0

References to be provided: None

Learning Objective: PP-LP-2.0 Objective 3.k

Question Origin: Bank

Comments: KA is matched by measuring knowledge of communication response protocols during plant events, specifically entry into an AOP.

Tier/Group: T3

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

9.14.1 Annunciator Response (continued)

5. Transient Annunciator Response

- a. Normal alarm response protocol may be suspended by the CRS/SM during unplanned transient conditions in which multiple alarms occur even though the unit is not in an Event Procedure. The CRS/SM will make an announcement of "Implementing Transient Annunciator Response".
- b. The normal alarm response protocol is automatically suspended upon entry into an Event procedure and no announcement is required.
- c. Once implemented, the crew will announce alarms that are received or cleared that they evaluate as being critical or of particular significance to the event response in progress. Referencing of these annunciator response procedures will be by CRS direction.
- d. Once the plant has been stabilized and the CRS or SM determines plant control and monitoring is within normal operational levels, the announcement of "Exiting Transient Annunciator Response" will be made. Annunciators sealed in as a result of the event or transient are required to be reviewed unless directed by the CRS or Shift Manager.

6. Field Panel Alarm Response

- a. The panel operator shall silence/acknowledge the alarm and review the associated annunciator response procedure.
- b. The alarm may be considered an Expected Alarm if it was previously identified and the alarm response procedure referenced prior to the evolution.
- c. If the alarm indicates a potential operability, system operation, or safety concern, it shall be reported to the Control Room.

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QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: BANK
Difficulty:
Ref. Provided:
K/A 1: G2.1.38

Cog Level: LOWER
Reference:
Key Words:
K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

68. 2009B NRC RO 068

With the plant operating in Mode 1, which ONE of the following requires INDEPENDENT verification instead of CONCURRENT verification?

- A. Installing a jumper in PIC-02 for a surveillance test
- B. Lifting leads in Rod Control Power Cabinet 1BD for troubleshooting
- C✓ Removal of control power fuses for a clearance on RHR pump 1B-SB
- D. Performance of PIC portions of OWP-RP due to the failure of PRZ PT-455

Plausibility and Answer Analysis

- A. Incorrect. Plausible since a surveillance test directs these actions, but concurrent verification is required since the incorrect switch operation could result in an RPS or ESF actuation.*
- B. Incorrect. Plausible since a work order directs these actions, but concurrent verification is required since the incorrect switch operation could result in an RPS.*
- C. Correct. Concurrent verification is not needed on 480V breakers as they would have independent verification since no adverse action would occur as a result of removing the fuses.*
- D. Incorrect. Plausible since an OWP directs these actions, but concurrent verification is required since the incorrect switch operation could result in an RPS or ESF actuation.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

G2.2.13

2.2 Equipment Control

2.2.13 Knowledge of tagging and clearance procedures.

(CFR: 41.10 / 45.13)

Importance Rating: 4.1 4.3

Technical Reference: OPS-NGGC-1303, section 9.2.3, pg 12, Rev 7

References to be provided: None

Learning Objective: PP-LP-3.11 Objective 7

Question Origin: BANK from 2004 Harris NRC Exam

Comments: KA is matched since question measures knowledge of activities required during application of a clearance.

Tier/Group: T3

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

9.2 Independent Verification Guidelines

9.2.3 Unless waived in accordance with 9.5.3 of this procedure, INDEPENDENT VERIFICATION shall be used to document the physical position of valves, instrument isolations, electrical and mechanical jumpers, lifted leads, instrument lines, switches, breakers, wires, fuses, blank flanges, pipe caps or plugs, or test equipment that could cause a plant transient for COMPONENT(S) AND/OR SYSTEM(S) REQUIRING INDEPENDENT VERIFICATION for the following cases:

1. Initial system lineups conducted following an outage where the system was not maintained in the normal operating lineup.
2. When any of the components or systems are being aligned in preparation for entry into a mode where they are required to be operable.
3. The system or component is removed from service for placement of clearance tags in accordance with OPS-NGGC-1301, Equipment Clearance.
4. The system or component is returned to service or restored to a standby lineup, clearance tags are being removed in accordance with OPS-NGGC-1301, Equipment Clearance.
5. When electrical or mechanical jumpers are installed and removed, electrical leads are lifted or terminated, instrument tubing is reconnected, and test equipment that could cause a plant transient is removed as part of temporary modifications, procedure steps, or W/O tasks.
6. When directed by specific surveillance or test procedures.
7. When ensuring the correct installation and removal of temporary modifications to COMPONENT(S) AND/OR SYSTEM(S) REQUIRING INDEPENDENT VERIFICATION.
8. When actions are performed that may initiate a plant trip or safety system actuation if improperly performed.
9. Any time and on any plant system or component when a supervisor determines the need to ensure proper restoration.

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Origin:	BANK	Cog Level:	LOWER
Difficulty:		Reference:	
Ref. Provided:		Key Words:	
K/A 1:	G2.2.13	K/A 2:	

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

69. 2009B NRC RO 069

What Technical Specification OPERATIONAL MODE is the plant in with RCS temperature being maintained at 375°F AND how many CSIPs are required to be operable?

The plant is in Mode (a) AND there must be at least (b) CSIP(s) operable.

- A. (a) 3
(b) 1
- B. (a) 4
(b) 1
- C. (a) 4
(b) 2
- D✓ (a) 3
(b) 2

Plausibility and Answer Analysis

- A. The first part is correct. The second part is plausible since 1 CSIP would be required when in Mode 4.*
- B. Incorrect. Mode 4 is plausible since the temperature at which the mode is determined is 350°F. The second part is plausible since 1 CSIP would be required when in Mode 4.*
- C. Incorrect. Mode 4 is plausible since the temperature at which the mode is determined is 350°F. The second part is correct.*
- D. Correct. Mode 3 is ≥ 350 °F. 2 CSIPs are required.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

G2.2.35

2.2 Equipment Control

2.2.35 Ability to determine Technical Specification Mode of Operation.

(CFR: 41.7 / 41.10 / 43.2 / 45.13)

Importance Rating: 3.6 4.5

Technical Reference: TS Table 1.2, pp 1-9
TS 3.5.2.a, pp 3/4 5-3, Amendment 24

References to be provided: None

Learning Objective: TS-LP-2.0 AO Objective 1.g

Question Origin: NEW

Comments: The KA is matched since the question measures the ability to determine mode of operation based on plant conditions.

Tier/Group: T3

EMERGENCY CORE COOLING SYSTEMS

3/4.5.2 ECCS SUBSYSTEMS - T_{in} GREATER THAN OR EQUAL TO 350°F

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent Emergency Core Cooling System (ECCS) subsystems shall be OPERABLE with each subsystem comprised of:

- a. One OPERABLE Charging/safety injection pump.
- b. One OPERABLE RHR heat exchanger.
- c. One OPERABLE RHR pump, and
- d. An OPERABLE flow path capable of taking suction from the refueling water storage tank on a Safety Injection signal and, upon being manually aligned, transferring suction to the containment sump during the recirculation phase of operation.

APPLICABILITY: MODES 1, 2, and 3.

SHEARON HARRIS - UNIT 1

3/4 5-3

Amendment No. 24

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

QUESTION	SCORE	STATUS	ANSWER
3. HOT STANDBY	< 0.99	0	> 350°F
4. HOT SHUTDOWN	< 0.99	0	350°F > T _{avg} > 200°F
5. COLD SHUTDOWN	< 0.99	0	≤ 200°F
6. REFUELING**	≤ 0.95	0	≤ 140°F

*Excluding decay heat.

**Fuel in the reactor vessel with the vessel head closure bolts less than fully tensioned or with the head removed.

SHEARON HARRIS - UNIT 1

1-9

Origin: NEW

Cog Level: LOWER

Difficulty:

Reference:

Ref. Provided:

Key Words:

K/A 1: G2.2.35

K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

70. 2009B NRC RO 070

Given the following plant conditions:

- REM-01SW-3500A, SW from WPB to Circ Water radiation monitor is in alarm.
- Chemistry sample verifies high activity in the piping monitored by REM-01SW-3500A

Which ONE of the following describes the impact on the release in progress AND the action required IAW AOP-005, Radiation Monitoring System?

A. The release will be automatically terminated

Place the running train of ESW in standby

B. The release will be automatically terminated

Direct the Radwaste Operator to isolate individual components

C. The release will NOT be automatically terminated

Place any running train of ESW in standby

D✓ The release will NOT be automatically terminated

Direct the Radwaste Operator to isolate individual components

Plausibility and Answer Analysis

Most liquid release process monitors include an automatic actuation to terminate the release on high rad levels. The service water monitors do not though. Therefore, the release will not be terminated automatically.

Attachment 7 provides actions for service water monitors. Both actions are listed on Attachment 7. However, there are two SW monitors 3500A and 3500B. 3500A in alarm indicates that it is in the WPB header which is supplied by NSW not ESW. Therefore, the running train of ESW will not be placed in STBY.

A Incorrect. This is plausible because most monitors automatic terminate a release SW does not though. Placing ESW in standby is plausible because this action also listed in attachment 7 but will not be taken for WPB SW monitor.

B Incorrect. This is plausible because most monitors automatic terminate a release SW does not though. Isolating individual components is correct.

C. Incorrect. Release not automatically terminated is correct. Placing ESW in standby is plausible because this action also listed in attachment 7 but will not be taken for WPB SW monitor.

D. Correct. Release not automatically terminated and isolating individual components is correct.

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

G2.3.11

2.3 Radiation Control

2.3.11 Ability to control radiation releases.

(CFR: 41.11 / 43.4 / 45.10)

Importance Rating: 3.8 4.3

Technical Reference: AOP-005 Rev 26 Pg 22-23

References to be provided: None

Learning Objective: AOP-LP-3.5 Obj 5

Question Origin: Bank question. 2007 RO Audit Exam

Comments: KA is matched because wuestion evaluates knowledge of the relationship between the radiation monitoring system and a liquid release.

Tier/Group: T3

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

Origin: BANK
Difficulty:
Ref. Provided:
K/A 1: G2.3.11

Cog Level: LOWER
Reference:
Key Words:
K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

71. 2009B NRC RO 071

Given the following plant conditions:

- Fuel handling operations are in progress
- Several Fuel Handling Building (FHB) area radiation monitors on both trains show increasing radiation levels
- ONE 'A' train channel has reached its high alarm setpoint.

Based on these plant conditions, the FHB Operating Floor Supply Fans (AH-56, AH-57, AH-58, AH-59) will be (1) AND the FHB Normal Exhaust Isolation Dampers (FL-D4, FL-D5, FL-D21, FL-D22) will be (2).

A. (1) secured

(2) open

B. (1) running

(2) open

C. (1) running

(2) shut

D✓ (1) secured

(2) shut

Plausibility and Answer Analysis

- A. *This is plausible because only 'A' Train has reached its high alarm setpoint. And it is a train specific signal but either train shuts down all of normal supply and exhaust.*
- B. *This is plausible because only 'A' Train channel has reached its high alarm setpoint. Most signals require a coincidence but FHB Emergency Exhaust is 1/12 Train specific.*
- C. *This is plausible because only 'A' Train has reached its high alarm setpoint. And it is a train specific signal but either train shuts down all of normal supply and exhaust.*
- D. *Correct. FHB Emergency Exhaust is 1/12 Train specific signal. Either train shuts down all of normal supply and exhaust.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

G2.3.5

2.3 Radiation Control

2.3.5 Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.

(CFR: 41.11 / 41.12 / 43.4 / 45.9)

Importance Rating: 2.9 2.9

Technical Reference: AOP-005-BD Rev 7 Pg 3; OP-170 section 8.2 Rev 21 pg
21-23

References to be provided: None

Learning Objective: Radiation Monitoring Student Text Objective 6

Question Origin: OIT Exam Bank - RMS (06A) 1

Comments: KA is matched because question evaluates knowledge
level regarding a fixed radiation monitor.

Tier/Group: T3

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

1.0 DISCUSSION (continued)

- High alarm on any of the following FHB Spent Fuel Pool Area Monitors initiates FHB Emergency Exhaust mode of operation:
 - RM-*1FR-3564ASA • RM-*1FR-3566ASA
 - RM-*1FR-3564BSB • RM-*1FR-3566BSB
 - RM-*1FR-3565ASA • RM-*1FR-3567ASA
 - RM-*1FR-3565BSB • RM-*1FR-3567BSB

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8.1. Auto Start of Emergency Exhaust System

8.1.1. Initial Conditions

1. High radiation signal (100 mr/hr) received from the SFP Area Rad. Monitors (1 out of 12 coincidence on either train).

NOTE: High radiation levels on Rad Monitor Train A (B) will automatically start EMERGENCY EXHAUST FAN E-12 1-4X-SA (EMERGENCY EXHAUST FAN E-13 1-4X-SB).

NOTE: High radiation levels on Rad Monitor Train A or B in the FHB will secure and isolate normal ventilation.

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Origin: BANK
Difficulty:
Ref. Provided:
K/A 1: G2.3.5

Cog Level: HIGHER
Reference:
Key Words:
K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

72. 2009B NRC RO 072

With the plant at power, as a member of Operations, which ONE of the following tasks would require utilization of a Special RWP in order for you to complete the activity?

- A. Entry into a High Radiation Area to evaluate boric acid deposits
- B. Entry into a Locked High Radiation Area hang a clearance
- C✓ Entry into Containment to inspect for RCS leakage on CNMT Level 221
- D. Entry into an area with loose surface contamination at 2500 dpm/100cm² to perform a valve line-up

Plausibility and Answer Analysis

A. Incorrect. Plausible since the equipment is located inside a HRA with ALARA concerns but SRWP is not required.

B. Incorrect. Plausible since the area is locked to prevent entry and a SRWP is required for entry for all except OPS and RP personnel.

C. Correct. SRWP is required for entry into containment with the plant at power.

D. Incorrect. Plausible since the area would be posted as a loose surface contaminated area, but OPS and RP personnel are exempted from requiring a SWRP under these conditions.

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

G2.3.7

2.3 Radiation Control

2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions.

(CFR: 41.12 / 45.10)

Importance Rating: 3.5 3.6

Technical Reference: HPP-600, section 5.2.14, pp 6 Rev 22

References to be provided: None

Learning Objective: PP-LP-3.7 Objective 4

Question Origin: NEW

Comments: Meets KA by having applicant recognize that a Special RWP is required for the task above and beyond a General RWP.

Original KA supplied by NRC was G2.3.6. Replacement KA is G2.3.7

Tier/Group: T3

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

R2.1.115.3 Moderate and High Risk Activities

These tasks are performed under an AT that has been written specifically for the task incorporating a level of detail and planning commensurate with the hazard. Refer to HPS-NGGC-0014 for guidance on RWP instructions for ALARA tasks written specifically for moderate and high risk activities. [CORR] (SOER 01-1, Recommendations 3 and 8)

1. Entries into Very High Radiation Areas.
2. In-core instrument thimble work.
3. Work on ex-core detectors.
4. Trash basket handling.
5. Fuel handling activities.
6. Steam generator entries.
7. Resin transfers.
8. Underwater filter/vacuum operations.
9. Diving operations.
10. Gross Failed Fuel Detector maintenance using a neutron source.
11. Performing radiography in non-RCAs within the Restricted Area.
12. Decontamination and/or hands-on maintenance of plant equipment in a High Radiation Area or greater, or in areas with loose surface contamination greater than 100,000 dpm/100 cm².
13. Maintenance tasks where individual worker dose is expected to exceed 100 mrem per entry.
14. All entries into:
 - a. the RCB at power
 - b. the reactor cavity
 - c. the in-core sump
 - d. the seal table room
19. With the exception of RP, Operations, and Management/Job Inspection, entries into areas with loose surface contamination greater than 100,000 dpm/100 cm².
20. With the exception of RP and Operations, entries into LHRAs.
21. With the exception of RP, all entries into Airborne Radioactivity Areas.
- R2.1.3** 22. Any work that has the potential to significantly increase contamination levels or create an Airborne Radioactivity Area (for example, welding, grinding, or cutting on contaminated surfaces). [Action Item # 80H0978]
23. Any dose-significant work.

HPP-800	Rev. 22	Page 6 of 13
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Origin: NEW
 Difficulty:
 Ref. Provided:
 K/A 1: G2.3.7

Cog Level: LOWER
 Reference:
 Key Words:
 K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

73. 2009B NRC RO 073

During a plant startup with power at 8%, which ONE of the following conditions requires entry into PATH-1?

- A. Pressurizer Level exceeds 92%
- B. One Reactor Coolant Pump trips
- C✓ Pressurizer Pressure exceeds 2385 psig
- D. All turbine governor and throttle valves close

Plausibility and Answer Analysis

A. Incorrect. Plausible since this is a Rx trip condition, but not below 10% power (P-7).

B. Incorrect. Plausible since this is a Rx trip condition, but not below P-8.

C. Correct. Always active

D. Incorrect. Plausible since this is a Rx trip condition, but not below 10% power (P-7).

G2.4.2

2.4 Emergency Procedures / Plan

2.4.2 Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.

(CFR: 41.7 / 45.7 / 45.8)

Importance Rating: 4.5 4.6

Technical Reference: EOP PATH 1 GUIDE pg 2 R 26

References to be provided: NONE

Learning Objective: EOP-LP-3.1 Objective 1

Question Origin: Bank

Comments: KA is met by measuring knowledge of trip setpoints requiring PATH-1 entry.

Tier/Group: T3

QUESTIONS REPORT for 2009B NRC RO QUESTIONS

PATH-1 GUIDE

PURPOSE/ENTRY CONDITIONS

This guide provides actions to verify proper response of the automatic protection system to assess plant conditions, to identify the appropriate recovery procedure, and to recover from a loss of reactor or secondary coolant. It also provides actions to terminate SI following an inadvertent actuation. This guide is provided for training support on PATH-1 and to provide a backup to PATH-1 with the same level of detail as other two column format procedures in the EOP network.

1. The entry condition for PATH-1 will be one of the following:
 - o ANY REACTOR TRIP OR SAFETY INJECTION ACTUATION
 - o ANY CONDITION REQUIRING REACTOR TRIP OR SAFETY INJECTION ACTUATION
2. Any of the following conditions will generate a demand for reactor trip.

<u>Parameter</u>	<u>Trip Setpoint</u>
Power Range Neutron Flux (High Setpoint)	109%
Power Range Neutron Flux (Low Setpoint)	25%
Power Range High Positive Rate	+5%/2 seconds
Power Range High Negative Rate	-5%/2 seconds
Intermediate Range High Flux	25%
Source Range High Count Rate	10 ⁵ CPS
Overtemperature Delta T	Greater than calculated setpoint
Overpower Delta T	Greater than calculated setpoint
Pressurizer Low Pressure	1960 PSIG
Pressurizer High Pressure	2385 PSIG
Pressurizer High Level	92%
Steam Generator Low-Low Water Level	25%
Steam Generator Low Water Level Coincident with Steam/Feedwater Flow Mismatch	25% (level) 40% (flow)

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Origin: BANK
Difficulty:
Ref. Provided:
K/A 1: G2.4.2

Cog Level: LOWER
Reference:
Key Words:
K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

74. 2009B NRC RO 074

Given the following plant conditions:

- While performing PEP-230 Control Room Operations, the Site Emergency Coordinator - MCR directs the RO to align Control Room Area HVAC System for post accident operation per OP-173 Control Room Area HVAC System section 8.2.

The following annunciators are lit:

- ALB-30-1-1, CONTROL ROOM ISOLATION TRAIN A
 - ALB-30-2-1, CONTROL ROOM ISOLATION TRAIN B
- BOTH the Train A and Train B Normal Outside Air Intake (OAI) Radiation Monitors are in HIGH ALARM.

Assuming no other actions, if both CONTROL ROOM ISOL TRAIN A **AND** TRAIN B RESET switches are taken to RESET, ALB-30-1-1 and ALB-30-2-1 (1) clear and the Control Room Area HVAC System (2) automatically re-isolate if another Control Room Outside Air Intake Radiation Monitor subsequently alarms.

- A. (1) will
(2) will
- B✓ (1) will
(2) will not
- C. (1) will not
(2) will
- D. (1) will not
(2) will not

QUESTIONS REPORT

for 2009B NRC RO QUESTIONS

Plausibility and Answer Analysis

- A. *Incorrect. This is plausible because the first part is correct and the second part would be correct if the signal from the rad monitor was a single shot.*
- B. *Correct. Per OP-173 Caution prior to step 8.2.2.1, A Control Room Isolation System may be manually reset after 5 seconds on the MCB to reposition valves and dampers. If this is done and the original signal is still greater than the alarm setpoint, the Control Room Area HVAC System will not automatically re-isolate until the original signal goes below its setpoint and another actuation signal is received.*
- C. *Incorrect. The first part is plausible because the one monitor on each train remains in high alarm and the second part would be correct if the signal from the rad monitor was a single shot.*
- D. *Incorrect. The first part is plausible because the one monitor on each train remains in high alarm and the second part is correct.*

G2.4.39

2.4 Emergency Procedures / Plan

2.4.39 Knowledge of RO responsibilities in emergency plan implementation.

(CFR: 41.10 / 45.11)

Importance Rating: 3.9 3.8

Technical Reference: OP-173 section 8.2 Caution Rev. 29 page 12

References to be provided: None

Learning Objective: Control Room Area Ventilation Student Text Objective 3.b

Question Origin: New

Comments: Meets KA because the RO must implement this action as directed by the Shift Manager in the E-Plan

Original KA provided by NRC was G2.4.38. Replacement KA is G2.4.39.

Tier/Group: T3

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

8.2. Aligning the Control Room Area HVAC System for Post Accident Operation
R (Reference 2.3.6)

8.2.1. Initial Conditions

- 1. Control Room Area HVAC isolation has occurred. _____
- 2. Section 8.1.2 has been completed. _____

8.2.2. Procedural Steps

CAUTION

A Control Room Isolation System may be manually reset after 5 seconds on the MCB to reposition valves and dampers. If this is done and the original signal is still greater than the alarm setpoint, the Control Room Area HVAC System will not automatically re-isolate until the original signal goes below its setpoint and another actuation signal is received.

- 1. **PLACE** the CONTROL ROOM ISOL TRAIN A AND TRAIN B RESET switches to RESET. _____
- 2. **VERIFY** ALB-030/1-1, Control Room Isolation Train A, and ALB-030/2-1, Control Room Isolation Train B have cleared. _____
- 3. **IF** more than one NORMAL SUPPLY FAN AH-15 ASA (BSB) is running, **THEN PERFORM** the following:
 - a. **STOP** one fan. _____
 - b. **VERIFY** that the following associated A (B) train valves/dampers remain open for the running fan and go closed for the stopped fan.
 - AH-15 IN CZ-D1 (CZ-D2) SLB-5 (6) _____
 - AH-15 DISCH CZ-25 (CZ-26) SLB-5 (6) _____
 - CONT RM NORMAL RECIRC DAMPER CZ-D69 SA (CZ-D70 SB) _____

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Origin: NEW	Cog Level: HIGHER
Difficulty:	Reference:
Ref. Provided:	Key Words:
K/A 1: G2.4.39	K/A 2:

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

75. 2009B NRC RO 075

Given the following plant conditions:

- A startup is in progress with Reactor power at 7%
- The Main Turbine is at 1800 RPM
- The 'A' and 'B' CW pumps have just tripped
- Condenser Zone 1 pressure is 4.5 inches Hg absolute
- Condenser Zone 2 pressure is 5.1 inches Hg absolute

Based on current plant conditions, the crew should implement (1) and (2) .

- A✓ (1) AOP-012, Partial Loss of Condenser Vacuum
 (2) Manually trip the turbine
- B. (1) AOP-012, Partial Loss of Condenser Vacuum
 (2) Verify automatic turbine trip
- C. (1) PATH-1
 (2) Manually trip the turbine
- D. (1) PATH-1
 (2) Verify automatic turbine trip

Plausibility and Answer Analysis

- A. *Correct. Entry conditions are met based on trip of the CW pumps and degrading vacuum conditions. The turbine must be manually tripped because with turbine load less than 60%, the turbine will trip with condenser pressure less than 5 inches Hg but only on Zone 1.*
- B. *Incorrect. The first part is correct. The second part is plausible since the turbine trip limit of 5 inches Hg has been exceeded, but not in Zone 1.*
- C. *Incorrect. The first part is plausible since a turbine trip would initiate a Reactor trip requiring entry into PATH-1, but not below P-10. The second part is correct.*
- D. *Incorrect. The first part is plausible since a turbine trip would initiate a Reactor trip requiring entry into PATH-1, but not below P-10. The second part is plausible since the turbine trip limit of 5 inches Hg has been exceeded, but not in Zone 1.*

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

G2.4.4

2.4 Emergency Procedures / Plan

Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.

(CFR: 41.10 / 43.2 / 45.6)

Importance Rating: 4.5 4.7

Technical Reference: AOP-012 BD, section 1.0.a, rev 9.
AOP-012 section 3.0 step 2, pp 4 Rev 21.

References to be provided: None

Learning Objective: AOP-LP-3.12 Objective 1

Question Origin: New

Comments: Meets KA by having operator identify entry conditions based on degrading vacuum and determining appropriate procedure entry.

Tier/Group: T3

QUESTIONS REPORT
for 2009B NRC RO QUESTIONS

PARTIAL LOSS OF CONDENSER VACUUM - BASIS DOCUMENT

1.0 DISCUSSION

The objective of this procedure is to determine and correct the cause of a loss of Condenser vacuum. This procedure is entered whenever a partial loss of Condenser vacuum occurs under any mode of operation.

The following automatic actions may occur:

- a. Turbine trips if Condenser Zone 1 pressure (PI-1900A) exceeds:
 - 1) 5 inches Hg AND Turbine first stage pressure is less than 60% TURBINE LOAD.
 - 2) 7.5 inches Hg AND Turbine first stage pressure is greater than 60% TURBINE LOAD.

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PARTIAL LOSS OF CONDENSER VACUUM

INSTRUCTIONS

RESPONSE NOT OBTAINED

3.0 OPERATOR ACTIONS

NOTE

This procedure contains no immediate actions.

- | | |
|---|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> 1. CHECK Turbine - IN OPERATION * <input checked="" type="checkbox"/> 2. CHECK Condenser pressure in both Zones less than: <ul style="list-style-type: none"> • 7.5 inches Hg absolute AND Turbine first stage pressure is greater than 60% TURBINE LOAD - OR - • 5 inches Hg absolute AND Turbine first stage pressure is less than 60% TURBINE LOAD | <ul style="list-style-type: none"> <input type="checkbox"/> 1. GO TO Step 5. 2. PERFORM the following: <ul style="list-style-type: none"> <input type="checkbox"/> a. IF Reactor power is greater than P-10 (10%), THEN TRIP Reactor AND GO TO EOP-Path-1. <input type="checkbox"/> b. IF Reactor power is less than P-10 (10%), THEN TRIP Turbine AND GO TO Step 5. |
|---|---|

AOP-012

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Origin: NEW
Difficulty:
Ref. Provided:
K/A 1: G2.4.4

Cog Level: HIGHER
Reference:
Key Words:
K/A 2: