

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	215004	K1.02
	Importance Rating	3.4	

Knowledge of the physical connections and/or cause- effect relationships between SOURCE RANGE MONITOR (SRM) SYSTEM and the following: Reactor manual control

Question: RO #1

Plant conditions are:

- Reactor Mode Switch is in STARTUP/STANDBY
- All IRMs are on Range 3
- Source Range Monitor (SRM) A is reading 0.5 cps
- SRMs B and C are reading  $8.3 \times 10^4$
- SRM D drawer mode switch is in STANDBY
- A rod block signal has been generated

Which one of the following has caused the rod block?

- A. SRM Upscale
- B. SRM Inoperable
- C. SRM Downscale
- D. SRM Detector Wrong Position

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – SRM Upscale doesn't come in until 1E5 cps
- B: Correct - With Reactor Mode Switch NOT in RUN and SRM detector channel switch out of operate a Rod Block on SRM INOP will be generated.
- C: Incorrect - SRM Downscale bypassed with Associated IRM range 3
- D: Incorrect - Detector Wrong Position will NOT generate a Rod Block, with IRMs on or above range 3

Technical Reference(s): LP NOH04SRMSYSC-00 Table 2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH04SRMSYSC-00 Obj. (As available)  
SRMSYSE006

Question Source: Bank # 21837  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 6  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	262001	K1.01
	Importance Rating	3.8	

Knowledge of the physical connections and/or cause- effect relationships between A.C. ELECTRICAL DISTRIBUTION and the following: Emergency generators

Question: RO #2

Given:

- Normal AC electrical line up
- The 10A403 bus trips due to a BUS DIFFERENTIAL OVERCURRENT

Which of the following describes how this effects the "C" Emergency Diesel Generator and output breaker?

- A. The diesel is locked out and the output breaker is locked out.
- B. The diesel can be manually started and output breaker must be manually closed.
- C. The diesel will automatically start and the output breaker must be manually closed.
- D. The diesel will automatically start and the output breaker will automatically close.

Proposed Answer: A

## Explanation (Optional):

- A: Correct - The EDG regular lockout on BUS DIFFERENTIAL OVERCURRENT prevents the diesel from starting and also prevents output breaker closure.
- B: INCORRECT - With the Regular Lockout Relay tripped, all DG starts are prevented and output breaker closure is prevented.
- C: INCORRECT - With the Regular Lockout Relay tripped, all DG starts are prevented and output breaker closure is prevented.
- D: INCORRECT - With the Regular Lockout Relay tripped, all DG starts are prevented and output breaker closure is prevented.

Technical Reference(s): HC.OP-SO.KJ-0001, Section 3.3.1 (Attach if not previously provided) and 3.3.3  
NOH01EDG000C-00-1  
sectionIV.C.3.e.1) & 2)

Proposed References to be provided to applicants during examination: none

Learning Objective: EDG000E013 (As available)

Question Source: Bank # 56512  
Modified Bank # (Note changes or attach parent)  
New

## Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	215003	K2.01
	Importance Rating	2.5	

Knowledge of electrical power supplies to the following: IRM channels/detectors

Question: RO #3

A complete loss of the power supply to the IRMs occurs.

What describes this effect on the IRMs?

With a loss of \_\_\_\_\_ the IRM fails \_\_\_\_\_.

- A. 125 VDC, INOP
- B. 125 VDC, AS-IS
- C. 24 VDC, INOP
- D. 24 VDC, AS-IS

Proposed Answer: C

Explanation (Optional):

- A: Incorrect - 125 VDC is control power not associated with IRMs
- B: Incorrect - 125 VDC is control power not associated with IRMs
- C: Correct - IRM's are powered from 24 VDC and would fail INOP (downscale),

D: Incorrect – IRMs fail INOP (downscale) not AS-IS

Technical Reference(s): NOH0IRMSYS-02

(Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: IRMSYSE008

(As available)

Question Source: Bank # WTS 4344

Modified Bank #

(Note changes or attach parent)

New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 7

55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	259002	A3.02
	Importance Rating	3.4	

Ability to monitor automatic operations of the REACTOR WATER LEVEL CONTROL SYSTEM including: Changes in reactor water level

Question: RO #4

The plant is operating at 70% reactor power with 2 Reactor Feed Pumps (RFPs) running in automatic with the Master Level PDS level set at 35".

- A Narrow Range level is reading 36"
- B Narrow Range level is reading 35"
- C Narrow Range level is reading 34"

Then, B Narrow Range level transmitter fails and lowers to 0".

Assuming NO operator action, which of the following describes the initial plant response?

- A. Actual RPV level remains the same. Level Control transfers to single element.
- B. RPV level will lower until a scram occurs.
- C. Actual water level lowers 1 inch.
- D. Actual water level rises 1 inch.

Proposed Answer: D

Explanation (Optional):

- A: Incorrect – “C” level input will take control and level will rise , not lower. 3 element control is not affected
- B: Incorrect – “C” level input will take control and level will rise , not lower. 3 element control is not affected
- C: Incorrect – level will rise due to the failure and “C” level taking control
- D: Correct - On a failure of a narrow range Rosemount Level Detector (PDT-N004A, B or C) with the feedwater system in automatic three-element control from the Master Level Controller, level stays near its setpoint since the level signal is now the lower of the two good remaining level inputs.

When B fails it is NO longer the Median value. B Narrow range channel will NO longer be Median Select. It will transfer to "C" because it's setpoint is 1" lower. Actual level will rise one inch until "C" Channel is reading 35".

Technical Reference(s): NOH04FWCONTC-06 Page 18 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH04FWCONTC-06 Obj 10 (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:



Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	218000	K3.02
	Importance Rating	4.5	

Knowledge of the effect that a loss or malfunction of the AUTOMATIC DEPRESSURIZATION SYSTEM will have on following: Ability to rapidly depressurize the reactor

Question: RO #5

Given:

- Drywell pressure 40 psig
- PCIG to the drywell has isolated

By design, which one of the following describes the effect of this loss on the ADS SRVs ability to perform their ADS function?

ADS SRVs...

- A. will NOT operate.
- B. will operate to permit a maximum of ONE opening.
- C. will operate to permit a maximum of TWO openings.
- D. will operate to permit a maximum of THREE openings.

Proposed Answer: C

## Explanation (Optional):

- A: Incorrect – an accumulator for each SRV is designed to allow for at least one opening in the ADS relief function.
- B: Incorrect – a maximum of 2 openings is possible by design
- C: Correct – Per LP NOH01MSTEAMC-05 Section III.A.6. - The SRVs each have an accumulator designed for two actuations against a drywell pressure of 43.4 psig (70% of design) if a pneumatic failure occurs. The safety function is not affected because it is not dependent on pneumatic operation.  
Procedure HC.OP-AB.ZZ-0001 Att.13 step 1 – ADS SRVs are opened once and not reclosed or cycled.
- D: Incorrect - a maximum of 2 openings is possible by design

Technical Reference(s): LP NOH01MSTEAMC-05 Section III.A.6. (Attach if not previously provided)  
HC.OP-AB.ZZ-0001 Att.13 step 1.0

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01MSTEAMC-05 R6 (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

## Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	239002	K5.06
	Importance Rating	2.7	

Knowledge of the operational implications of the following concepts as they apply to  
RELIEF/SAFETY VALVES: Vacuum breaker operation

Question: RO #6

The plant was operating at 100% power then has scrambled from a full Group I isolation.

What is the consequence of a stuck closed SRV Vacuum Breaker with these conditions?

- A. Torus water will be pushed lower into the tail pipe, and cause steam to enter the Drywell air space.
- B. Steam will directly enter the SRV tailpipe causing a high drywell pressure.
- C. High pressure in the SRV tail pipe could prevent the SRV from opening when RPV pressure reaches the safety function setpoint.
- D. Torus water may be drawn up into the tail pipe following opening, and water hammer on subsequent opening of the SRV may damage the T-Quencher.

Proposed Answer: D

## Explanation (Optional):

- A: Incorrect - Steam may enter the torus air space from uncondensed steam if the T-Quencher breaks off.
- B: Incorrect – although steam will enter the tailpipe a hi drywell pressure will not result because the tailpipe discharges under water.
- C: Incorrect - The differential of this pressure is  $\approx 50$  psid.
- D: Correct - The SRV's vacuum breaker will open @ 0.5 psig  $\Delta P$ , to allow drywell atmosphere into the SRV piping preventing a water hammer. Water hammer would be caused following the next SRV lift when hot steam is introduced into the piping. When that steam condenses it draws a vacuum in the piping above the level of the Torus water level. This draws up the water into the piping above the T-quenchers. If the vacuum breaker wasn't there on the next lift the height of the water could be sufficient enough to have a large enough impact force to break the T-quencher via WATER HAMMER.

Technical Reference(s): LP NOH01MSTEAMC-05 Section (Attach if not previously provided)  
III.A.5

Proposed References to be provided to applicants during examination:

Learning Objective: LP NOH01MSTEAMC-05 – OBJ R5 (As available)

Question Source: Bank # 54790  
Modified Bank # (Note changes or attach parent)  
New

## Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:



Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	209001	K4.02
	Importance Rating	3.0	

Knowledge of LOW PRESSURE CORE SPRAY SYSTEM design feature(s) and/or interlocks which provide for the following: Prevents water hammer

Question: RO #7

Which one of the following describes a design feature incorporated in the Core Spray system to prevent water hammer?

- A. A Jockey Pump for each Core Spray Loop is provided with keep fill water directly from the Demin System.
- B. A Jockey Pump for each Core Spray Loop is provided with keep fill water directly from the Suppression Pool.
- C. A Jockey Pump for each of the Core Spray Pumps provides keep fill water directly from the Demin System.
- D. A Jockey Pump for each of the Core Spray Pumps provides keep fill water directly from the Suppression Pool.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – The CS&T system via a jockey pump provides discharge piping keep-fill, one for each loop
- B: Correct – See P&ID 52-1 sht 1. – One jockey pump for each CS Loop, supplying Suppression Pool (Torus) water to the discharge piping.

Per LP NOH01CS&T00C-04 Section C.43.C. – CS&T provides CS system keep-fill

C: Incorrect – There are only 2 jockey pumps not 4. CS&T provides the water

D: Incorrect - There are only 2 jockey pumps not 4

Technical Reference(s): M-52-1 sheet 1

(Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH0CSSYS0-03-OBJ R5h

(As available)

Question Source: Bank #

Modified Bank #

(Note changes or attach parent)

New

X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 7

55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	264000	K4.04
	Importance Rating	2.6	

Knowledge of EMERGENCY GENERATORS (DIESEL/JET) design feature(s) and/or interlocks which provide for the following: Field flashing

Question: RO #8



Given:

- The plant was at 100% power when a Loss of Offsite Power occurred.
- The 'A' EDG failed to automatically start.
- Operators were unable to start the 'A' EDG from the Control Room.

What describes the actions necessary to flash the field of the generator and provide power to the "A" vital bus IAW HC.OP-SO.KJ-0001?

- A. Place the EMERGENCY TAKE-OVER switch on 1A-C-422 in EMERG. Place the REMOTE ENGINE CONTROL in START on 1A-C-423. Close the 'A' EDG output breaker from the Control Room.
- B. Press the DIESEL ENG REMOTE pushbutton for the 'A' EDG on 10C651 and ensure REMOTE light is on. Place the REMOTE ENGINE CONTROL in START on 1A-C-423. The EDG output breaker will auto-close.
- C. Place the REM/LOC/MAINT CONTROL SELECT switch on 1A-C-421 in MAINTENANCE. Place LOCAL ENGINE CONTROL Switch on 1A-C-421 in START. The EDG output breaker will auto-close.
- D. Press the DIESEL ENG REMOTE pushbutton for the 'A' EDG on 10C651 and ensure REMOTE light is on. Place the REM/LOC/MAINT CONTROL SELECT switch on 1A-C-421 in MAINTENANCE. Place LOCAL ENGINE CONTROL Switch on 1A-C-421 in START. Close the 'A' EDG output breaker from the Control Room.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect - Placing the EMERGENCY TAKE-OVER switch on 1A-C-422 in EMERG defeats the automatic closure of the EDG output breaker. This is why the procedure for Manual Emergency Starting of EDG's from the Remote Panels has conditional steps for "IF DIESEL RUNNING - LOADED is ON" and "IF loading of the EDG is required locally." The response of the output breaker is dependent on how Remote control was gained (from Control Room or from Emergency Takeover). With the breaker controls in EMERGENCY, breaker can not be closed from the Control Room
- B: Correct - Selecting REMOTE for the 'A' EDG engine on 10C651E enables the REMOTE ENGINE CONTROL switch on 1A-C-423. The auto-closure circuit for the EDG output

breaker also remains enabled. When the EDG frequency and voltage satisfied the Diesel Ready for Load permissive (>95% Frequency and Voltage), the breaker will auto close.

- C: Incorrect - Starting the EDG from the 1A-C-423 panel with the LOCAL/REMOTE/MAINT in MAINT does NOT flash the generator field. The generator would have no output and output breaker does not have the conditions to close (>95% frequency and voltage)
- D: Incorrect - Starting the EDG from the 1A-C-423 panel with the LOCAL/REMOTE/MAINT in MAINT does NOT flash the generator field. The generator would have no output. Selecting REMOTE for the 'A' EDG engine on 10C651E does NOT enable the LOCAL ENGINE CONTROL switch on 1A-C-421.

Technical Reference(s): HC.OP-SO.KJ-0001 (Attach if not previously provided)  
LP NOH01EDG000C-00-1 Step  
III.B.2.c.-a)

Proposed References to be provided to applicants during examination: none

Learning Objective: (As available)

Question Source: Bank # 62474  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	215005	K5.06
	Importance Rating	2.5	

Knowledge of the operational implications of the following concepts as they apply to AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM : Assignment of LPRM's to specific APRM channels

Question: RO #9

It has been determined that an LPRM must be bypassed.

- The LPRM is an "A" level LPRM.
- The LPRM mode switch is placed in BYPASS without bypassing the associated APRM.

These alarms are received:

- APRM SYS A UPSCALE TRIP/INOP (C3-C4)
- REACTOR SCRAM TRIP LOGIC A1 (C3-A2)

What caused this response?

The LPRM just bypassed was the\_\_\_\_\_.

- A. eighth detector bypassed in APRM "A"
- B. seventh detector bypassed in APRM "C"
- C. fourth LPRM bypassed and the second level "A" detector bypassed in APRM "A"
- D. fifth LPRM bypassed and the fifth level "A" detector bypassed in APRM "C"

Proposed Answer: A

Explanation (Optional):

- A: Correct. APRM A, C and E have 21 LPRMs assigned to them. Bypassing the eighth detector would result in 13 available detectors. The APRM inop trip actuates when less than 14 detectors as sensed by the LPRM OPERATE switch position. Less than 2 detectors in a level is an administrative limitation.
- B: Incorrect. APRM B, D and F have 22 LPRMs assigned to them. Bypassing the seventh detector would result in 15 available detectors. The APRM inop trip actuates when less than 14 detectors as sensed by the LPRM OPERATE switch position. Less than 2 detectors in a level is an administrative limitation.
- C: Incorrect. APRM A, C and E have 21 LPRMs assigned to them. Bypassing the fourth detector would result in 17 available detectors. The APRM inop trip actuates when less than 14 detectors as sensed by the LPRM OPERATE switch position. Less than 2 detectors in a level is an administrative limitation.
- D: Incorrect. APRM A, C and E have 21 LPRMs assigned to them. Bypassing the fifth detector would result in 16 available detectors. The APRM inop trip actuates when less than 14 detectors as sensed by the LPRM OPERATE switch position. Less than 2 detectors in a level is an administrative limitation.

Technical Reference(s): HC.OP-SO.SE-0001 table SE-002 (Attach if not previously provided) and Note 5.3.5.

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH04APRM00C-05 Obj. (As available)  
APRM00E003

Question Source: Bank # 56789  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

ES-401

Written Examination  
Question Worksheet

Form ES-401-5

10 CFR Part 55 Content: 55.41 6  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	211000	K5.01
	Importance Rating	2.7	

Knowledge of the operational implications of the following concepts as they apply to STANDBY LIQUID CONTROL SYSTEM : Effects of the moderator temperature coefficient of reactivity on the boron

Question: RO #10

What describes how moderator temperature affects the ability of boron to shutdown the reactor?

- A. The required boron concentration is unaffected by moderator temperature.
- B. At higher moderator temperatures a lower boron concentration is required.
- C. At higher moderator temperatures a higher boron concentration is required.
- D. At lower moderator temperatures a lower boron concentration is required.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – moderator temperature does affect required boron concentration
- B: Correct – PER LP NOH0SLCSYSC02-Section III.B.b.2) – The Boron concentration must be sufficient to provide a negative reactivity worth equal to the combined effects of rated voids, doppler, xenon, & temperature from 545°F to 70°F plus a shutdown margin

of  $-5\% \Delta K/K$ , (0.95 Keff). Also Per TS 3.1.5 bases - a) This concentration is based on:

- Minimum concentration required for shutdown.
- Mass of the water in the vessel, RHR shutdown cooling loops, and recirculation loops at level 8 (+54") at 70°F.

Hot shutdown boron concentration is lower than Cold shutdown boron concentration as defined in EOP bases. The moderator temperature coefficient is negative and a decrease in coolant temperature decreases the negative reactivity therefore more boron is required at lower temperature.

C: Incorrect- see explanation for "B"

D: Incorrect- see explanation for "B"

Technical Reference(s): LP NOH0SLCSYSC02-Section (Attach if not previously provided)  
III.B.b.2  
TS bases 3.1.5

Proposed References to be provided to applicants during examination: none

Learning Objective: (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 1  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	262002	K6.01
	Importance Rating	2.7	

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

Question: RO #11

The static inverter section of a 120 VAC Uninterruptable Power Supply (UPS) output has failed to zero.

The inverter was in a normal operational alignment.

Power to the associated 120 VAC distribution panels will come from \_\_\_\_\_.

- A. backup AC power due to static switch operation
- B. normal AC power due to the static switch operation
- C. 125 VDC because it is the backup when the static inverter fails
- D. normal AC power because the static inverter section is only used by the battery as a backup to the AC normal source

Proposed Answer: A

Explanation (Optional):

A: Correct – See HC.OP-SO.PN-0001, exhibit 2

B: Incorrect - inverter rectifies AC and provides an output from the inverter.



- C: Incorrect - 125 VDC inputs through the inverter
- D: Incorrect - inverter rectifies AC and provides an output from the inverter.

Technical Reference(s): HC.OP-SO.PN-0001, exhibit 2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01EAC00-03-ELO-20 (As available)

Question Source: Bank # 56858  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	400000	K6.05
	Importance Rating	2.8	

Knowledge of the effect that a loss or malfunction of the following will have on the CCWS:  
Motors

Question: RO #12

The plant is operating at rated power. The "A" loop of SACS is supplying TACS when a motor overload on the "A" SACS pump occurs and the pump trips.

Which one the following describes the effect of the pump trip?

(Assume all components are in their normal alignment and function as designed)

- A. TACS associated systems will lose cooling flow. "B" loop SACS loads will continue to be supplied with cooling.
- B. TACS associated systems will lose cooling flow. ALL SACS loads on the "A" loop of SACS will lose their cooling water supply.
- C. TACS will automatically swap to the "B" loop of SACS and continue to supply cooling to TACS loads. "B" loop SACS loads will continue to be supplied with cooling.
- D. TACS will automatically swap to the "B" loop of SACS and continue to supply cooling to TACS loads. ALL SACS loads on the "A" loop of SACS will lose their cooling water supply.

Proposed Answer: C

Explanation (Optional):

- A: Incorrect – TACS will auto swap to the “B” SACS loop.
- B: Incorrect - TACS will auto swap to the “B” SACS loop. There will still be another pump operating in the “A” SACS loop to supply cooling to loads.
- C: Correct – IAW LP NOH04STACS0C-06 – The “in-service” loop is the loop supplying TACS. Low flow to TACS from the operating SACS loop (12,000 GPM) will start the opposite loop pumps if in AUTO (FSL-2544A,B,C,D). The low flow will occur when the “A” SACS pump trips. There will still be another pump operating in the “A” SACS loop to supply cooling to loads. Additionally, the SACS loads on the “A” side will continue to be supplied with the exception of the RHR heat exchanger.
- D: Incorrect - There will still be another pump operating in the “A” SACS loop to supply cooling to loads.

Technical Reference(s): NOH04STACS0C-06 – Section IV. A.1.f.& g.) (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: LP Obj 15 (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

ES-401

Written Examination  
Question Worksheet

Form ES-401-5

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	206000	A1.08
	Importance Rating	4.1	

Ability to predict and/or monitor changes in parameters associated with operating the HIGH PRESSURE COOLANT INJECTION SYSTEM controls including: System lineup: BWR-2,3,4

Question: RO #13

Reactor power was 28% when instrument testing caused a high drywell pressure signal to be sent to HPCI, causing it to initiate.

The ISLN LOGIC A TRIP PB was depressed instead of the TURB TRIP PB.

HPCI would respond by:

- A. closing the Outboard Steam Supply valve (HV-F003), closing HPCI pump suction valve from the suppression pool (HV-F042), and tripping the turbine.
- B. closing the Inboard Steam Supply valve (HV-F002), closing HPCI Warm-up line isolation valve (HV-F100), and tripping the turbine.
- C. closing the Inboard and Outboard Steam Supply valves (HV-F002 and HV-F003), closing HPCI pump suction valve from the suppression pool (HV-F042). The HPCI turbine will coast down but will NOT trip
- D. closing the Outboard Steam Supply valves (HV-F003), closing HPCI pump suction valve from the suppression pool (HV-F042). The HPCI turbine will coast down but will NOT trip.

Proposed Answer: A

Explanation (Optional):

- A: Correct – PER HC.OP-SO.BJ-0001 section 3 Interlocks - HPCI channel A isolation signal causes :
- Closure of HV-F003 (Outboard steam supply valve)
  - Closure of HV-F042 (Torus suction)
  - Trip of the HPCI turbine only the components from "A" logic are operated on a manual isolation.
- B: Incorrect – this is for logic "C" isolation, which does not have a manual P/B trip
- C: Incorrect – only logic "A" components will be operated; the turbine receives a trip signal.
- D: Incorrect - the turbine receives a trip signal.

Technical Reference(s): HC.OP-SO.SM-0001, Table SM-005 (Attach if not previously provided)  
LP NOH01HPCI00-06 Step  
IV.C.2.b.2) a)

Proposed References to be provided to applicants during examination: none

Learning Objective: LP Obj. 9 (As available)

Question Source: Bank # 33960  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

ES-401

Written Examination  
Question Worksheet

Form ES-401-5

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	203000	A1.02
	Importance Rating	3.9	

Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) controls including: Reactor pressure

K/A match justification: Injection with LPCI is to facilitate flooding and reactor pressure will change when that occurs

Question: RO #14

The plant was operating at rated power when an event occurred.

Given:

- ALL Control Rods fully inserted
- EOP 206, RPV Flooding is in progress
- All LPCI Loops in service to support flooding

Which one of the following would be indications that the RPV has been flooded to the main steam lines IAW EOP-206?

- (1) Rising SRV tailpipe temperatures
- (2) Lowering SRV tailpipe temperatures
- (3) Rising RPV pressure
- (4) Lowering RPV pressure

ONLY...

A. 1 and 3



- B. 1 and 4
- C. 2 and 3
- D. 2 and 4

Proposed Answer: C

Explanation (Optional):

- A: Incorrect – SRV tailpipe temperatures would lower
- B: Incorrect - SRV tailpipe temperatures would lower, RPV pressure would rise
- C: Correct – Per EOP-206 Table RF-2 - Flooded RPV Indications
- D: Incorrect - RPV pressure would rise

Technical Reference(s): EOP-206 Table RF-2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 10  
55.43

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	205000	A2.10
	Importance Rating	2.9	

Ability to (a) predict the impacts of the following on the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions Valve operation

Question: RO #15

RHR Loop A has just been placed into the Shutdown Cooling mode of operation. You are directed to adjust the cooldown rate.

Currently the BC-HV-F048A RHR HX A SHELL SIDE BYP VLV is 50% open and BC-HV-F003A RHR HX A OUTLET VLV is 50% open.

Which action is taken to adjust the cooldown rate IAW HC.OP-SO.BC-0002?

- A. Throttling OPEN the BC-HV-F003A RHR HX A OUTLET VLV will cause the cooldown rate to decrease.
- B. Throttling CLOSED on the BC-HV-F003A RHR HX A OUTLET VLV will cause the cooldown rate to increase.
- C. Throttling OPEN the BC-HV-F048A RHR HX SHELL SIDE BYP VLV will cause the cooldown rate to decrease.
- D. CLOSING the BC-HV-F047A RHR HX A INLET VLV will cause the cooldown rate to increase.

Proposed Answer: C

Explanation (Optional):

- A: Incorrect. Throttling open on the F003A will cause the cooldown rate to increase
- B: Incorrect. Throttling open on the F003A will cause the cooldown rate to decrease
- C: Correct. Per HC.OP-SO.BC-0002, Step 5.2.34.B.1. - **PERFORM** the following as necessary to maintain the Shutdown Cooling return to RPV temperature relatively constant, as monitored on TR-R605 point 3(4) OR CRIDS A2381(A2383), while maintaining the required RHR Shutdown Cooling flow, simultaneously:  
B. IF temperature is decreasing, THEN **PERFORM** the following:  
1. Slowly **THROTTLE** OPEN on the BC-HV-F048A(B)  
RHR HX SHELL SIDE BYP MOV.  
2. IF the BC-HV-F0048A(B) is fully opened,  
THEN, **THROTTLE** CLOSED BC-HV-F003A(B) RHR HX A(B) OUTLET VLV
- D: Incorrect - closing the F047A will cause cooldown rate to decrease

Technical Reference(s): HC.OP-SO.BC-0002 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: (As available)

Question Source: Bank # INPO/Fermi 2001  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7

ES-401

Written Examination  
Question Worksheet

Form ES-401-5

55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	217000	A2.01
	Importance Rating	3.8	

Ability to (a) predict the impacts of the following on the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: System initiation signal

Question: RO #16

Given:

- The plant is at 75% power
- RCIC is in the Full Flow Test Mode of Operation

Due to a plant event, RPV level dropped to -40 inches.

What is the status of RCIC and what actions, if any, are required IAW HC.OP-SO.BD-0001 RCIC System Operation?

- A. RCIC has isolated. ARM & DEPRESS is required for RCIC injection.
- B. RCIC remains in full flow test. NO other actions are required.
- C. RCIC is injecting. Ensure FIC-R600, RCIC flow, is  $\approx$ 600 gpm.
- D. RCIC is NOT injecting. It must be manually re-aligned for injection.

Proposed Answer: C

## Explanation (Optional):

- A: Incorrect – RCIC automatically realigns to inject on a RPV level of -38”
- B: Incorrect - RCIC automatically realigns to inject on a RPV level of -38”
- C: Correct – Per OP-SO-BD-0001 section 3.3, interlock section, on an initiation signal RCIC will realign to inject – Section 5.3 discusses actions to take on initiation
- D: Incorrect – not per the procedure step

Technical Reference(s): OP-SO.BD-0001 sections 3.3 and 5.3 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: RCIC00E014 (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

## Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	263000	A3.01
	Importance Rating	3.2	

Ability to monitor automatic operations of the D.C. ELECTRICAL DISTRIBUTION including:  
Meters, dials, recorders, alarms, and indicating lights

Question: RO #17

A plant transient causes RCIC to receive an initiation signal.

As RCIC is starting up, the operators note all indications for RCIC are normal except for the RCIC Pump Discharge to Feedwater System HV-F013 which has failed to open and its Overload/Power Failure light is lit solid.

Which one of the following describes the cause of this indication?  
(Assume NO operator actions have been taken)

- A. A loss of AC power to the valve has occurred.
- B. A loss of DC power to the valve has occurred.
- C. A motor overload to the AC powered valve has occurred.
- D. A motor overload to the DC powered valve has occurred.

Proposed Answer: B

Explanation (Optional):

A: Incorrect – the valve is 250 VDC powered

- B: Correct – Per LP NOH04RCICC00-06 Step II.B.1.b.3)C) –  
Overload/Power Failure and Acknowledge
- If overload condition exists, amber OVLD/PWR FAIL light will flash until ACKNOWLEDGE p.b. is depressed, then light will go solid.
  - **If power failure condition exists, light will be solid.**
  - Light extinguishes when overload/power failure condition clears.
- C: Incorrect – the valve is DC powered and the light would be flashing if an overload condition had occurred
- D: Incorrect - the light would be flashing if an overload condition had occurred

Technical Reference(s): LP NOH04RCICC00-06 Step II.B.1.b.3)C) describes the light function for the F007 valve which is the same as for the F013. (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: LP Obj.10 (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:



Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	261000	A3.02
	Importance Rating	3.2	

Ability to monitor automatic operations of the STANDBY GAS TREATMENT SYSTEM  
including: Fan start

Question: RO #18

Given:

- The FRVS Vent System has responded to a High Drywell pressure.
- The Plant Operator has verified response IAW HC.OP-SO.GU-0001 Filtration, Recirculation, and Ventilation System Operation.

Which one of the following describes the subsequent response of the FRVS Vent System to a High Reactor Building Exhaust Radiation signal on all channels?

- A. The "B" FRVS Vent Fan will automatically start from standby and the "A" FRVS Vent Fan will remain operating.
- B. The "A" FRVS Vent Fan will remain operating and the "B" FRVS Vent Fan will remain in standby.
- C. The "A" FRVS Vent Fan will shutdown, then "B" FRVS Vent Fan will automatically start from standby.
- D. The "B" FRVS Vent Fan will shutdown, then "A" FRVS Vent Fan will automatically start from standby.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect - The AUTO/AUTO Lead selection prevents both fans from starting.
- B: Correct - The Auto Lead Fan A starts and will remain running. B will only auto start if there is a low flow condition on A Fan coincident with an initiation signal. Per the LP - The FRVS vent fan selected for Auto Lead operation will auto start on the same signals that start the FRVS recirc fans. 2) The LOCA Sequencers will start the Auto Lead fan 19 seconds after initiation. 3) The vent fan selected for Auto operation will auto start under the following conditions: **a)** Automatic start signal present as described in 1 and 2 above and **b)** A low flow condition, (6950 scfm), exists on the Auto Lead fan for more than 45 seconds.
- C: Incorrect - Only if A experiences a low flow condition.
- D: Incorrect - A is the normal Auto Lead Fan. A would be running. B would not have been running to require shutdown.

Technical Reference(s): HC.OP-SO.GU-0001 (Attach if not previously provided)  
HC.OP-SO.SM-0001

NOH01RBVENTC-00  
Sect.III.B.7.3.C

Proposed References to be provided to applicants during examination: none

Learning Objective: RBVENTE007 (As available)

Question Source: Bank # 2005 audit  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7

ES-401

Written Examination  
Question Worksheet

Form ES-401-5

55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	223002	A4.01
	Importance Rating	3.6	

Ability to manually operate and/or monitor in the control room: Valve closures (PCIS/NS4)

Question: RO #19

Which one of the following actions will close all the NS4 outboard isolation valves EXCLUDING the MSIVs?

- A. Arming and Depressing the "B" NS4 logic manual initiation pushbutton.
- B. Arming and Depressing the "D" NS4 logic manual initiation pushbutton.
- C. De-energizing "A" and "D" NS4 logic channels.
- D. De-energizing "B" and "C" NS4 logic channels.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – This action would result in no valve closures.
- B: Correct – Per LP, Main Steam Isolation Valves - Channels A or C and B or D and All outboard valves will close if "D" manual initiation collar is armed and pushbutton is pressed (except MSIVs).
- C: Incorrect – This action would close the MSIVs.
- D: Incorrect – This action would close the MSIVs.

Technical Reference(s): LP NOH01NSSSS0C-02 Steps (Attach if not previously provided)  
III.A.3.b.3) & III.B.2.d.2)  
HC.OP-SO.SM-0001 Tables

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01NSSSS0C-02 Obj.14, Given a (As available)  
specific parameter that initiates  
NSSSS, isolation signals, identify all  
valves isolated by that parameter and  
the setpoint at which the isolation  
signal is generated

Question Source: Bank # 53931  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	212000	A4.04
	Importance Rating	3.9	

Ability to manually operate and/or monitor in the control room: Bypass SCRAM instrument volume high level SCRAM signal

Question: RO #20

Given:

- The reactor has scrammed and the mode switch is in SHUTDOWN.
- The problem that caused the scram has been identified and corrected.
- Annunciator "CRD SCRAM DISCH VOL WTR LVL HI" is sealed in.

The following action is taken:

- The Scram Discharge Volume High Level Keylock switch is placed in BYPASS.

Which one of the following describes:

(1) Whether RPS can be reset at this time      AND

(2) The effect, if any, on RPS if the mode switch was placed in STARTUP one minute later?

- A. (1) RPS can be reset.  
(2) A Full scram would occur.
- B. (1) RPS can be reset.  
(2) ONLY a half scram would occur.
- C. (1) RPS can be reset.

(2) NO effect.

- D. (1) RPS can NOT be reset.  
(2) NO effect.

Proposed Answer: A

Explanation (Optional):

- A: Correct – The scram will reset while the mode switch is in bypass. When it is taken to “startup” the scram discharge volume high level scram is no longer bypassed and a scram will occur.
- B: Incorrect – RPS would cause a full scram.
- C: Incorrect - RPS would cause a full scram.
- D: Incorrect – RPS can be reset, a full scram would occur after the reset.

Technical Reference(s): NOH01RPS00C-06 – Table 1 (Attach if not previously provided)  
Reactor Scrams

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01RPS00C-06 Obj.4 (As available)

Question Source: Bank # 80585  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 6  
55.43

ES-401

Written Examination  
Question Worksheet

Form ES-401-5

Comments:



Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	300000	2.4.35
	Importance Rating	3.8	

Emergency Procedures / Plan: Knowledge of local auxiliary operator tasks during emergency and the resultant operational effects.

Question: RO #21

Given:

- A loss of coolant accident has occurred.
- The Reactor Auxiliaries Cooling System (RACS) has been restored.

Which of the following describes the availability/response of the Emergency Instrument Air Compressor (EIAC) for these conditions should instrument air header pressure begin lowering?

- A. The EIAC is NOT available until PCIS is reset. It can then be started locally after relieving intercooler pressure.
- B. The EIAC is NOT available until the LOCA signal is cleared, PCIS reset, and the 1E breaker is closed locally.
- C. The EIAC is NOT available until the Non-1E breaker is locally closed and instrument air pressure is less than 85 psig.
- D. The EIAC will automatically start on instrument air header pressure less than 85 psig if the LOCA signal is cleared.

Proposed Answer: B

## Explanation (Optional):

- A: Incorrect – The 1-E Breaker must be locally closed.
- B: Correct – PER SO.KB-001 - To restart the Emergency Instrument Air Compressor following a LOCA, the feeder breaker on Class 1-E Unit Substation 10B450 must be reclosed (LOCALLY). The Compressor can then be started from either the Control Room OR Local Panel 10C189.
- C: Incorrect – the 1-E breaker must be closed.
- D: Incorrect – PCIS must be reset and the 1-E breaker locally closed.

Technical Reference(s): HC.OP-SO.KB-0001 step 3.3.5 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01INSAIR-02 – Obj. R14 (As available)

Question Source: Bank # 36066  
Modified Bank # (Note changes or attach parent)  
New

## Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	205000	2.2.39
	Importance Rating	3.9	

Equipment Control: Knowledge of less than or equal to one hour technical specification action statements for systems. (shutdown cooling)

Question: RO #22

Given:

- The plant has been shutdown for 7 days after a 350 day run.
- De-tensioning of the Reactor Head is in progress.
- "A" RHR is in shutdown cooling (SDC).
- "B" RHR in standby.
- Reactor coolant temperature is 135°F and steady.
- RHR flow is 10,000 gpm.
- Engineering determines that the "A" RHR Heat Exchanger has failed due to leakage to SACs.
- The SRO declares the "A" RHR Loop inoperable and it is removed from service with the heat exchanger isolated.

In accordance with Technical Specifications, which one of the following actions is required?

- A. Immediately and at least once per 12 hours thereafter, demonstrate the operability of at least one alternate method capable of decay heat removal for each inoperable SDC loop.
- B. Within one hour establish reactor coolant circulation by an alternate method and monitor reactor coolant temperature at least once per hour.
- C. Within one hour and at least once per 12 hours thereafter, demonstrate capability of at least one alternate method of reactor coolant circulation for each inoperable SDC loop.
- D. Immediately establish reactor coolant circulation by an alternate method and monitor reactor coolant temperature at least once every 12 hours.

Proposed Answer:      B

Explanation (Optional):

- A: Incorrect – immediate action is not required. Additionally, the alternate means must be demonstrated at least once every 24 hours
- B: Correct – TS3.9.11.2 is applicable when in OPERATIONAL CONDITION 5, when irradiated fuel is in the reactor vessel and the water level is less than 22 feet 2 inches above the top of the reactor pressure vessel flange and heat losses to ambient\*\* are not sufficient to maintain OPERATIONAL CONDITION 5.

Therefore action 'b' applies - With no RHR shutdown cooling mode loop in operation, within one hour establish reactor coolant circulation by an alternate method and monitor reactor coolant temperature at least once per hour.

- C: Incorrect – operability NOT capability must be demonstrated.
- D: Incorrect – immediate action is not required. And temps must be monitored at least every hour

Technical Reference(s): TS 3.9.11.2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: TS LP Objective 13 (As available)

Question Source: Bank #  
Modified Bank # 33500 (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 10  
55.43

Comments:

Facility: Hope Creek  
Vendor: GE  
Exam Date: 2010  
Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	212000	K4.02
	Importance Rating	3.5	

Knowledge of REACTOR PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the following: The prevention of a reactor SCRAM following a single component failure

Question: RO #23

Given:

- The SRMs are being used to monitor reactor power during refueling.
- The shorting links have been removed in preparation for low power physics testing.
- The Mode Switch is still in Refuel.

What, if any method, can prevent the SRM upscale scram if an SRM were to fail upscale?

- A. The SRM Upscale scram can ONLY be bypassed with its joystick.
- B. The SRM Upscale scram can ONLY be bypassed by installing the shorting links.
- C. By installing the shorting links or bypassing the SRM with its joystick.
- D. The SRM Upscale scram cannot be bypassed with Mode Switch in Refuel.

Proposed Answer: C

Explanation (Optional):

- A: Incorrect – the SRM upscale trip can also be bypassed with the shorting links installed
- B: Incorrect - the SRM upscale trip can also be bypassed with its SRM joystick which removes its input to RPS
- C: Correct – Bypassing the SRM removes its input to RPS, with shorting links removed, a single NMS trip (i.e. any SRM, IRM or APRM scram input) will cause a reactor scram (this is the meaning of non-coincidence). Therefore, a scram is prevented if they are installed
- D: Incorrect – It can be bypassed as stated in the correct answer explanation.

Technical Reference(s): LP NOH01RPS00C-06 Section IV.C.3.a.1).c) (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01RPS00C-06 Obj.8 (As available)

Question Source: Bank # 33837  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 6  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	217000	K5.03
	Importance Rating	2.6	

Knowledge of the operational implications of the following concepts as they apply to REACTOR CORE ISOLATION COOLING SYSTEM (RCIC): Differential pressure indication

KA Match Justification – For RCIC Differential pressure indication is used for steam line flow determination and subsequent valve actuations

Question: RO #24

With the Reactor Core Isolation Cooling (RCIC) Pump injecting at 600 gpm, the following occurs:

- B1-A2, RCIC STEAM LINE DIFF PRESSURE HI

Which ONE of the following describes the effect on RCIC Inboard Steam Supply Isolation Valve (HV-F007) and RCIC Steam Supply Isolation Valve (HV-F045)?

	HV-F007 RCIC INBD STM <u>SUPPLY VALVE</u>	HV-F045 RCIC STEAM SUPPLY <u>ISOLATION VALVE</u>
A.	CLOSES	REMAINS OPEN
B.	CLOSES	CLOSES
C.	REMAINS OPEN	CLOSES
D.	REMAINS OPEN	REMAINS OPEN



Proposed Answer: A

Explanation (Optional): KA Match justification – Differential pressure indication is used for steam line flow determination

A: Correct – PER SOP HC.OP-SO.BD-0001 Section 3 Interlocks

B: Incorrect - The F045 will close on high RPV level not high steam line flow

C: Incorrect - A high steam flow signal cause the F007 to close, The F045 will close on high RPV level not high steam line flow

D: Incorrect – A high steam flow signal cause the F007 to close

Technical Reference(s): LP NOH04RCIC00-06 (Attach if not previously provided)  
HC.OP-SO.BD-0001 Section 3  
Interlock

Proposed References to be provided to applicants during examination: none

Learning Objective: LP NOH04RCIC00-06 Obj.16 (As available)

Question Source: Bank # WTS 4096  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	262001	K6.02
	Importance Rating	3.6	

Knowledge of the effect that a loss or malfunction of the following will have on the A.C.  
ELECTRICAL DISTRIBUTION: Offsite power

Question: RO #25

Which one of the following actions, if any, will occur as a result of a station service transformer winding fault which results in a transformer lockout?

- A. All oil pumps and fans for that transformer will start.
- B. The in-feed breakers supplying buses from that transformer will trip.
- C. The other station service transformers supplied by the same section of the 13.8KV ring bus will continue to supply their respective buses.
- D. The buses supplied by that transformer will be de-energized until re-energized by the operators. All oil pumps and fans for that transformer will start.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect - oil pumps and fans already running, not an auto start
- B: Correct – PER LP Section IV.C.2.a.2).b)  
The following automatic actuation occur: Generically:  
Any breakers supplied from 1AX501, 1AX502, or 1AX503 are tripped and their closing circuitry is blocked.

- C: Incorrect – transformer lockout must be reset
- D: Incorrect - oil pumps and fans already running, not an auto start

Technical Reference(s): LP NOH01NON1E-04, Section IV.C.2.a.2).b (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01NON1E-04 Obj. R5 (As available)

Question Source: Bank # 54724  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	206000	K4.09
	Importance Rating	3.8	

Knowledge of HIGH PRESSURE COOLANT INJECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Automatic flow control: BWR-2,3,4

Question: RO #26

HPCI is being run for the quarterly full flow test surveillance. The reactor operator has just reached the required 5680 gpm flow rate with the controller in AUTO when the ramp generator circuit output signal fails low.

Which one of the following describes the response of the HPCI System?

- A. HPCI speed rises, flow rises.
- B. HPCI speed lowers, flow lowers.
- C. HPCI remains at the same speed and flow.
- D. HPCI trips due to a loss of speed reference signal.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – Speed and flow lower
- B: Correct – Per LP The ramp generator and the flow error signals feed into a LVG. The lower of the two signals is passed to the turbine control valve. If the ramp generator fails low, this low signal will pass to the TCV and it will close causing decreased speed and flow.

C: Incorrect – Speed and flow lower

D: Incorrect – Speed and flow lower

Technical Reference(s): NOHO1HPCI00-06 pages 76 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOHO1HPCI00-06 Obj.12.e OR 16 (As available)

Question Source: Bank # 53761

Modified Bank # (Note changes or attach parent)

New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7

55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	259001	K1.05
	Importance Rating	3.2	

Knowledge of the physical connections and/or cause- effect relationships between REACTOR FEEDWATER SYSTEM and the following: Condensate system

Question: RO #27

When operating at rated power with all RFPTs and Condensate Pumps in operation, the discharge valve of the "A" PCP inadvertently strokes closed.

Which one of the following describes the response?

- A. An automatic reactor scram due to insufficient feedwater flow.
- B. An automatic trip of the "A" RFPT and a recirculation pump runback to 30%.
- C. A recirculation pump runback to 45% and a RFPT speed limit of  $\approx 86.3\%$ .
- D. A recirculation pump runback to 45% and a RFPT speed limit of  $\approx 89.3\%$ .

Proposed Answer: C

Explanation (Optional):

- A: Incorrect – although suction pressure to the feed pumps will lower, it will not lower enough to cause a loss of FW flow. The RFPTs will runback along with recirc
- B: Incorrect - With 3 RFPT's in service prior to the trip of the PCP, reactor recirc will not

runback to 30% and the A RFPT should remain in service.

- C: Correct – PER HC.OP-AB.RPV-0004, Automatic Actions, “Primary Condensate Pump TRIP with Initial Total Feed water Flow > 75%, 3 PCP’s AND 2 RFPT’s in service: RFPT Runback to 86.3% demand and a Reactor Recirc Pump Runback to 45%. Per System Procedure; section 3.3.2 Primary Condensate Pump(s) will trip on HV-1680A(B,C) PRI CNDS PMP DISCH VLV A(B,C) not open as follows (initial pump start) Not >35% open after 40 seconds Not 100% open after 99 seconds
- D: Incorrect - PER HC.OP-AB.RPV-0004, Automatic Actions, “Primary Condensate Pump TRIP with Initial Total Feed water Flow > 75%, 3 PCP’s AND 2 RFPT’s in service: RFPT Runback to 86.3% demand {NOT 89.3%} and a Reactor Recirc Pump Runback to 45%. Per System Procedure; section 3.3.2 Primary Condensate Pump(s) will trip on HV-1680A(B,C) PRI CNDS PMP DISCH VLV A(B,C) not open as follows (initial pump start) Not >35% open after 40 seconds Not 100% open after 99 seconds

Technical Reference(s): HC.OP-AB.BOP-RPV-0004 (Attach if not previously provided)  
HC.OP-SO.AD-0001

Proposed References to be provided to applicants during examination: none

Learning Objective: LP Obj. MNCONDEO15 (As available)

Question Source: Bank # 54645  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	201001	K2.03
	Importance Rating	3.5	

Knowledge of electrical power supplies to the following: Backup SCRAM valve solenoids

Question: RO #28

Which one of the following describes:

- (1) the power supply to the backup scram valve solenoids AND  
(2) whether the loss of this power supply would result in a reactor scram?

- A. (1) 120 VAC  
(2) NO reactor scram would occur.
- B. (1) 120 VAC  
(2) A reactor scram would occur.
- C. (1) 125 VDC  
(2) NO reactor scram would occur.
- D. (1) 125 VDC  
(2) A reactor scram would occur.

Proposed Answer: C

Explanation (Optional):

A: Incorrect – 120 VAC powers the normal scram valves



- B: Incorrect - 120 VAC powers the normal scram valves
- C: Correct – Per LP - 125 VDC 1E electrical distribution supplies power to the backup scram valves (1AD417 and 1BD417). The Backup Scram Valves automatically energize to the vent position in the event of both RPS channels receiving a trip signal.
- D: Incorrect – no reactor scram would occur

Technical Reference(s): LP NOH01RPS00C-06 Section V.A.6. (Attach if not previously provided)  
LP NOH04CRDHYD0--04  
Section III.B.14.C.

Proposed References to be provided to applicants during examination: none

Learning Objective: LP NOH04CRDHYD0--04- Obj.3.f. (As available)  
&13.g

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	202001	K3.05
	Importance Rating	3.3	

Knowledge of the effect that a loss or malfunction of the RECIRCULATION SYSTEM will have on following: Recirculation system MG sets: Plant-Specific

KA match justification – The MG set lube oil system is associated with the recirc pump and therefore the recirc system. The failure of the oil system affects the MG sets

Question: RO #29

The plant is at 50% power.

A failure on the operating AC Lube Oil pump for “B” Recirculation Pump MG Set causes discharge pressure to immediately degrade to 15 psig. The standby AC Lube Oil pump fails to start.

What is the effect of this condition on the “B” Recirculation MG Set and Pump?

- A.    - The DC oil pump will auto start after a six second time delay.  
      - The “B” reactor recirculation pump will have a full runback after a six second time delay.
- B.    - The DC oil pump starts immediately.  
      - The “B” scoop tube will lock up after a six second time delay.  
      - The “B” reactor recirculation pump trips after a six second time delay.
- C.    - The DC oil pump starts immediately.  
      - The “B” reactor recirculation pump will immediately have a full runback and then trip six seconds after the runback is complete.
- D.    - The DC oil pump will auto start after a six second time delay.

- The "B" scoop tube will lock up after a six second time delay.
- The "B" reactor recirculation pump trips after a six second time delay.

Proposed Answer: D

Explanation (Optional):

- A: Incorrect - There are no recirc runbacks associated with the MG set lube oil system.
- B: Incorrect – There is a six second time delay
- C: Incorrect - There are no recirc runbacks associated with the MG set lube oil system.  
The DC pump has a six second time delay.
- D: Correct - Per HC.OP-SO.BB-0002 -"B' scoop tube will lock up after a six second time delay, 'B' reactor recirculation pump trips after a six second time delay and the DC oil pump will auto start with a six second time delay at <30 psig oil pressure

Technical Reference(s): HC.OP-SO.BB-0002 Sections (Attach if not previously provided)  
3.3.3 & 3.3.5  
PN1-B31-1030-24

Proposed References to be provided to applicants during examination: none

Learning Objective: LP NOH01RECCON-09 Obj. (As available)  
R12,13,16

Question Source: Bank # 56328  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

ES-401

Written Examination  
Question Worksheet

Form ES-401-5

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	233000	K4.03
	Importance Rating	2.8	

Knowledge of FUEL POOL COOLING AND CLEAN-UP design feature(s) and/or interlocks which provide for the following: Maintenance of adequate pool temperature  
KA justification- question asked the design feature involving the interlock

Question: RO #30

What is the purpose of bypassing the interlocks for the BC-HV-F006A(B), F008 and F009 using the keylock switches in the lower relay room?

- A. It enables RHR pumps A or B to take an alternate suction from the Torus.
- B. It enables the RHR pumps to fulfill their LPCI function if any valve full open sensors are failed.
- C. It enables RHR pumps A and B to fulfill their Shutdown Cooling function if any valve full open sensors are failed.
- D. It enables RHR pumps A and B to be lined up in the Fuel Pool Cooling Assist Mode when required.

Proposed Answer: D

Explanation (Optional):

- A: Incorrect - There is only one Torus suction for RHR.
- B: Incorrect - The bypass is only for the suction valve interlock.

- C: Incorrect - The bypass is only for the suction valve interlock.
- D: Correct – PER HC.OP-SO.BC-0002, Rev. 23, Section 3.3.5 - Valves F004, F006, F008 & F009 are all closed in the FPC Assist mode requiring the interlock to be bypassed to align RHR for FPC assist.

Technical Reference(s): HC.OP-SO.BC-0002, Rev. 23, (Attach if not previously provided)  
Section 3.3.5 and figure 1

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01RHRSYSC-07. Obj. 6 (As available)

Question Source: Bank # 53884  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	272000	K5.01
	Importance Rating	3.2	

Knowledge of the operational implications of the following concepts as they apply to  
RADIATION MONITORING SYSTEM : Hydrogen injection operation's effect on process  
radiation indications: Plant-Specific

Question: RO #31

The plant is starting up.

Prior to placing the Hydrogen Water Chemistry Injection system (HWCI) in service and raising power above 20%, the MSL radiation monitor setpoints are adjusted\_\_\_\_\_.

- A. down, to be consistent with radiation monitor setpoints previously used during HWCI operation thereby preventing spurious alarms.
- B. down, to ensure N16 radiation levels do NOT mask a true fuel element failure.
- C. up, to be consistent with radiation monitor setpoints previously used during HWCI Operation thereby preventing spurious alarms.
- D. up, to ensure N16 radiation levels do NOT mask a true fuel element failure.

Proposed Answer: C

Explanation (Optional):

- A: Incorrect – background radiation levels will increase and the setpoints must be adjusted up to those previously seen with HWCI inservice
- B: Incorrect - the setpoints must be adjusted up

- C: Correct – Per LP V.A.3 - Radiation monitor setpoint changes are required prior to initiating and after stopping the HWCI System due to the additional N<sub>16</sub> radiation levels in the main steam lines during HWCI System operation.  
TS Table 3.3.2-1 Note## - The hydrogen water chemistry (HWC) system shall not be placed in service until reactor power reaches 20% of RATED THERMAL POWER. After reaching 20% of RATED THERMAL POWER, and prior to operating the HWC system, the normal full power background radiation level and associated trip setpoints may be **increased** to levels previously measured during full power operation with hydrogen injection.
- D: Incorrect – masking fuel element failure is not the concern

Technical Reference(s): NOH01HWCI00-03 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01HWCI00-03 Obj R6 (As available)

Question Source: Bank # 53406  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 11  
55.43

Comments:



Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	219000	K6.06
	Importance Rating	3.7	

Knowledge of the effect that a loss or malfunction of the following will have on the RHR/LPCI:  
TORUS/SUPPRESSION POOL COOLING MODE : Suppression pool

Question: RO #32

While implementing EOPs, following a seismic event, plant conditions are:

- Suppression Pool Temperature is 230°F.
- RPV Water Level is –10 inches and rising.
- RHR Pump AP202 is injecting at 7,000 gpm.
- RHR Pump BP202 is in Suppression Pool Cooling at 7,750 gpm.
- Loop A Core Spray is injecting at 2,000 gpm. (1000 gpm per pump)
- Loop B Core Spray is injecting at 2,200 gpm. (1100 gpm per pump)
- Suppression Chamber pressure is 5.0 psig.
- Torus water level lowered to 0 inches due to a leak but has stabilized.

Which one of the following action(s) must be taken?

- A. Reduce "B" RHR Pump flow ONLY.
- B. Reduce "A" & "B" RHR Pump flow ONLY.
- C. Reduce "B" RHR Pump flow.  
Reduce "B" Loop Core Spray Flow.
- D. Reduce "A" & "B" RHR Pump flow.  
Reduce "A" & "B" Loops Core Spray Flow.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – A RHR pump flow must also be reduced.
- B: Correct – The NPSH limits have been exceeded per EOP caution 2.
- C: Incorrect – A RHR pump flow must be reduced. Core Spray is unaffected.
- D: Incorrect – Core Spray is unaffected.

Technical Reference(s): EOP Caution 2

(Attach if not previously provided)

Proposed References to be provided to applicants during examination: EOP Caution 2  
AB-155

ES-401

Written Examination  
Question Worksheet

Form ES-401-5

Learning Objective: NOH01RHRSYSC-07 Obj. 18 (As available)

Question Source: Bank # 53616

Modified Bank # (Note changes or attach parent)

New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7

55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	226001	A1.10
	Importance Rating	3.0	

Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE controls including: Emergency generator loading

Question: RO #33

Plant conditions:

- Reactor Level is -100 inches and slowly rising
- Drywell Pressure is 9.8 psig and slowly rising
- RHR Pump "A" is in Drywell Spray Mode
- RHR Pump "C" is injecting in the LPCI Mode

Then, a loss of offsite power occurs.

Which one of the following describes the status of the RHR pumps once the EDGs power the vital buses?

- A. "A" RHR pump starts immediately upon it's respective bus EDG output breaker closing. "C" RHR pump starts 5 seconds later. Both RHR pumps will be injecting to the RPV in the LPCI Mode.
- B. "A" RHR pump starts immediately upon it's respective bus EDG output breaker closing. "C" RHR pump starts 5 seconds later. "A" RHR pump will be in Drywell Spray Mode and "C" RHR pump will be injecting in the LPCI Mode.

- C. Both RHR pumps start immediately upon the respective bus EDG output breaker closing. Both RHR loops will be injecting to the RPV in the LPCI Mode.
- D. Both RHR pumps start immediately upon the respective bus EDG output breaker closing. "A" RHR pump will be in Drywell Spray Mode and "C" RHR pump will be injecting in the LPCI Mode.

Proposed Answer: D.

Explanation (Optional):

- A: Incorrect – There is no time delay on the pump start once the EDG output breaker closes to power up the bus. "A" RHR would be in the Containment Spray Mode
- B: Incorrect - There is no time delay on the pump start once the EDG output breaker closes to power up the bus
- C: Incorrect - The 'A' pump will stay in Containment Spray Mode because the LPCI injecting valves had to be previously closed to allow for spray injection. These valves would have remained in their pre-loss of power position.
- D: Correct – Per LP Section IV.D.1.c. - With offsite power NOT available and a LOCA signal present Hi Drywell Pressure in this case), each RHR pump will start as soon as its respective DG output breaker closes.  
Per Section IV.A.14. - The 'A' pump will stay in Containment Spray Mode because the LPCI injecting valves had to be previously closed to allow for spray injection. These valves would have remained in there pre-loss of power position.

Technical Reference(s): NOH01RHRSYSC-07

(Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01RHRSYSC-07,

(As available)

Question Source: Bank #

Modified Bank #

(Note changes or attach parent)

ES-401		Written Examination Question Worksheet		Form ES-401-5
	New	X		
Question History:				
Question Cognitive Level:	Memory or Fundamental Knowledge			
	Comprehension or Analysis		X	
10 CFR Part 55 Content:	55.41	7		
	55.43			
Comments:				

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	215001	A2.07
	Importance Rating	3.4	

Ability to (a) predict the impacts of the following on the TRAVERSING IN-CORE PROBE ; and  
(b) based on those predictions, use procedures to correct, control, or mitigate the  
consequences of those abnormal conditions or operations: Failure to retract during accident  
conditions: Mark-I&II(Not-BWR1)

Question: RO #34

An individual Traversing In-core Probe (TIP) trace is in progress when OHA C5-B5 "DRYWELL PRESSURE HI" is received due to a leak in the recirculation system.

25 minutes following the event, the Reactor Operator reports these indications on the TIP Valve Control Monitor:

- "SQUIB MONITOR" light - extinguished
- "SHEAR VALVE MONITOR" light - extinguished
- "BALL VALVE OPEN" light - illuminated
- "BALL VALVE CLOSED" light - extinguished

Which of the following describes the status of the TIP and required action(s), if any, IAW OP-AB.CONT-0002, Primary Containment?  
(Assume NO operator actions have been taken)

- A. The TIP has responded as designed because the ball valve is open and the shear valve has been fired.
- B. The TIP has responded as designed because the detector has withdrawn and the ball valve is open.
- C. The TIP detector may NOT have withdrawn. Withdraw the detector and verify the ball valve closes.
- D. The TIP detector may NOT have withdrawn. Fire the shear valves, withdraw the detector, and then close the ball valve.

Proposed Answer: C

Explanation (Optional):

- A: Incorrect – The ball valve indicates open and there is no automatic firing of the shear valve
- B: Incorrect – the ball valve indicates open
- C: Correct – Per the procedure - Withdraw the detectors and verify the ball valves close.
- D: Incorrect – Per the procedure the first step is to attempt to withdraw the detector, also firing the squib valve would only be done if the ball valve couldn't be closed and the source of the containment leak is that penetration.

Technical Reference(s): AB.CONT-002 Step G.1.

(Attach if not previously provided)



Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01TIPS00-00 – Obj. R6 (As available)

Question Source: Bank # 56564  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	245000	A3.06
	Importance Rating	2.5	

Ability to monitor automatic operations of the MAIN TURBINE GENERATOR AND AUXILIARY SYSTEMS including: Turbine lube oil pressure

Question: RO #35

The plant was operating at rated power when a steam leak in the Drywell causes pressure to rise. The Reactor is shutdown prior to Drywell pressure reaching 1.68 psig and all scram actions are completed.

Ten minutes after the scram, conditions are:

- Drywell Pressure 2.1 psig and slowly rising
- RPV level 40" and rising
- RPV pressure 800 psig and lowering slowly
- Turbine Speed 200 RPM and lowering

Overhead alarm C8-F3, "TURBINE/GEN LUBE OIL SYS TROUBLE", is illuminated. Further investigation identifies all nine Lift Pumps digital alarms and the Turning Gear Oil Pump (TGOP) digital alarms are visible on the CRIDS display.

What condition do these alarms identify and what action, if any, must be taken?

- A. The TGOP failed to AUTO start and must be manually started to allow the Lift Pumps to start.
- B. The low bearing oil header pressure is due to the High Drywell pressure, the operator must verify the EBOP is running.

- C. The Lube Oil system has an apparent leak causing the TGOP and lift pumps to trip. The NEO must be sent to investigate.
- D. This is due to the Main Turbine speed coasting down, the operator must verify the TGOP and Lift Pumps start when Turbine speed reaches < 100 RPM.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – The TGOP is de-energized due to LOCA load shed on 10C650E
- B: Correct - CRIDS indicates the pumps are not running. IAW HC.OP-SO.SM-0001 the 10B323 load center is stripped on a LOCA 1 signal the TGOP is de-energized resulting in the Lift pumps tripping. The EBOP (DC pump) should start on low TGOP discharge pressure
- C: Incorrect - without the TGOP running and suction pressure > 1 psig the Lift pumps trip
- D: Incorrect – the LIFT pumps and TGOP due not rely on Turbine speed for a start signal, the TGOP starts on pressure and the lift pump starts on the TGOP and > 1 psig suction pressure. Abnormal BOP-002 has step to ENSURE lift pumps are running <900 RPM

Technical Reference(s): HC.OP-SO.SM-0001 (Attach if not previously provided)  
NOH01MTLO-05

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01MTLO-05 Obj 8.b, 11.f. (As available)

Question Source: Bank # 56902  
Modified Bank # (Note changes or attach parent)  
New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X

## Comprehension or Analysis

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	230000	A4.06
	Importance Rating	4.0	

Ability to manually operate and/or monitor in the control room: Valve logic reset following automatic initiation of LPCI/RHR in injection mode

Question: RO #36

Given:

- A LOCA has occurred in the Drywell.
- RPV level is +20 inches and is steady.
- Suppression Chamber pressure is 7.3 psig and rising slowly.
- The CRS directs "B" RHR be placed in Suppression Chamber Spray.

For the above conditions, which operator actions and plant conditions are required to establish Suppression Chamber Spray?

LPCI injection valve, BC-HV-F017B must be \_\_\_\_ (1) \_\_\_\_ .

Suppression Chamber Spray valve BC-HV-F027B must be opened, by \_\_\_\_ (2) \_\_\_\_ the initiation signal.

- A. (1) Opened (2) overriding
- B. (1) Opened (2) resetting
- C. (1) Closed (2) overriding
- D. (1) Closed (2) resetting

Proposed Answer: C

Explanation (Optional):

- A: Incorrect – F017 must be closed to permit the F027 to open. Initiation signal must be present to override valves in the required position to spray
- B: Incorrect – F017 must be closed to permit the F027 to open. With present plant conditions the initiation signal can not be reset.
- C: Correct – Per LP NOH01RHRSYSC-07 Section IV.A.11.b.2), F017 must be closed to permit the F027 to open. Initiation signal must be present to override valves in the required position to spray
- D: Incorrect –F017 must be closed to permit the F027 to open. With present plant conditions the initiation signal can not be reset.

Technical Reference(s): NOH01RHRSYSC-07 Obj. 6 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01RHRSYSC-07 (As available)

Question Source: Bank # X  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	215002	2.1.31
	Importance Rating	4.6	

Conduct of Operations: Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup. (RBM)

Question: RO #37

Given:

- Reactor power is 83%
- Neither RBM is bypassed
- Rod 14-15 has just been selected

Refer to the attached figures of:

- The 4-Rod Display
- NI Detector Core Positions
- Rod Block Monitor Controls and Indicators

Which of the following describes the status of the RBM CHANNEL A and CHANNEL B INOP indicator lights?

- A. Neither RBM CHANNEL A or RBM CHANNEL B INOP lights would be illuminated.
- B. Both RBM CHANNEL A and RBM CHANNEL B INOP lights would be illuminated.
- C. RBM CHANNEL A INOP light would be illuminated. RBM CHANNEL B INOP light would be extinguished.
- D. RBM CHANNEL A INOP light would be extinguished. RBM CHANNEL B INOP light would be illuminated.

Proposed Answer: C

Explanation (Optional):

- A: Incorrect – RBM “A” INOP light would be lit
- B: Incorrect – Only RBM “A” INOP would be lit
- C: Correct - RBM A has an inoperable trip. A three string rod was selected. RBM A is missing 50% of its inputs. RBM B has 50% of the 6 inputs. The trip is at less than 50%  
Per LP NOH04RBMSYSC-00 Section IV.B.3.b. - The white INOP light illuminates when one (or more) of the RBM channel INOP Trip Unit trip conditions exist.  
Per LP Section III. B.6.b.2) - Should the number of LPRM detector output signals from the Input Downscale Trip Units fall below 50% of the number assigned to the selected control rod, the Count Circuit will generate a trip signal to the INOP Trip Unit
- D: Incorrect – RBM “A” INOP would be lit. “B” would be extinguished



Technical Reference(s): NOH04RBMSYSC-00

(Attach if not previously provided)

Proposed References to be provided to applicants during examination:

Control board  
10C650C section  
indication four rod  
display, Core Map,  
RBM 10C651C  
sectionLearning Objective: NOH04RBMSYSC-00 Obj.  
RBMSYSE002

(As available)

Question Source: Bank # 69479

Modified Bank #

(Note changes or attach parent)

New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 6

55.43

Comments:

Facility: Hope Creek  
Vendor: GE  
Exam Date: 2010  
Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	271000	A4.06
	Importance Rating	3.3	

Ability to manually operate and/or monitor in the control room: System indicating lights and alarms (Offgas)

Question: RO #38

While operating at 90% power, a Main Condenser low vacuum alarm is received.

These indications exist on 10C651A panel for Unit 1 Recombiner TRAIN, which was previously in service:

- "TRAIN ISOLATED" light illuminated
- Green "CLOSE" push button flashing

Which of the following describes the status of the Air Ejector and/or Off-Gas Systems?

- A. "A" Recombiner outlet temperature reached 800° F causing an isolation of Off-gas and HA-HV-5646, SJAE Discharge to Unit 1 Offgas Train, has failed to close.
- B. Recombiner Strip Heater Control is NOT in OPERATE and HA-HV-5643A, Main Stm to Unit One Pre-heater, has failed to close.
- C. The CLOSE PB will continue to flash due to an isolation until the Recombiner Strip Heater Control is placed in the STBY position.
- D. The Feed Gas Cooler Condenser outlet temperature has reached 180° F and the HA-HV-5647, Common Recombiner Return to Condenser, has failed to close.

Proposed Answer: B

## Explanation (Optional):

- A: Incorrect - Recombiner trips at 900° F outlet temperature  
B: Correct - IAW HC.RW-SO.HA-0001.  
C: Incorrect - strip heaters are normally kept in operate,  
D: Incorrect - Recombiner trips at 200° F FGCC outlet temperature,

Technical Reference(s): HC.RW-SO.HA-0001, (Attach if not previously provided)  
NOH01GASRWOC-05

Proposed References to be provided to applicants during examination: none

Learning Objective: (As available)

Question Source: Bank # 34200  
Modified Bank # (Note changes or attach parent)  
New

## Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	600000 AA2.02	
	Importance Rating	2.8	

Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE: Damper position

Question: RO #39

Which of the following plant ventilation system(s) automatically shutdown in the event of a fire to assure that the fire dampers will close?

- A. RBVS and FRVS.
- B. Service Area Supply and Service Area Exhaust.
- C. Service Area Supply, Service Area Exhaust and RBVS.
- D. Service Area Supply, Service Area Exhaust, RBVS and FRVS.

Proposed Answer: B

Explanation (Optional):

A. Incorrect – Not RBVS OR FRVS

B. Correct IAW NOH01FIREPRO-03, Some dampers were identified that would not close against the system design airflow. To assure that these dampers would close, in-duct ionization detectors were installed that cause automatic shutdown of the associated ventilation system. Refer to Table 2 for a summary of the ventilation systems that shutdown automatically to assure fire dampers will close. ( Table 2 does not include RBVS OR FRVS)

C. Incorrect – not RBVS

D. Incorrect – not RBVS OR FRVS

Technical Reference(s) NOH01FIREPRO-03 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: none

Learning Objective: \_\_\_\_\_ (As available)

Question Source: Bank # \_\_\_\_\_  
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New X

Question History: Last NRC Exam \_\_\_\_\_

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

10 CFR Part 55 Content: 55.41 X  
\_\_\_\_\_

Comments:

Facility: Hope Creek  
Vendor: GE  
Exam Date: 2010  
Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295031	EK1.02
	Importance Rating	3.8	

Knowledge of the operational implications of the following concepts as they apply to REACTOR  
LOW WATER LEVEL : Natural circulation: Plant-Specific

Question: RO #40

Whenever Reactor coolant temperature is below 200°F, periods with RPV level  $\leq$  80 inches should be minimized.

Which of the following statements describes the operational implications for this precaution IAW HC.OP-IO.ZZ-0002, Preparation For Plant Startup?

- A. Prevents flashing in the RWCU system.
- B. Ensures sufficient NPSH is available for the reactor recirc pumps.
- C. Ensures natural circulation is immediately available upon a loss of forced circulation.
- D. Ensures RPV vessel and head flange temperatures comply with Technical Specifications.

Proposed Answer: C

Explanation (Optional):

- A: Incorrect - flashing occurs with high system flow and rising temperature, raising level does not effect system flow
- B: Incorrect - - adequate NPSH is assured at 12.5", raising level will add NPSH but is not the reason for precaution per the procedure
- C: Correct – IAW the procedure step 3.2.1 WHEN maintaining the average Reactor coolant temperature below 200°F, the time the Reactor Vessel level is  $\leq$  80 inches should be minimized to ensure natural circulation is immediately available upon a loss of forced circulation.
- D: Incorrect – RPV level does not directly affect temperature and this is not the reason as stated in the procedure

Technical Reference(s): HC.OP-IO.ZZ-0002 step 3.2.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: IOP002E003 (As available)

Question Source: Bank # 57043  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 5  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295006	AK1.03
	Importance Rating	3.7	

Knowledge of the operational implications of the following concepts as they apply to SCRAM :  
Reactivity control

Question: RO #41

A reactor scram has just occurred and the crew is executing HC.OP-AB.ZZ-0000, REACTOR SCRAM.

Which of the following is the reason that step S-8 directs the operator to RESET the scram (SB) if conditions permit?

- A. To prevent excessive discharge of hot radioactive water to the Reactor Building Equipment Drain Sump.
- B. To reduce the potential for CRD pump run-out and reduce the amount of time for the HCU accumulators to recharge.
- C. To restore the CRD hydraulic system to normal for insertion of control rods that are NOT fully inserted.
- D. To re-establish the normal primary vessel boundaries by isolating the CRD HCU from the scram discharge volume (SDV) and closing the SDV vent and drain valves.

Proposed Answer: C



## Explanation (Optional):

- A: Incorrect - resetting scram will send water to the Rx Bldg Equipment Drain Sump
- B: Incorrect - system flow restricting orifice limits pump run-out to 200 gpm
- C: Correct – From the LP: Allows restoration of the CRD hydraulic system normal Insert and Withdrawal capability if rods are found at the 02 or \*\* post Scram reset.
- D: Incorrect - the Scram reset will open the vents and drains

Technical Reference(s): NOHO1AB000-02, Obj.4 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: AB0000E004 (As available)

Question Source: Bank # NRC 2005  
Modified Bank # (Note changes or attach parent)  
New

## Question History:

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

10 CFR Part 55 Content: 55.41 10  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295019	AK2.09
	Importance Rating	3.3	

Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR and the following: Containment

Question: RO #42

The plant is operating at rated power.

Which one of the following describes the effects of a loss of instrument air on Primary Containment ?

(Assume NO operator actions)

- A. The normal vent paths will be lost. The normal make-up path will remain available. The Rx Bldg to Torus Relief Vacuum Breakers will NOT be affected.
- B. The normal make-up and vent paths will be lost. The Rx Bldg to Torus Relief Vacuum Breakers will NOT be affected.
- C. The normal make-up and vent paths will NOT be lost. The Rx Bldg to Torus Relief Vacuum Breakers will become unavailable.
- D. The normal make-up and vent paths will be lost. The Rx Bldg to Torus Relief Vacuum Breakers will become unavailable

Proposed Answer: D

## Explanation (Optional):

- A: Incorrect – The normal vent path will also be lost because the CACS valves fail closed on loss of instrument air
- B: Incorrect - The normal make-up path will also be lost because the CACS valves fail closed on loss of instrument air
- C: Incorrect – The main condenser will be lost as a heat sink (outboard MSIV closure)
- D: Correct – Per AB.COMP -0001 Attachment 2

Technical Reference(s): ABCOMP -0001

(Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: INSAIRE016, Given a system or component that is either physically connected to or required for support of the Instrument Air System or emergency instrument air compressor, assess the interrelationship, IAW available references. (As available)

Question Source: Bank #

Modified Bank #

(Note changes or attach parent)

New

X

## Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 7

55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295024	EK2.07
	Importance Rating	3.9	

Knowledge of the interrelations between HIGH DRYWELL PRESSURE and the following:  
PCIS/NSSSS

Question: RO #43

Which of these correctly describes the Drywell Pressure signal input relationship to the Primary Containment Isolation System (PCIS)?

NOTE: Nuclear Steam Supply Shutoff System (NSSSS)  
Reactor Protection System(RPS)

- A. PCIS LOCA LEVEL 2 logic signal originates from Core Spray & RPS instrumentation.
- B. PCIS LOCA LEVEL 2 logic signal for originates from ONLY the Core Spray instrumentation.
- C. PCIS LOCA LEVEL 1 logic signal originates from ONLY the RPS instrumentation.
- D. PCIS LOCA LEVEL 1 logic signal originates from Core Spray & NSSSS instrumentation.

Proposed Answer: A

## Explanation (Optional):

- A: Correct – Per LP NOH04PCIS00C-00 Table 1, figures 1 and 2
- B: Incorrect – LOCA level 2 high DW pressure also originate from RPS/NS4
- C: Incorrect - All LOCA Level 1 high DW pressure signals originate from the Core spray system
- D: Incorrect – All LOCA Level 1 high DW pressure signals originate from the Core Spray system

Technical Reference(s): LP NOH04PCIS00C-00 Table 1, (Attach if not previously provided)  
figures 1 and

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH04PCIS00C-00 Obj. R4 and R5 (As available)

Question Source: Bank # 56560  
Modified Bank # (Note changes or attach parent)  
New

## Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295025	EK 2.01
	Importance Rating	4.1	

Knowledge of the interrelations between HIGH REACTOR PRESSURE and the following: RPS

KA match justification – the question asks the relationship between RPS and high reactor pressure by testing the knowledge and understanding that the high reactor pressure scram signal is never bypassed in RPS. Asking just for that information without other inputs to RPS would make the question a lower level of difficulty.

Question: RO #44

Which one of the following describes RPS scram signals that under specific conditions are automatically bypassed.

- (1) OPRM
- (2) Turbine Stop Valve Closure
- (3) Reactor Mode Switch In Shutdown
- (4) Reactor Vessel Steam Dome Pressure High

- A. (1), (2) and (3)
- B. (1), (2) and (4)
- C. (1), (3) and (4)
- D. (2), (3) and (4)

Proposed Answer: A

Explanation (Optional): 1) OPRM: Bypassed-< 26.1% Rated Thermal Power OR > 68% Rated

Core Flow OR OPRM Bypassed OR Associated APRM in Bypass will bypass the OPRM trip contact(s), 2) Turbine Stop Valve: – Closure Bypassed- <104.2 psig Turb 1<sup>st</sup> Stage Pressure. 3) Rx. Mode Switch in Shutdown: Bypassed - 6 (+/-4) seconds after the Mode Switch is in SHUTDOWN 4) Reactor Vessel Steam Dome Pressure High: Bypassed-NONE

- A: Correct - (1), (2) and (3) See above explanation  
B: Incorrect - (4) is never bypassed  
C: Incorrect - (4) is never bypassed  
D: Incorrect - (4) is never bypassed

Technical Reference(s): NOH01RPS00C-06 Table 1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01RPS00C-06 Obj. 4 (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 6  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295021	AK2.03
	Importance Rating	3.6	

Knowledge of the interrelations between LOSS OF SHUTDOWN COOLING and the following:  
RHR/Shutdown Cooling

Question: RO #45

Given:

- Alternate Shutdown Cooling is being implemented by using the "C" to "A" RHR Loop Cross-Tie.

If the operator opens BC-HV-F007C, "C" RHR PMP MIN FL MOV during this operation, how will the plant initially respond?

- A. RHR Pump "C" will lose NPSH.
- B. The RPV will drain to the Suppression Pool.
- C. Flow through the "A" RHR Heat Exchanger will rise.
- D. SACS outlet temperature from "A" RHR Heat Exchanger will rise.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – C RHR Pump would eventually lose NPSH. The stem stipulates the selection of the first consequence
- B: Correct - Opening HV-F007 C will establish a drain path from the B Recirculation Pump Loop to the Torus via C RHR Pump Suction and HV-F007



- C: Incorrect - The flow which existed initially in the A RHR Heat Exchanger will lower due to a drain path being opened to the Torus.
- D: Incorrect - The loss of RHR flow to the A RHR Heat Exchanger will lower the heat burden on SACS and hence the SACS outlet temperature will not rise.

Technical Reference(s): HC.OP-AB.RPV-0009, Rev.6 Att.2 (Attach if not previously provided)  
Caution for step 1.6

Proposed References to be provided to applicants during examination: none

Learning Objective: (As available)

Question Source: Bank # NRC 2009  
Modified Bank # (Note changes or attach parent)  
New

Question History: NRC 2009

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

10 CFR Part 55 Content: 55.41 5  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295030	EK3.02
	Importance Rating	3.5	

Knowledge of the reasons for the following responses as they apply to LOW SUPPRESSION  
POOL WATER LEVEL: HPCI operation: Plant-Specific

Question: RO #46

IAW the EOPs, HPCI must be secured when suppression pool level lowers to \_\_\_\_\_

- A. 30 inches to prevent over-pressurizing primary containment.
- B. 38.5 inches to prevent inadequate HPCI pump NPSH.
- C. 30 inches to prevent inadequate HPCI pump NPSH.
- D. 38.5 inches to prevent over-pressurizing primary containment.

Proposed Answer: A

Explanation (Optional):

- A: Correct –EOP 102 step SP/L-10 directs securing HPCI if SP level cannot be maintained >30 inches. HPCI steam exhaust line is located ≈25" torus level and would be uncovered as torus level lowers, which allows for steam to directly enter the torus air space
- B: Incorrect – This is the level that emergency depressurization is required
- C: Incorrect – not the reason stated in the EOP bases document

D: Incorrect - This is the level that emergency depressurization is required

Technical Reference(s): EOP-102 bases for step SP/L-10 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: EOP102E009 (As available)

Question Source: Bank # AUDIT 2005 slightly  
modified  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 8  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295016	AA1.08
	Importance Rating	4.0	

Ability to operate and/or monitor the following as they apply to CONTROL ROOM  
ABANDONMENT :Reactor Pressure

KA match justification – monitoring and controlling decay heat removal directly affects reactor pressure

Question: RO #47

The plant was operating 100% reactor power with all systems normal.

- A fire started under the Control Room Console 10C651 causing a reactor scram.
- The Control Room has been evacuated because of extreme smoke conditions.
- The reactor has been depressurized to 75 psig with SRV's.

Which system will be used to remove reactor decay heat, IAW HC.OP-IO.ZZ-0008, Shutdown From Outside The Control Room, from controls at Panel 10C399, Remote Shutdown Panel?

- A. RHR loop "A" in Shutdown Cooling.
- B. RHR loop "B" in Shutdown Cooling.
- C. RHR loop "A" in Suppression Pool Cooling.
- D. RHR loop "B" in Suppression Pool Cooling.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – no controls for A RHR from the RSP to place it in shutdown cooling
- B: Correct – IAW IO-ZZ-0008 step 5.10.6 at less than 80 psig reactor pressure, RHR 'B' is placed in shutdown cooling. NOTE: must be less than 82 psig to clear the low pressure interlock on shutdown cooling suction valves
- C: Incorrect – There are no controls at the RSP to place "A" RHR in suppression pool cooling. Additionally, shutdown cooling must be placed in service
- D: Incorrect - shutdown cooling must be placed in service

Technical Reference(s): IO-ZZ-0008 step 5.10.6 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: (As available)

ES-401

Written Examination  
Question Worksheet

Form ES-401-5

Question Source: Bank # 55906

Modified Bank #

(Note changes or attach parent)

New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 6

55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295038	EA1.03
	Importance Rating	3.7	

Ability to operate and/or monitor the following as they apply to HIGH OFF-SITE RELEASE  
RATE: Process liquid radiation monitoring system

Question: RO #48

Given:

- A discharge of the Equipment Drain Sample Tank is in progress to the River
- The Liquid Radwaste Discharge Isolation Valve (HV-5377A) to the Cooling Tower Blowdown automatically closes.

Which one of these condition(s) would cause this termination?  
(Assume NO operator action)

- (1) Liquid Radwaste Effluent High radiation setpoint is reached
- (2) Cooling Tower Blowdown dilution flow low flow setpoint is reached
- (3) Liquid Radwaste Effluent sample flow rate HI setpoint is reached
- (4) Cooling Tower Blowdown RMS High radiation setpoint is reached
- (5) Liquid Radwaste Effluent High discharge flow setpoint is reached

- A. (1) and (3) ONLY
- B. (2), (4) and (5) ONLY
- C. (2), (3) and (4) ONLY

D. (1), (2) and (5) ONLY

Proposed Answer: D

Explanation (Optional):

- A: Incorrect. (3) is incorrect. (5) is also correct
- B: Incorrect. (4) is incorrect. (1) is also correct
- C: Incorrect. (3) is incorrect. (1) is also correct
- D: Correct IAW HC.OP-AR.SP-0001 Alarm Point 9RX508  
AUTOMATIC ACTION - Isolation of HV-5377A&B due to any one of the following:
- High radiation (HIGH LED on 0SP-RI-4861)
  - High Disch Flow ( setpoint determined by Liquid Effluent Permit )
  - Low Dilution Flow ( setpoint determined by Liquid Effluent Permit )
  - Low Sample Flow (0HBFIS-4861)
  - Monitor Failure

Technical Reference(s): HC.OP-AR.SP-0001 Alarm Point (Attach if not previously provided)  
9RX508, Att 5

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH04RMSYSC-07 OBJ.4 (As available)

Question Source: Bank # NRC 2009  
Modified Bank # (Note changes or attach parent)  
New

Question History: NRC 2009



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

10 CFR Part 55 Content: 55.41 13  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295018	AA1.02
	Importance Rating	3.3	

Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE  
LOSS OF COMPONENT COOLING WATER : System loads

Question: RO #49

Given:

The 'A' SACS Loop is in service supplying TACS.

- The 'D' SACS pump is running.
- The 'B' SACS Pump is Cleared and Tagged.
- The 'A' Fuel Pool Cooling Heat Exchanger (FPCC side only) is isolated for a piping leak repair.

THEN, a lightning strike results in:

- An 'A' channel LOCA Level 1 signal.
- The loss of the 10A404 4KV bus.

What is the status of the Fuel Pool Cooling System given these conditions?

Fuel Pool Cooling\_\_\_\_\_

- A. is unaffected.
- B. heat removal is being provided by the 'B' SACS Loop.
- C. heat removal has been lost and can be restored when the LOCA signal is reset.
- D. heat exchanger cross-tie valves auto open to provide Loop 'A' SACS flow to the

'B' FPCC heat exchanger.

Proposed Answer: C

Explanation (Optional):

- A: Incorrect - The loss of the 10A404 Bus results in the loss of the 'D' SACS Pump and the 'B' SACS loop and the loss of cooling to the only in service FPCC HX.
- B: Incorrect – The “D” SACS pump is tripped on the bus loss
- C: Correct - The loss of the 10A404 Bus results in the loss of the 'D' SACS Pump and the 'B' SACS loop. With the 'A' FPCC HX OOS on the FPCC side, all SACS cooling to FPCC is lost. The Cross-tie valve HV-2317A and HV-7922A receive close signals from the LOCA signal and cannot be opened without clearing the signal. The LOCA signal must be cleared to open the cross-tie valves and supply 'A' loop SACS flow to the 'B' FPCC HX.
- D: Incorrect - The valves close on a LOCA signal and have no auto open signals.

Technical Reference(s): HC.OP-SO.SM-0001 (Attach if not previously provided)  
NOH01FPCCOO-05

Proposed References to be provided to applicants during examination: None

Learning Objective: STACS0E020 Given plant conditions, (As available)  
determine the STACS response to a  
valid LOCA and/or LOP signal.

Question Source: Bank # 60630  
Modified Bank # (Note changes or attach parent)  
New

ES-401

Written Examination  
Question Worksheet

Form ES-401-5

Question History:

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

10 CFR Part 55 Content:	55.41	7
	55.43	

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295005	AA1.01
	Importance Rating	3.1	

Ability to operate and/or monitor the following as they apply to MAIN TURBINE GENERATOR  
TRIP : Recirculation system: Plant-Specific

Question: RO #50

A plant startup was in progress when the 'A' RPS bus was lost due to the inadvertent tripping of the 'A' RPS MG output breaker.

Current conditions are:

- Reactor power: 23%
- Main Generator load: 260 MWe
- Main Turbine 1st Stage Pressure 80 psig
- DFCS is in Single Element Control on the Master Level Controller
- 'A' RPS bus de-energized

Assuming NO operator actions are taken, what would be the IMMEDIATE effect if the Main Turbine were to trip under these conditions?

- A. Trip of both Reactor Recirculation Pumps.
- B. ONLY an Intermediate runback of both Reactor Recirculation Pumps.
- C. Trip of the 'A' Recirc pump ONLY.
- D. ONLY a Full runback of both Reactor Recirculation Pumps.

Proposed Answer: A

Explanation (Optional):

- A: Correct. A precaution in HC.OP-SO.SB-0001 warns that transfer of an RPS power supply will result in EOC-RPT actuation and a recirc pump trip if the Turbine Stop valves are closed. This is due to the momentary loss of power to the RPS bus during the transfer. The only way to prevent this is to bypass the EOC-RPT trip with the Recirc Pump Trip System Disable switches. IAW HC.OP-IO.ZZ-0003, the Recirc Pump Trip System Disable switches are placed in NORMAL immediately after synchronizing and loading the Main Turbine, and prior to placing feedwater in Single Element control on the Master level controller. The initial conditions for this question have the plant at a point where the switches would already be in NORMAL.
- B: Incorrect. The pumps will trip and not runback
- C: Incorrect. both pumps will trip
- D: Incorrect. The pumps will trip and not runback

Technical Reference(s): HC.OP-SO.SB-0001 (Attach if not previously provided)  
PN1-C71-1020-0006 Sheets 9, 11,  
13, 15  
HC.OP-IO.ZZ-0003

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01 RECIRC-07 Obj.7 (As available)

Question Source: Bank # 61260  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295003	AA2.02
	Importance Rating	4.2	

Ability to determine and/or interpret the following as they apply to **PARTIAL OR COMPLETE**  
**LOSS OF A.C. POWER** : Reactor power, pressure, and level

Question: RO #51

The plant was operating at rated power when bus lockouts occur on buses 10A110 and 10A120 due to voltage perturbations.

Which one of the following describes the INITIAL effect on the plant?  
(Assume NO operator actions)

- A. The plant will NOT scram, however, reactor power will lower and RFPTs will be available to control RPV level.
- B. The plant will scram and RPV level will be controlled by HPCI and RCIC. RPV pressure will be controlled with bypass valves augmented by SRVs as required.
- C. The plant will scram and RPV level will be controlled by HPCI and RCIC. RPV pressure must be controlled by SRVs ONLY.
- D. The plant will NOT scram however, reactor power will rise and RFPTs will be available to control RPV level .

Proposed Answer: B

## Explanation (Optional):

- A: Incorrect – The plant will scram on low level due to loss of condensate
- B: Correct – These busses power 2 of 3 secondary condensate pumps and 2 of 3 primary condensate pumps. With this loss of condensate pumps, the plant will scram on low level. HPCI and RCIC will be available to control RPV level. The bypass valves will be available to control RPV pressure. HPCI and RCIC function independent AC power.
- C: Incorrect – SRVs would be required if an MSIV closure occurred. No MSIV closure will occur due to the bus lockouts
- D: Incorrect – secondary condensate pumps have lost power and will not be available. And the reactor will scram. A belief that a loss of FW heating occurred could lead to thinking power went up.

Technical Reference(s): NOH01MNCONDC-05 Section (Attach if not previously provided)  
III.B.7. & 15.

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01MNCONDC-05 Obj. 9 & 10 (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

## Question History:

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

10 CFR Part 55 Content: 55.41 4  
55.43

Comments:



Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295037	EA2.04
	Importance Rating	4.0	

Ability to determine and/or interpret the following as they apply to SCRAM CONDITION  
PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN :  
Suppression pool temperature

Question: RO #52

Which of the following describes the basis for initiating boron injection before exceeding the Boron Injection Initiation Temperature (BIIT)?

- A. This ensures the Reactor will be in Hot-Shutdown before the Suppression Pool reaches the Heat Capacity Temperature Limit.
- B. This ensures the Reactor will be in Hot-Shutdown before the Suppression Pool reaches the Heat Capacity Level Limit.
- C. This ensures the Primary Containment Pressure Limit will NOT be exceeded before RPV pressure is below the Minimum Alternate Flooding Pressure.
- D. This ensures Suppression Pool Temperature will NOT exceed 150°F during an Emergency Depressurization, if required.

Proposed Answer: A

Explanation (Optional):

- A: CORRECT - The Boron Injection Initiation Temperature Limit (BIIT) is the highest Suppression Pool temperature at which initiation of boron injection will permit injection

of the Hot Shutdown Boron Weight of boron before Suppression Pool temperature exceeds the Heat Capacity Temperature Limit.

- B: Incorrect - Before Suppression Pool temperature exceeds the Heat Capacity Temperature Limit.
- C: Incorrect - Before Suppression Pool temperature exceeds the Heat Capacity Temperature Limit.
- D: Incorrect – The Boron Injection Initiation Temperature Limit (BIIT) of 150°F is the highest Suppression Pool temperature at which initiation of boron injection will permit

Technical Reference(s): EOP 101A bases for step RC/Q- (Attach if not previously provided)  
10

Proposed References to be provided to applicants during examination: none

Learning Objective: EO101AE005 (As available)

Question Source: Bank # 53439  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295026	EA2.03
	Importance Rating	3.9	

Ability to determine and/or interpret the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Reactor pressure

Question: RO #53

Given:

- An ATWS is in progress
- APRM's read 10%
- Manual rod insertion is in progress
- MSIV's are closed
- Pressure is being maintained at 800 psig using SRV's
- Suppression Pool temperature is 185°F and rising at 2°F/5 min
- Suppression Pool level is 70" and steady
- Suppression Chamber pressure is 22 psig and rising at 1 psi/15 min

Based on the conditions above, which of the following describes the INITIAL action and the reason for that action?

- A. Reduce RPV pressure to prevent exceeding the Pressure Suppression Pressure limit.
- B. Emergency Depressurize to prevent exceeding the Heat Capacity Temperature limit.
- C. Emergency Depressurize to prevent exceeding the Pressure Suppression Pressure limit.
- D. Reduce RPV pressure to prevent exceeding the Heat Capacity Temperature limit.

Proposed Answer: D

Explanation (Optional):

- A: Incorrect – PSP curve is not dependent on Reactor pressure
- B: Incorrect - With RPV pressure at 800 psig and SP temperature at 185 °F and rising at 2°F/ 5 min, the HCTL will be exceeded in about 23 min. IAW Step SP/T-9, a pressure reduction prior to an ED is warranted. ED is NOT required yet.
- C: Incorrect - SP pressure is at 22 psi and rising at 1 psi/15 min. and SP level is at 70 " and stable. With this rate of change, it will be about 30 minutes before the PSPL is exceeded, an ED is NOT yet appropriate.
- D: Correct - With RPV pressure at 800 psig and SP temperature at 185 °F and rising at 2°F/ 5 min, the HCTL will be exceeded in about 23 min. IAW Step SP/T-9, a pressure reduction prior to an ED is warranted

Technical Reference(s): EOP-101A

(Attach if not previously provided)

Proposed References to be provided to applicants during examination:

EOP-102 SP/T leg steps 7 thru 10 & HCTL curve, DW/P leg steps 7 to 13 & PSP curve, EOP-101A RC/P leg only

Learning Objective:

(As available)

Question Source: Bank # NRC 2005 slightly modified

Modified Bank #

(Note changes or attach parent)

New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 10

55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	700000	2.1.28
	Importance Rating	4.1	

Conduct of Operations: Knowledge of the purpose and function of major system components and controls. (Generator Voltage and Electric Grid Disturbances)

KA match justification- need to understand the purpose/function of the cross tripping circuitry to answer question

Question: RO #54

Given:

- The plant is operating at 100% power.
- LAC Police report a marsh fire directly beneath the New Freedom 500 KV Line (5023).
- HC.OP-AB.BOP-0004 Grid Disturbances is entered.
- It is determined that the 5023 line must be removed from service.

What is the concern when removing the line from service IAW HC.OP-AB.BOP-0004, Grid Disturbances?

If the Cross-Tripping circuits are \_\_\_\_.

- A. armed, a trip of either Salem Unit 1 or Salem Unit 2 can result
- B. armed, a trip of either Salem Unit 1, Salem Unit 2 or Hope Creek can result
- C. NOT armed, a trip of either Salem Unit 1 or Salem Unit 2 can result
- D. NOT armed, a trip of either Salem Unit 1, Salem Unit 2 or Hope Creek can result

Proposed Answer: A

Explanation (Optional):

- A: Correct – per abnormal Caution 2
- B: Incorrect – Hope Creek would not be affected
- C: Incorrect – the concern is when the circuits are armed
- D: Incorrect – the concern is when the circuits are armed. Hope Creek is not affected

Technical Reference(s): OP-AB.BOP-0004 Caution 2. (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: ABBOP4E007-given plant conditions/procedures determine required actions of the retainment overrides and subsequent operator actions in accordance with grid disturbances (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 4  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295023	AK3.02
	Importance Rating	3.4	

Knowledge of the reasons for the following responses as they apply to REFUELING ACCIDENTS : Interlocks associated with fuel handling equipment.

Question: RO #55

The refueling platform interlocks ensure that \_\_\_\_ (1) \_\_\_\_ does NOT occur during fuel handling operations by preventing \_\_\_\_ (2) \_\_\_\_.

- A. (1) excessive iodine gas release  
(2) withdrawal of any control rods with the Mode Switch in the REFUEL position
- B. (1) inadvertent criticality  
(2) control rod withdrawal whenever fuel loading equipment is energized
- C. (1) excessive iodine gas release  
(2) refueling hoist movement when fuel pool level is below the alarm setpoint
- D. (1) inadvertent criticality  
(2) control rod withdrawal whenever fuel loading equipment is over the core

Proposed Answer: D

Explanation (Optional):

- A: - Incorrect – Iodine quantity is not inputted into the Rod Block Circuitry. One control rod withdraw is permitted with MS in Refuel
- B: - Incorrect - Interlocks allow CR movement with refuel platform energized.

- C: Incorrect - Iodine quantity is not inputted into the Rod Block Circuitry . CR movement is not interlocked with FP level.
- D: Correct – Per USFSAR 7.7.1.4 Design Basis for Refueling Platform Interlocks

Technical Reference(s): USFSAR 7.7.1.4

(Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH04MANCONC-04 Obj. 1 & 8 (As available)

Question Source: Bank # 2005 audit

Modified Bank # (Note changes or attach parent)

New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 6

55.43

Comments:



Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295028	2.2.25
	Importance Rating	3.2	

Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits. (High Drywell Temperature)

Question: RO #56

The Technical Specification for Drywell Air Temperature Limit ensures that the containment peak air temperature does not exceed the drywell design temperature of \_\_\_(1)\_\_\_ during a LOCA and the LCO temperature limit is based on drywell \_\_\_(2)\_\_\_

- A. (1) 310 °F  
(2) average air temperature
- B. (1) 310 °F  
(2) highest local temperature
- C. (1) 340 °F  
(2) average air temperature
- D. (1) 340 °F  
(2) highest local temperature

Proposed Answer: C

Explanation (Optional):

A: Incorrect - 310 degrees is torus design temperature

- B: Incorrect - 310 degrees is torus design temperature
- C: Correct - IAW TS bases 3.6.1.7 - The limitation on drywell average air temperature ensures that the containment peak air temperature does not exceed the design temperature of 340°F during LOCA conditions and is consistent with the safety analysis. The 135°F average temperature is conducive to normal and long term operation.
- D: Incorrect - based on average temperature

Technical Reference(s): TS bases 3.6.1.7

(Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: TECSPCE009 Explain the bases for (As available)  
Hope Creek Generating Station  
Technical Specification Safety Limits  
and Limiting Safety System Settings.

Question Source: Bank # WTS

Modified Bank #

(Note changes or attach parent)

New

Question History:

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

10 CFR Part 55 Content: 55.41 5  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295004	AK1.05
	Importance Rating	3.3	

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

Question: RO #57

The plant is at rated power.

A loss of 125 VDC occurs to the normal in-feed breaker for 7.2 KV Bus 10A110.

Which describes the effect of this loss, if any?

The breaker \_\_\_(1)\_\_\_ trip on a bus lockout and the ability to open and/or close the breaker from the control room \_\_\_(2)\_\_\_ be functional.

- A. (1) will NOT, (2) will
- B. (1) will NOT, (2) will NOT
- C. (1) will, (2) will NOT
- D. (1) will, (2) will

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – breaker protection and control room control function is lost
- B: Correct – Per the LP The 125 VDC Power System supplies DC power as breaker control power for: 4.16 KV, 480 V Unit Substation & 250 VDC breakers
- C: Incorrect – Breaker protection will be lost
- D: Incorrect – the 125 VDC supplies must be swapped manually

Technical Reference(s): NOH01DCELEC-01-Section III.A.1.a, E-0051 print (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: DCELECE020 Given a list of loads (As available)  
powered by the DC Distribution  
System evaluate the affect of a loss of  
D.C. power for each component.

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295001	AA2.01
	Importance Rating	3.5	

Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE  
LOSS OF FORCED CORE FLOW CIRCULATION : Power/flow map

Question: RO #58

The plant was at rated power with the OPRMs OPERABLE when the 10A120 bus was lost.

Current plant conditions:

- C3-F1 OPRM TRIP ENABLE is in alarm (all channels enabled)
- C3-F2 OPRM ALARM is in alarm (two channels in alarm)
- Reactor Power: 56%
- Core Flow indication on FR-R613 Jet Pump Flow recorder: 16 Mlbm/hr
- Jet Pump Loop A Flow on FI-R611A: 28 Mlbm/hr
- Jet Pump Loop B Flow on FI-R611B: 12 Mlbm/hr
- Recirc Pump 'A' Flow on FI-R617: 10,000 gpm
- Recirc Pump 'A' speed: 30%

Which of the following describes the location entered on the power/flow map and what action is required for this condition IAW HC.OP-AB.RPV-003, Recirculation System/Power Oscillations?

- A. Region 1 has been entered. Immediately lock the mode switch in shutdown.
- B. Region 1 has been entered. Immediately insert control rods IAW enhanced stability guidance to exit the region.
- C. The MELLA boundary has been exceeded. Immediately lock the mode switch in shutdown.
- D. The MELLA boundary has been exceeded. Immediately insert control rods IAW enhanced stability guidance to exit the region.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – would be correct if the OPRMs were inoperable
- B: Correct - . must add Idle and Operating Loop Jet pump flows to determine actual core flow when the operating recirc pump is <48% speed or 23 kgpm flow. This yields an actual core flow of 40 mlbm/hr. With 56% power this places the plant in Region 1 of the Power to Flow map. With OPRMS operable, Condition B directs inserting control rods using the Enhanced Stability Guidance to EXIT Region 1.
- C: Incorrect – the MELLA boundary has not been exceeded
- D: Incorrect – Region 2 is only referred to with OPRMs inoperable

Technical Reference(s): AB-RPV-003 Power/Flow maps (Attach if not previously provided)

Proposed References to be provided to applicants  
during examination:

AB-RPV-003  
power/flow maps

Learning Objective: ABRPV3E007

(As available)

Question Source: Bank # 64577

Modified Bank #

(Note changes or attach parent)

New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 10

55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295022	AK1.02
	Importance Rating	3.6	

Knowledge of the operational implications of the following concepts as they apply to LOSS OF CRD PUMPS: Reactivity control

Question: RO #59

The plant is starting up following a maintenance outage.

At 07:35, Reactor pressure is 700 psig when the B CRD pump trips. Charging header pressure drops to 700 psig.

At 07:45, while preparations are being made to start the A CRD pump, three accumulator alarms are received.

- Control Rod 14-07 is at position 00 with accumulator pressure at 920 psig
- Control Rod 14-15 is at position 00 with accumulator pressure at 920 psig
- Control Rod 26-23 is at position 24 with accumulator pressure at 950 psig

When is the Mode Switch required to be Locked in Shutdown IAW HC.OP-AB.IC-001, Control Rod?

- A. Immediately.
- B. If the same conditions exist at 07:55.
- C. If the same conditions exist at 08:05.
- D. When accumulator pressure on control rod 26-23 lowers to <940 psig.



Proposed Answer: D

Explanation (Optional):

- A: Incorrect – one withdrawn control rod must have an inoperable accumulator (<940 psig)
- B: Incorrect – with RX pressure >900 psig a 20 minute clock starts. Then, if two withdrawn control rods have an inoperable accumulator (<940 psig) the mode switch is locked in shutdown. (the clock starts at time of discovery – i.e. all conditions met, not from the initial pump trip)
- C: Incorrect – with RX pressure >900 psig a 20 minute clock starts. Then, if two withdrawn control rods have an inoperable accumulator (<940 psig) the mode switch is locked in shutdown
- D: Correct – Per AB-IC-001 retainment override step – IF Reactor Pressure < 900 psig AND Charging Water Header Pressure < 940 psig AND ANY WITHDRAWN Control Rod Scram Accumulator INOPERABLE. THEN LOCK the Mode Switch in shutdown

Technical Reference(s): AB-IC-001 Retainment override (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295012	AK2.01
	Importance Rating	3.4	

Knowledge of the interrelations between HIGH DRYWELL TEMPERATURE and the following:  
Drywell ventilation?

Question: RO #60

Give the following conditions:

- A small break LOCA has occurred
- Drywell pressure is 1.8 psig and rising slowly
- Drywell temperature is 138 °F and rising slowly
- ALL ECCS have responded as designed

Which of the below describes the system status and required actions, if any, related to Drywell Ventilation for this event

The Drywell Cooler fans:

- A. have tripped and will auto restart in low speed only.
- B. have tripped and will NOT auto restart in low speed.
- C. remain running but RACS must be manually aligned to the coiling coils.
- D. remain running but Chilled Water must be manually aligned to the coiling coils.

Proposed Answer: B

## Explanation (Optional):

- A: Incorrect – The fans must be manually started
- B: Correct – The fans tripped on the LOCA signal and must be manually started as required.
- C: Incorrect - The fans are lost when a LOCA signal occurs (hi DW pressure) and the electrical supply bus is load shed.
- D: Incorrect - The fans are lost when a LOCA signal occurs (hi DW pressure) and the electrical supply bus is load shed.

Technical Reference(s): LP NOHO4DWVENTC-03 Section (Attach if not previously provided)  
III.B.3.b.1)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOHO4DWVENTC-03 Obj.R5 (As available)

Question Source: Bank # 71307  
Modified Bank # (Note changes or attach parent)  
New

## Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295036	EK3.02
	Importance Rating	2.8	

Knowledge of the reasons for the following responses as they apply to **SECONDARY**  
CONTAINMENT HIGH SUMP/AREA WATER LEVEL : Reactor SCRAM

Question: RO #61

Given:

- The RCIC turbine is on fire and the Fire Brigade has been actively spraying water on RCIC.
- The Fire Brigade reports steam coming out of the RCIC steam supply line.
- The Fire Brigade has just reported that the fire is under control and they should be securing shortly.
- RCIC Pump room (4110) Floor level is 6"
- RHR Pump room "B" (4109) Floor level is 3"
- RHR Pump room "D" (4107) Floor level is 3"
- Core Spray Pump room "B" (4104) Floor level is 3"
- Core Spray Pump room "D" (4105) Floor level is 3"
- "D" South Reactor Building Sump pump (DP-265) is tagged out for motor replacement
- Reactor Building HVAC Exhaust Rad level is  $1.5 \times 10^{-3} \mu\text{Ci}/\text{ml}$

In addition to restoring floor levels to normal using all available sump pumps, which of the following correctly states the proper operator actions to be taken and/or the reasons for those actions:

- (1) Isolate ALL water discharging into the RCIC pump room in order to terminate level challenges to RHR & Core Spray pump rooms.
- (2) Runback Recirc and initiate a manual scram to ensure personnel safety and equipment operability.
- (3) Emergency Depressurize the Reactor in order to place primary containment in it's

lowest possible energy state.

- (4) Verify FRVS is in-service and RBVS is isolated in order to prevent/minimize off-site releases due to high radiation levels.

ONLY:

- A. (1)
- B. (2) and (4)
- C. (2), (3) and (4)
- D. (1), (2) and (3)

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – per EOP 103/4, actions taken to suppress fire need not be secured –step RB13
- B: Correct - Max Safe OP limit has been exceeded in 1 area, the RCIC Room. (EOP step RB 13) Due to high radiation in the reactor building and the field report of the steam coming from the steam supply line, RCS is discharging to Rx building. A Manual Scram needs to be initiated. (EOP step RB 17) Due to RX BLDG HVAC High Rad, Verify FRVS start and RBVS Isolation (EOP step RB 1)
- C: Incorrect - Max Safe OP limit has NOT been exceed in 2 or more areas. Therefore you don't need to Emergency Depressurize.
- D: Incorrect - per EOP 103/4, actions taken to suppress fire need not be secured –step RB13. Max Safe OP limit has NOT been exceed in 2 or more areas. Therefore you don't want to Emergency Depressurize.

Technical Reference(s): HC.OP-EO.ZZ-0103/4, BASES (Attach if not previously provided)  
pages 1, 3, 7, 8, 10

Proposed References to be provided to applicants during examination: EOP 103/4 ONLY  
steps RB-13 thru 23

Learning Objective: EOP103E006 Given any step in the (As available)  
procedure, describe the reason for  
performance of that step and/or  
expected system response to control

manipulations prescribed by the step.

Question Source: Bank # NRC 2005  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 10  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295009	AA1.03
	Importance Rating	3.0	

Ability to operate and/or monitor the following as they apply to LOW REACTOR WATER  
LEVEL : Recirculation system: Plant-Specific

Question: RO #62

The plant was operating at full power when a feedwater transient occurred resulting in RPV level lowering to 17 inches before recovering to 30 inches.

Then, one RFPT trips and RPV level again begins to lower.

Which one of the following describes the response of the Recirc Pumps, if any, during the initial transient and after the trip of the RFPT.

- A. Initially there is NO response from the Recirc Pumps. Once the RFPT trips and as soon as RPV level lowers to <30 inches, a full Recirc runback occurs.
- B. Initially there is NO response from the Recirc Pumps. Once the RFPT trips, and as soon as RPV level lowers to <30 inches, an intermediate Recirc runback occurs.
- C. Initially, an intermediate Recirc runback occurs. After the RFPT trips, a full Recirc runback occurs.
- D. Initially, a full Recirc runback occurs. The Recirc pumps will then trip when RPV lowers to -38 inches.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – With an RFPT trip and level <30 inches, an intermediate runback occurs
- B: Correct – Initially no runback initiation signals were reached (<12.5 inches would have caused a full runback) Per the LP, With an RFPT trip and level <30 inches, an intermediate runback occurs
- C: Incorrect – no initial response occurs
- D: Incorrect – no initial response occurs. The -38 inches is a ATWS RPT trip from RRCS

Technical Reference(s): LP NOH01RECCON-09 Section IV.C.2.f.1) & 2) (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01RECCON-09 Obj. R15 (As available)

Question Source: Bank #

Modified Bank # (Note changes or attach parent)

New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X



ES-401

Written Examination  
Question Worksheet

Form ES-401-5

10 CFR Part 55 Content: 55.41 6  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	500000	EA2.02
	Importance Rating	3.0	

Ability to determine and / or interpret the following as they apply to HIGH PRIMARY  
CONTAINMENT HYDROGEN CONCENTRATIONS: Oxygen monitoring system availability

Question: RO #63

While implementing EOP 102, Primary Containment, Post LOCA, the CRS directs you to sample containment atmosphere using the H2/O2 Analyzers.

Which of the following describes:

(1) ALL available sample locations monitored by the Hydrogen/Oxygen Analyzers

(2) whether any containment isolation signal to the associated containment isolation valves can be overridden to ensure availability?

- A. (1) The upper drywell and the torus only  
(2) They ALL CAN be overridden
- B. (1) The upper drywell and the torus only  
(2) They ALL CANNOT be overridden
- C. (1) The upper drywell, lower drywell and the torus  
(2) They ALL CANNOT be overridden
- D. (1) The upper drywell, lower drywell and the torus  
(2) They ALL CAN be overridden

Proposed Answer: D

Explanation (Optional):

- A: Incorrect – the lower drywell is also sampled
- B: Incorrect – the lower drywell is also sampled and all containment isolation signals to the isolation can be manually overridden
- C: Incorrect - all containment isolation signals to the isolation can be manually overridden
- D: Correct per LP NOH01H2O2AN-03 - Each package (H2O2 analyzer) takes samples from three different locations; High - Drywell head region, Low - Drywell cylindrical region, Suppression Chamber Air Space. CIVs can be individually opened after the associated isolation override P.B. is depressed at (10C650E).

Technical Reference(s): LP NOH01H2O2AN-03 Section (Attach if not previously provided)  
III.A.2.a.2) & III.B.1.e.3)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01H2O2AN-03 Obj. 2 & 3 (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295029	2.1.30
	Importance Rating	4.4	

Conduct of Operations: Ability to locate and operate components, including local controls.(High Suppression Pool Level)

Question: RO #64

Given :

- Suppression Pool level is 80 inches and steady.
- The normal means of lowering Suppression Pool level are unavailable.
- The CRS has directed implementation of EOP-0317, SUPPRESSION CHAMBER LEVEL REDUCTION USING RCIC.

The field operator takes local actions IAW EOP-317 to permit which one of the following valve alignments to lower suppression pool level?

The operator will open:

- BD-HV-F010 RCIC PMP SUCT FROM CST ISLN MOV  
BD-HV-F022 Test BYP TO CST ISLN MOV  
BD-HV-F031 RCIC PMP SUCT FROM SUPPRESSION POOL ISLN MOV
- AP-HV-F011 COMMON TEST LINE TO CST ISLN MOV  
BD-HV-F022 Test BYP TO CST ISLN MOV  
BD-HV-F031 RCIC PMP SUCT FROM SUPPRESSION POOL ISLN MOV
- BD-HV-F010 RCIC PMP SUCT FROM CST ISLN MOV  
BD-HV-F031 RCIC PMP SUCT FROM SUPPRESSION POOL ISLN MOV  
BJ-HV-F042 PMP SUC FROM SUPP CHAMBER ISLN
- BD-HV-F010 RCIC PMP SUCT FROM CST ISLN MOV  
AP-HV-F011 COMMON TEST LINE TO CST ISLN MOV  
BD-HV-F022 Test BYP TO CST ISLN MOV

Proposed Answer: B

Explanation (Optional): K/A match justification – All procedural direction for lowering suppression pool level is accomplished from the control room. Although there are no specific local controls used to accomplish the task, interlocks must be bypassed at local panels to permit the procedure to work

A: Incorrect – the F010 will not be open per EOP 317

B: Correct – EOP steps establish this lineup

C: Incorrect - the F010 and F042 will not be open per EOP 317

D: Incorrect – the F010 will not be open per EOP 317

Technical Reference(s): EO-ZZ-0317

(Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: EOP300E003 As applicable, identify (As available)  
isolation signals/interlocks bypassed  
during the performance of each of the  
300 series Emergency Operating  
procedures.

Question Source: Bank #

Modified Bank #

(Note changes or attach parent)

New

X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X

## Comprehension or Analysis

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295010	AA1.02
	Importance Rating	3.6	

Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE:  
Drywell floor and equipment drain sumps

Question: RO #65

Given the following conditions:

- The plant was at 100% power when a 60 gpm LOCA occurred
- Drywell pressure is 2.0 psig and rising 0.1 psig every two minutes
- NO operator actions have been taken

What would be the status of the Drywell Floor Drain sump pumps under these conditions?

- A. Both sump pumps stopped.
- B. Both sump pumps running continuously.
- C. Both sump pumps running intermittently depending on sump level.
- D. One sump pump running continuously and the other sump pump running intermittently depending on sump level.

Proposed Answer: A

Explanation (Optional):

- A: Correct - MCCs 10B252 and 10B262 are shed on high drywell pressure. The CP267 Drywell Floor Drain sump pump is powered from 10B252 and the DP267 Drywell Floor Drain sump pump is powered from 10B262.
- B: Incorrect – both will be stopped due to LOCA load shed
- C: Incorrect - The power for the pumps is LOCA load shed.
- D: Incorrect - The power for the pumps is LOCA load shed.

Technical Reference(s): NOH04RWOVER-02 Section II.J.2. (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: SECCONE012 Given a set of conditions and a drawing of the controls, instrumentation and/or alarms located in the main control room, identify the status of the Secondary Containment by evaluation of the controls/instrumentation/alarms. (As available)

Question Source: Bank # 62500  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 13  
55.43

Comments:



Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	2.1.32	
	Importance Rating	3.8	

Ability to explain and apply all system limits and precautions.

Question: RO #66

The Feedwater system operating procedure HC.OP-SO.AE-0001 contains a caution when placing RFPT exhaust valve seal water in service.

This caution is written to ensure the Exhaust Valve Seal Overflow remains \_\_\_\_\_

- A. open to prevent rupturing the feed pump exhaust diaphragm.
- B. closed to prevent excessive water from entering the RFP turbine and causing damage on subsequent RFPT startup.
- C. closed to maintain sufficient coverage of the exhaust isolation valve seat and disc.
- D. open to minimize erosion of the downstream RFPT exhaust piping and ensure an adequate vacuum seal.

Proposed Answer: A

Explanation (Optional):

- A: Correct – IAW HC.OP-SO.AE-0001 – Steps 3.1.12. - Anytime the RFPT Exhaust Valve Seal Water is in-service the FW-V034 (FW-V036, FW-V038), Exhaust Valve Seal Overflow, MUST be open.
- B: Incorrect – The concern is not water entering the turbine per procedure

- C: Incorrect – the valve must remain open  
D: Incorrect – this is not the concern per the procedure

Technical Reference(s): HC.OP-SO.AE-0001 – Steps (Attach if not previously provided)  
3.1.11 & 12

Proposed References to be provided to applicants during examination: none

Learning Objective: (As available)

Question Source: Bank # 54580  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 10  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	2.1.37	
	Importance Rating	4.3	

Knowledge of procedures, guidelines, or limitations associated with reactivity management.

Question: RO #67

Which one of these describes when control rod single notching is REQUIRED IAW HC.RE-IO.ZZ-0001, Core Operations Guidelines, during a startup?  
(Assume Reactor Engineering has specified NO deviations from the procedure requirements)

- A. At all times prior to reaching criticality.
- B. Moving a control rod tip past an SRM.
- C. After the first doubling is reached during startup.
- D. When the control rod position changes by less than or equal to 4 notches.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – After reaching 3 doublings and before reaching 5 doublings UNLESS approved by the Reactor Engineer. After reaching 5 doublings and below the POAH. Moving a control rod tip past an SRM.
- B: Correct – After reaching 3 doublings and before reaching 5 doublings UNLESS approved by the Reactor Engineer. After reaching 5 doublings and below the POAH. – or Moving a control rod tip past an SRM.

- C: Incorrect – After reaching 3 doublings and before reaching 5 doublings UNLESS approved by the Reactor Engineer. After reaching 5 doublings and below the POAH. Moving a control rod tip past an SRM.
- D: Incorrect – Single notching is recommended, When the position changes by less than or equal to 3 notches UNLESS moving to 00 or 48 (ex. 06-12 is three notches).

Technical Reference(s): HC.RE-IO.ZZ-0001 step 3.20 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: IOP003E009, (R) Given plant (As available)  
problems/industry events associated with  
a startup from cold shutdown to rated  
power, discuss the following IAW the plant  
problem/industry event document:  
a. The root cause of the problem/event.  
b. The HCGS design and/or procedural  
guidelines that will mitigate/reduce the  
likelihood of the problem/event at HCGS.  
c. The "lessons learned" from the  
problem/event.

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 10  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	2.2.2	
	Importance Rating	4.6	

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

Question: RO #68

Diesel Generator "A" 1AG400 has just been synchronized with the Class 1E bus 10A401 resulting in the following generator indications:

- 60.0 Hz
- 200 KW
- 200 KVAR
- 4.280 KV

Which one of the following actions are REQUIRED in accordance with HC.OP-SO.KJ-0001, EMERGENCY DIESEL GENERATORS OPERATION, to restore generator parameters within acceptable limits and the reason for this action?

- A. Raise real load using the GOVERNOR INCREASE PB to prevent reverse power.
- B. Lower reactive load using the GOVERNOR DECREASE PB to prevent reverse Power.
- C. Raise real load using the VOLTAGE CONTROL RAISE PB to prevent generator winding overheating.
- D. Lower reactive load using the VOLTAGE CONTROL LOWER PB to prevent generator winding overheating.

Proposed Answer: A

Explanation (Optional):

- A: CORRECT per procedure precaution 3.1.3., 10% load >443 Kw load
- B: INCORRECT - with generator sync'd to grid, GOV PB changes Real Load NOT reactive load
- C: INCORRECT - with the generator sync'd to the grid, VOLTAGE CONTROL RAISE/LOWER Control Handle will change Reactive load, NOT real load.
- D: INCORRECT - Local control procedure has you ADJUST KiloVar loading to approx. 100 to 500 KVARs using VOLTAGE CONTROL RAISE/LOWER Control Handle, since KVAR loading is already 200 KVARs, this does NOT need to be done

Technical Reference(s): HC.OP-SO.KJ-0001 Steps 3.1.3 (Attach if not previously provided) and 5.6.13.A.6.

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01EAC00-03 Obj.26 (As available)

Question Source: Bank # NRC 2005  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 7  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	2.4.1	
	Importance Rating	4.6	

Knowledge of EOP entry conditions and immediate action steps.

Question: RO #69

The plant is operating at 82% power with the following conditions:

- The "B" SRV is leaking
- "A" RHR loop is in suppression pool cooling
- Torus temperature is 96°F and is still slowly increasing
- Actions to address the leaking SRV are in progress
- Work on the refuel floor has resulted in an HIGH level alarm for the new fuel storage vault channel "A" (RE-4813A) area radiation monitor.

Which one of the following describes actions required?

- A. Immediately enter EOP-101, RPV Control, and EOP-102, Primary Containment Control, and place the "B" RHR loop in suppression pool cooling. NO other EOP entries are required.
- B. Immediately enter EOP-102, Primary Containment Control and place the "B" RHR loop in suppression pool cooling. Before suppression pool temperature reaches 110°F, scram the reactor and enter EOP-101, RPV Control. NO other EOP entries are required.
- C. Immediately enter EOP-101, RPV Control, EOP-102, Primary Containment Control, and EOP-103/4, RB & Rad Release Control. Place the "B" RHR loop in suppression pool cooling.
- D. Immediately enter EOP-102, Primary Containment Control, EOP-103/4, RB &

Rad Release Control and place the "B" RHR loop in suppression pool cooling. Before suppression pool temperature reaches 110°F, scram the reactor and enter EOP-101, RPV Control.

Proposed Answer: D

Explanation (Optional):

- A: Incorrect – EOP-101 entry is not yet required. EOP 103/4 entry is required
- B: Incorrect - EOP 103/4 entry is required
- C: Incorrect - EOP-101 entry is not yet required
- D: Correct - >95 °F is an EOP-102 entry. Also, the EOP requires use of all SP cooling to mitigate the temperature rise in the pool. EOP 101 is not entered until the scram is performed prior to the suppression pool reaching 110 °F Any area rad monitor above its normal level and in alarm, whether Alert or High level, requires entry to EOP-103/4

Technical Reference(s): EOP 103/4 bases (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: EOP103E006 Given any step in the (As available)  
procedure, describe the reason for  
performance of that step and/or  
expected system response to control

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

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

10 CFR Part 55 Content: 55.41 10



Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	2.3.12	
	Importance Rating	3.2	

Knowledge of Radiological Safety Principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.

Question: RO #70

The following conditions exist for a job to be performed on a system.

- The general area radiation levels are 20 mrem/hr in the room.
- The hot spot in the room is a pipe elbow that has a radiation level of 50 mrem/hr.
- The job will be performed near the hot spot area.

(Assumptions: ALL 4 cases below have the same transition time to and from destinations. All shielding placement and removal is at 50 mrem/hr. The hot spot with shielding in place is 25 mrem/hr)

Which one of the following methods would comply with ALARA principles for performance of the task?

- A. The job is performed by using 2 operators for 3 hours each on the job at the hot spot.
- B. The job is performed by 3 operators for 1.5 hours each on the job at the hot spot and a fourth operator reading instructions in the general room area for an hour.
- C. The job is performed by 2 operators for 2 hours each on the job at the hot spot and a third operator reading instructions in the general room area for 2 hours.

- D. 2 Radiation Protection personnel hang/remove 1 tenth thickness of lead shielding at the hot spot in 1.0 hours. The job is performed after the lead shielding is in place by using 2 operators for 3 hours each on the job.

Proposed Answer: C

Explanation (Optional):

- A: Incorrect - The job is performed by using 2 operators for 3 hrs each on the job at the hot spot. ( 2 operators X 50 mrem/hr x 3hrs) = 300 mrem/hr.
- B: Incorrect - The job is performed by 3 operators for 1.5 hrs each on the job at the hot spot and a fourth operator reading instructions in the general room area for 1 hr.( 3 operators X 50 mrem/hr x 1.5 hrs) + (1 operators X 20 mrem/hr x 1hr) = 245 mrem/hr.
- C: Correct -The job is performed by 2 operators for 2 hrs each on the job at the hot spot and a third Operator reading instructions in the general room area for 2 hrs. ( 2 operators X 50 mrem/hr x 2hr) + (1 operators X 20 mrem/hr x 2hrs) = 240 mrem/hr.
- D: Incorrect - Two Radiation Protection personnel hang and remove 1 tenth thickness of lead shielding on the hot spot in 1.0 hours for the job. The job is performed after the lead shielding is in place by using 2 operators for 3 hrs each on the job. ( 2 rad techs X 50 mrem/hr x 1.0 hr) + (2 operators X 25 mrem/hr x 3hr) = 250 mrem/hr.

Technical Reference(s): ALARA procedure. RP-AA-401, (Attach if not previously provided)  
Att 4 ALARA Plan.

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH04ADM024C-01 (As available)

Question Source: Bank #  
Modified Bank # NRC 2009 (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 12

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	2.3.13	
	Importance Rating	3.4	

Knowledge of Radiological Safety Procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high radiation areas, aligning filters, etc.

Question: RO #71

Given :

- The plant is in OPCON 5.
- Core offload has been in progress for 36 hours.
- A spent fuel bundle is being raised to the full up position on the main hoist over the core when it becomes unlatched and falls into the vessel.

A short time later, the following Refuel Floor Rad Monitors are in alarm:

- New Fuel Criticality ARM
- Spent Fuel Pool ARM

Which one of the following action(s) is IMMEDIATELY required IAW HC.OP-AB.CONT-0005, Irradiated Fuel Damage?

- A. Initiate action to establish Secondary Containment.
- B. Suspend the handling of Irradiated Fuel/Components.
- C. Evacuate all personnel from the refuel floor until a radiation protection survey is completed.
- D. Determine the location of the dropped bundle, inform the CRS and then evacuate the Refuel Floor.

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – Secondary containment is not required to be in place during all fuel moves there is 30 minute time limit when required (T/S 3.6.5.1.) Abnormal Step A.1.1 requires Secondary Containment to be verified as a subsequent action.
- B: Correct – this is the immediate action step in AB-CONT-0005 for the given conditions
- C: Incorrect – Evacuation of all **unnecessary** personnel is a subsequent action
- D: Incorrect – These would be subsequent actions as required.

Technical Reference(s): AB-CONT-0005

(Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: ABCNT5E003 (As available)

Question Source: Bank # 33925  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 12  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	4	
	K/A #	2.4.4	
	Importance Rating	4.5	

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

Question: RO #72

The plant was operating at rated power when a scram occurs:

Then:

- The Mode Switch was locked in SHUTDOWN.
- All rods inserted EXCEPT one rod, which is stuck @ notch 48.
- SRMs AND IRMs have been inserted.

Additionally:

- RPV level lowered to 14" and has since recovered to 35".
- RPV pressure peaked @ 1040 psig and is now 950 psig
- Annunciator C6-A3, Main Steam Line Radiation High is lit.

What procedure entries are required?

- (1) HC.OP-AB.ZZ-0000, REACTOR SCRAM
- (2) EOP-101, RPV CONTROL
- (3) HC.OP-AB.RPV-0008 - REACTOR COOLANT ACTIVITY
- (4) EOP-101A, ATWS RPV CONTROL

ONLY:

- A. (1) and (2)
- B. (1), (2) and (3)

- C. (3) and (4)
- D. (1), (3) and (4)

Proposed Answer: B

Explanation (Optional):

- A: Incorrect – (3) is also required due to Annunciator C6-A3
- B: Correct – entry conditions exist for these procedures AB-ZZ-000 on the scram, EOP-101 on high RPV pressure, AB-RPV-0008 on the annunciator alarm
- C: Incorrect – (4) is not required, one rod out is still considered shutdown
- D: Incorrect – (4) is not required, one rod out is still considered shutdown

Technical Reference(s): AB-ZZ-000, EOP-101, AB-RPV-0008, AB-RPV-0008 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: none

Learning Objective: AB0000E002 (R) Given a set of conditions and a drawing of the controls, instrumentation and/or alarms located in the main control room, determine the status of the Main Steam System or its components by observation of the control, instrumentation and alarms. (As available)  
MSTEAME012

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History:

ES-401

Written Examination  
Question Worksheet

Form ES-401-5

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

10 CFR Part 55 Content: 55.41 10  
55.43

Comments:



Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	2.2.39	
	Importance Rating	3.9	

Knowledge of less than or equal to one hour technical specification action statements for systems.

Question: RO #73

Following a reactor scram and loss of feedwater, the plant is being cooled down using HPCI in full flow recirculation. A review of the operating logs indicates that reactor pressure for the past two hours is as follows:

<u>Time</u>	<u>Reactor Pressure (psig)</u>
00:00.....	948
00:15.....	916
00:30.....	885
00:45.....	855
01:00.....	690
01:15.....	641
01:30.....	551
01:45.....	307
02:00.....	236

Based on these conditions, the cooldown rate is \_\_\_\_ (1) \_\_\_\_ administrative limits and \_\_\_\_ (2) \_\_\_\_ Technical Specification limits.

- A. (1) outside (2) outside
- B. (1) within (2) within
- C. (1) within; (2) outside

D. (1) outside (2) within.

Proposed Answer: A

Explanation (Optional):

- A: Correct. Between 0045 and 0145, cooldown reached 104 degrees within a one hour period which exceeds the one hour TS limit of 100 degrees/hr and the admin limit of 90 degrees per hr.
- B: Incorrect – both limits are exceeded
- C: Incorrect – the admin limit is exceeded
- D: Incorrect – the TS limit is exceeded

Technical Reference(s): HC.OP-IO.ZZ-0004 , att.4 (Attach if not previously provided)  
TS 3.4.6.1

Proposed References to be provided to applicants during examination: Steam Tables

Learning Objective: IOP004E004, (R) Interpret charts, (As available)  
graphs and tables contained within the  
SHUTDOWN FROM RATED POWER  
TO COLD SHUTDOWN Integrated  
Operating Procedure to maintain plant  
operations within specified limits.

Question Source: Bank # 80653  
Modified Bank # (Note changes or attach parent)  
New

Question History:

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

10 CFR Part 55 Content: 55.41 10

55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	2.2.12	
	Importance Rating	3.7	

Knowledge of surveillance procedures.

Question: RO #74

Given:

- Power is 90%
- HC.OP-IS.BH-0001, Standby Liquid Control Pump AP208 Inservice Test, to check flow rates during power operation is to be performed.

How is the firing of the squib valve(s) avoided when starting the pump(s) for this surveillance?

- A. The amphenol wiring plug is disconnected locally at the squib valve before running the SLC pump.
- B. The SLC squib valve firing circuitry comes directly from RRCS ONLY and is unaffected during the test.
- C. The breaker for the appropriate squib valve must be opened prior to running the SLC pump.
- D. Starting the SLC pump with the local control switch bypasses the squib firing circuit.

Proposed Answer: D

## Explanation (Optional):

- A: Incorrect – Not IAW the procedure
- B: Incorrect - Emergency pump start signal is generated from the control room switch or RRCS and the squib valve gets its fire command from the pump start, and from RRCS
- C: Incorrect – The squib valves do not have dedicated supply breakers
- D: Correct - This test starts the pumps from the local control panel which bypasses the squib firing circuit

Technical Reference(s): NOH01SLCSYSC-02 Section (Attach if not previously provided)  
III.B.3.c.2).a)

Proposed References to be provided to applicants during examination: none

Learning Objective: NOH01SLCSYSC-02 Obj.R8 (As available)

Question Source: Bank # 72736  
Modified Bank # (Note changes or attach parent)  
New

## Question History:

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

10 CFR Part 55 Content: 55.41 6  
55.43

Comments:

Facility: Hope Creek

Vendor: GE

Exam Date: 2010

Exam Type: R

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	2.1.25	
	Importance Rating	3.9	

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

Question: RO #75

Given the following conditions and using the provided figure:

- The reactor has been shutdown for 90 hours following 1000 EFPD of operation.
- The plant is in Cold Shutdown with RPV metal and RCS temperature of 140°F.
- A total loss of Shutdown Cooling occurred at 12:00 hours.
- All efforts to restore heat removal from the RPV have failed.
- Both Recirculation pumps have been secured.

When could the plant first reach OPCON 3?  
(Assume NO additional operator action)

Within 2 minutes of:

- A. 12:45
- B. 13:07
- C. 13:30
- D. 13:52

Proposed Answer: B

## Explanation (Optional):

- A: Incorrect - Value obtained by using the 160°F curve.
- B: Correct - Operational Condition 3 is achieved when the Reactor temperature reaches 200°F. The 140°F curve of Figure 1 intersects the 90-hour line between the 1.000 and 1.250 hour lines. 1307 is the only option that is between 1 hour and 1 hour and fifteen minutes following the loss of SDC.
- C: Incorrect - Value obtained by using the 120°F curve.
- D: Incorrect - Value obtained by using the 100°F curve.

Technical Reference(s): AB.RPV-0009 Figure 1 page 6 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: AB.RPV-0009  
Figure 1 page 6

Learning Objective: ABRPV9E005, (R) Interpret and apply (As available)  
charts, graphs and tables contained  
within Shutdown Cooling.

Question Source: Bank # NRC 2005  
Modified Bank # (Note changes or attach parent)  
New

Question History: NRC 2005

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

10 CFR Part 55 Content: 55.41 5  
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295018, AA2.05	
	Importance Rating		2.9

Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : System pressure

Question: SRO 76

The plant was operating at rated power when the Reactor Auxiliary Cooling System (RACS) head tank began to lower rapidly.

Then, a Reactor Water Cleanup (RWCU) System Non-Regenerative Heat Exchanger discharge high temperature signal was received resulting in an automatic isolation of the RWCU Inlet Outboard Isolation Valve, HV-F004,

NO other isolation valves were actuated. The plant remains stable at rated power.

Which of the following identifies (1) a potential cause of the RACS head tank lowering and (2) whether the subsequent affect on RWCU was reportable under 10 CFR 50.72 requirements

- A. (1) A leak in the RACS Heat Exchanger  
(2) NOT Reportable
- B. (1) A leak in the RACS Heat Exchanger  
(2) Reportable
- C. (1) A leak in the Reactor Recirc Pump Seal Cooler  
(2) NOT Reportable
- D. (1) A leak in the Reactor Recirc Pump Seal Cooler  
(2) Reportable

Proposed Answer: A



Explanation (Optional):

A. Correct – RACS system pressure is higher than Service Water System pressure. Therefore a leak in the heat exchanger would be from RACS to SW and result in lowering head tank level. The event is NOT reportable per 10CFR50.72 as item (b)(3)(iv)(B)(2) requires containment isolation signals affecting more than 1 system. This signal only affects 1 system.

B. Incorrect – The event is not reportable.

C. Incorrect – RACS system pressure is the lower pressure in recirc pump seal cooler heat exchanger. A leak would cause RACS head tank level to rise.

D. Incorrect - RACS system pressure is the lower pressure in recirc pump seal cooler heat exchanger. A leak would cause RACS head tank level to rise. The event is not reportable

Technical Reference(s): 10CFR50.72 as item (b)(3)(iv)(B)(2) (Attach if not previously provided)  
LP NOH01RACS00C-05  
Section III.A.3.

Proposed references to be provided to applicants during examination: 10 CFR 50.72

Learning Objective: NOH01RACS00C-05 Obj. 6.0 (As available)

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History: Last NRC Exam

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

10 CFR Part 55 Content: 55.41  
55.43 1

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295019, AA2.01	
	Importance Rating		3.6

Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : Instrument air system pressure

Question: SRO 77

Given:

- The plant is operating at 60% power
- Main Condenser Vacuum is 3 inches HgA and slowly degrading
- INSTRUMENT AIR HEADER A PRESSURE LO annunciator is in alarm
- INSTRUMENT AIR HEADER B PRESSURE LO annunciator is in alarm
- 1-KAHV-7595 Service Air Supply Header Isolation Valve isolated
- Instrument Air header pressure is still lowering
- Abnormal procedure AB.COMP-0001-Instrument and/or Service Air has been entered

Which of the following describes the plant condition and additional required procedure entries and action(s) required?

Instrument Air Pressure is:

- ≤70 psig. Lock the mode switch in Shutdown and enter AB.ZZ-0000, Reactor Scram.
- ≤70 psig. Enter AB.BOP-0006, Main Condenser Vacuum. Reduce Recirc pump speed to minimum. A reactor scram is NOT required unless control rod drifts begin to occur.
- >70 psig. Lock the mode switch in Shutdown and enter AB.ZZ-0000, Reactor Scram.
- >70 psig. Enter AB.BOP-0006, Main Condenser Vacuum. Reduce Recirc pump speed to minimum. A reactor scram is NOT required unless control rod drifts begin to occur.

Proposed Answer: A

Explanation (Optional):

A. Correct The stem states that 1-KAHV-7595 Service Air Supply Header Isolation Valve is Closed. The valve closes at 70 psig instrument air header pressure This is an entry to AB-COMP-0001, Entry to the main condenser vacuum abnormal is not yet required

B. Incorrect – A reactor scram is required IAW AB-COMP-0001

C. Incorrect – Inst Air header pressure is less than or equal to 70 psig because the KA-HV-7595 is closed.

D. Incorrect - A reactor scram is required IAW AB-COMP-0001

Technical Reference(s): AB-COMP-0001 retainment step (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: ABCMP1E005 Interpret and apply charts, graphs and tables contained within Instrument and/or Service Air. (As available)

Question Source: Bank # WTS 4071  
Modified Bank # (Note changes or attach parent)  
New

Question History: Last NRC Exam

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

10 CFR Part 55 Content: 55.41  
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295004 AA2.02	
	Importance Rating		3.9

Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER  
: Extent of partial or complete loss of D.C. power

Question: SRO 78

Given the following conditions:

- The plant is operating at rated power
- 125 VDC Battery 1CD411 was declared inoperable 1 hour ago
- The Quarterly Surveillance Tests for 250 VDC battery 10D431 and 125 VDC battery 1CD447 have just been completed with the following results:
  - 10D431 - Float voltage of one connected cell was 2.05 VDC
  - 1CD447 - Float voltage of one pilot cell was 2.10 VDC
  - All other cells tested were within allowable values

Which one of the following describes Technical Specification required actions at this time?

- Declare the 10D431 battery and RCIC inoperable.  
Restore both 125 VDC batteries to operable status within 2 (TWO) hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- Declare the 10D431 battery and HPCI inoperable.  
Restore both 125 VDC batteries to operable status within 2 (TWO) hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- Declare the 10D431 battery and RCIC inoperable.  
Restore 1CD411 to operable status within 1 (ONE) hour or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

- D. Declare the 10D431 battery and HPCI inoperable. Restore 1CD411 to operable status within 1 (ONE) hour or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

Proposed Answer: C

Explanation (Optional): IAW TS 3.8.2.1.A and B.

- A. Incorrect. ONLY 1 hour remains before Action A. applies because 1CD411 was declared inoperable 1 hour ago
- B. Incorrect. ONLY 1 hour remains before Action A. applies because 1CD411 was declared inoperable 1 hour ago. The system affected by the inop 250 VDC battery is RCIC not HPCI
- C. Correct. IAW TS 3.8.2.1.A and B.
- D. Incorrect. The system affected by the inop 250 VDC battery is RCIC not HPCI

Technical Reference(s) TS 3.8.2.1.A and B. (Attach if not previously provided)

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Proposed references to be provided to applicants during examination: TS 3.8.2.1

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Learning Objective: TECSPCE006 – given TS, (As available)  
discuss the specs contained in  
the applicability sections 3.0 and  
4.0

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Question Source: Bank # WTS

Modified Bank # (Note changes or attach parent)

New

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Question History: Last NRC Exam

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Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41

55.43

2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295030 EA2.01	
	Importance Rating		4.2

Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL  
(Suppression pool level)

Question: SRO 79

With the plant operating at 100% power the RO reports to you that Suppression Pool Level has drifted out of the allowable Technical Specification value.

Investigation reveals that a leak has developed on the Instrument tubing for Suppression Pool Level transmitter LT-4805-1 just downstream of valve V9982.

Using the attached P&ID, how will the reading on LT-4805-1 compare to ACTUAL Suppression Pool level and when would actions be required to achieve Hot Shutdown.

- A. Indicated level will read higher than actual level. Immediately commence actions to achieve Hot Shutdown.
- B. Indicated level will read higher than actual level. If the level is NOT restored to the required band within one hour, commence actions to achieve Hot Shutdown.
- C. Indicated level will read lower than actual level. Immediately commence actions to achieve Hot Shutdown.
- D. Indicated level will read lower than actual level. If the level is NOT restored to the required band within one hour, commence actions to achieve Hot Shutdown.

Proposed Answer: D

Explanation (Optional):

A. Incorrect – Level will indicate lower than actual, After one hour, actions must be taken to achieve Hot Shutdown.

B. Incorrect - Level will indicate lower than actual.

C. Incorrect - Immediate action is not required

D. Correct – The high pressure input to the level transmitter has the leak, this will result in indicated level reading lower than actual (DP goes down). TS 3.5.3 and bases supports the LCO time.

Technical Reference(s): TS 3.5.3 and bases (Attach if not previously provided)  
M-55-1 Sht 1

Proposed references to be provided to applicants during examination: M-55-1 Sht 1

Learning Objective: (As available)

Question Source: Bank # NRC 2005 – slightly modified  
Modified Bank # (Note changes or attach parent)  
New

Question History: Last NRC Exam 2005

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

10 CFR Part 55 Content: 55.41  
55.43 2

Comments:



Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295023, 2.2.38	
	Importance Rating		4.5

Equipment Control: Knowledge of conditions and limitations in the facility license.(Refueling Accidents)

Question: SRO 80

Given the following:

- The plant is in OPCON 5.
- Cavity drain down begins in preparation for reactor reassembly.
- Cavity level is being lowered to the top of the reactor flange.

One minute later, a Radiation Protection Technician on the refuel floor reports that cavity level has dropped below the reactor flange and continues to lower.

- The Area Rad Monitors indicate 250 mr/hr and slowly rising.
- Annunciator E6-A3, Refuel Floor Exhaust High Rad, is in alarm.
- The Refuel Floor Exhaust Channel "A" & "B" RMS are in High Alarm.
- The Refuel Floor Exhaust Channel "C" is approaching its High Alarm Setpoint.

Which one of the following is required?

- A. Place FRVS in service and declare an Alert.
- B. Place FRVS in service and declare an Unusual Event.
- C. Verify FRVS is in service and declare an Alert.
- D. Verify FRVS is in service and declare an Unusual Event.

Proposed Answer: D

Explanation (Optional):

A. Incorrect – AB.Cont-0005 states for irradiated fuel damage, evacuate all UNNECESSARY personnel from the refuel floor. The stem gives no indication of fuel damage. Also, a UE would be declared

B. Incorrect - AB.Cont-0005 states for irradiated fuel damage, evacuate all UNNECESSARY personnel from the refuel floor. The stem gives no indication of fuel damage.

C. Incorrect – a UE must be declared. Also the hi alarm on the refuel exhaust rad monitor is an auto start of FRVS which must be verified. An ALERT is not declared because there are no indications in the stem of MAJOR FUEL Damage as defined by the EAL Tech basis 6.4.1.B.

D. Correct – IAW EAL 6.4.1.a – a UE is declared. Also the hi alarm on the refuel exhaust rad monitor is an auto start of FRVS which must be verified.

Technical Reference(s): EAL 6.4.1.a (Attach if not previously provided)  
AB.CONT-0005

Proposed references to be provided to applicants during examination: ECG – not the  
attachments

Learning Objective: IOP009E004, Apply (As available)  
Precautions, Limitations and  
Notes while executing the  
REFUELING OPERATIONS  
Integrated Operating Procedure

Question Source: Bank #  
Modified Bank # (Note changes or  
attach parent)  
New X

Question History: Last NRC Exam

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

10 CFR Part 55 Content: 55.41

55.43	<u>1,4</u>
	<u>          </u>

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295037, 2.2.40	
	Importance Rating		4.7

Equipment Control: Ability to apply technical specifications for a system. (SCRAM Conditions Present and Reactor Power Above APRM Downscale or Unknown

K/A match justification – The KA match portion of the question involves knowing the TS rated flow for the SBLC pumps. This topic/EPE combination does not lend itself precisely to a system application. The only real TS application is by using SBLC as the system and applying the flow aspect for the pump. Then combining that information to address specific actions.

Question: SRO 81

Given:

- An ATWS occurred with the plant at rated power.
- RPV level and pressure are stable and being maintained in the required bands.
- At 14:20 hrs, "A" and "B" SLC pumps were manually started.
- "B" SLC Pump tripped immediately after start and CANNOT be restarted.

Then,

- At 14:22 hrs, the SLC TANK TROUBLE is received due to low tank level.
- Attempts to insert control rods have been unsuccessful.
- Reactor power is 10%.

Assuming the "A" SLC pump delivers the Tech Spec minimum flow rate for the next 90 minutes, which one of these actions would be required?

- A. Verify the "A" SLC pump is tripped then exit EOP-101A.
- B. Verify the "A" SLC pump is tripped and continue attempting rod insertion.
- C. Continue in EOP-101A, monitor SLC pump operation and begin a reactor cooldown.
- D. Continue in EOP-101A, monitor SLC pump operation and raise reactor water level to +12.5" to +54".

Proposed Answer: C

Explanation (Optional):

A. Incorrect. 'A' pump will still be running. EOP 101A is not exited until the reactor is shutdown under all conditions without boron.

B. Incorrect. 'A' pump will still be running.

C. Correct. After 75 minutes operation with only 1 SLC pump running, level is above the 0 gallon Low Level Pump trip setpoint. 4640 Gallons at the low level alarm point with 90 minutes runtime at 41.2 gpm  $[4640 - (41.2 \times 90)] = 932$  gallons remaining. Step RC/P-19 directs continuation at step RC/P-20 for depressurization and cooldown.

D. Incorrect. RPV Level cannot be raised until the reactor is shutdown under all conditions without boron.

Technical Reference(s)      HC.OP-EO.ZZ-0101A TS3.1.5      (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed references to be provided to applicants during examination:      none

\_\_\_\_\_

Learning Objective:      SLCSYSE017, Given a set of      (As available)  
   conditions and a drawing of, or  
   access to, the controls,  
   instrumentation and/or alarms  
   located in the Main Control  
   Room, determine the status of  
   the SLC System or its  
   components by evaluation of the  
   controls/instrumentation/alarms.

\_\_\_\_\_

Question Source:      Bank #      80580  
   Modified Bank #      \_\_\_\_\_ (Note changes or attach parent)  
   New      \_\_\_\_\_

Question History:      Last NRC Exam      2003

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

10 CFR Part 55 Content:      55.41      \_\_\_\_\_  
   55.43      5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295006, 2.4.30	
	Importance Rating		4.1

Emergency Procedures / Plan; Knowledge of events related to system operation / status that must be reported to internal organizations or external agencies, such as the state, the NRC, or the transmission system operator.(SCRAM)

Question: SRO 82

Given:

- An unexpected loss of an offsite transmission line occurred causing a plant scram.
- Following the scram, a loss of Feedwater occurred and RPV level lowered to (-68) inches before recovering.
- The HPCI Aux Oil Pump failed to start.
- RCIC automatically initiated and restored level.

With the above conditions and IAW 10 CFR 50.72, what is the earliest reporting requirement?

- A. 1 Hour Report
- B. 4 Hour Report
- C. 8 Hour Report
- D. 24 Hour Report

Proposed Answer: B

Explanation (Optional):

A. Incorrect - Would be correct if RPV Level Safety Limit reached or Emergency Classification of UE, Alert, SAE, or GE reached. Would be UE if LOP for greater than 15 minutes. Only have loss of single line

B. Correct – Per RAL 11.3.1 and 11.3.2 – valid ECCS actuation has or should have occurred and a scram occurred and Actuation of RPS unplanned

C. Incorrect - Would be correct if malfunctioning Aux Oil Pump was found prior to the event. RAL 11.2.2.b

D. Incorrect – This is correct for the transmission line loss, per ECG RAL 11.11 NERC Disturbance Reporting, however 4 Hour report is shorter reporting requirement

Technical Reference(s): ECG RAL 11.3.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: ECG no attachments except Att.1

Learning Objective: NEPECDTYSC-00 Obj 3.4 (As available)

Question Source: Bank # 80631  
Modified Bank #                      (Note changes or attach parent)  
New                     

Question History: Last NRC Exam                     

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

10 CFR Part 55 Content: 55.41                       
55.43 1  
                    

Comments:



Examination Outline Cross-reference:

Level

RO

SRO

Tier #

1

Group #

2

K/A #

295009 AA2.02

Importance Rating

3.7

Ability to determine and/or interpret the following as they apply to LOW REACTOR WATER LEVEL : Steam flow/feed flow mismatch

Question:

SRO 83

Hope Creek has reduced power to 80%, to remove the 6A Feedwater Heater from service due to a problem on the Bleeder trip valve. Plant conditions are:

- Feedwater control is in 3 element control
- A Steam Flow indicates - 3.24 E6 lbs/hr
- B Steam Flow indicates - 3.22 E6 lbs/hr
- C Steam Flow indicates - 3.26 E6 lbs/hr
- D Steam Flow indicates - 3.24 E6 lbs/hr
- FW flow (N001A) indicates - 6.51 E6 lbs/hr
- FW flow (N001B) indicates - 6.32 E6 lbs/hr
- Reactor Water level - Normal at 35" stable
- Reactor Pressure - 972 psig stable
- Generator MW - 995 MW
- Suppression Pool Temperature – 84.3°F

A transient occurs and 1 minute later plant conditions are:

- A Steam flow indicates - 2.85 E6 lbs/hr
- B Steam flow indicates - 3.01 E6 lbs/hr
- C Steam flow indicates - 3.02 E6 lbs/hr
- D Steam flow indicates - 2.99 E6 lbs/hr
- FW flow (N001A) indicates - 6.56 E6 lbs/hr
- FW flow (N001B) indicates - 6.38 E6 lbs/hr
- Reactor Water level is 33.5" slowly lowering
- Reactor Pressure - 966 psig stable
- Generator MW - 928 MW
- Suppression Pool Temperature – 86.3°F

Based on the above conditions, what procedure shall you direct actions from, in response to the event?

- A. HC.OP-AR.ZZ-0007 Annunciator F-1,"DFCS ALARM/TRBL"
- B. HC.OP-AB.BOP-0002, MAIN TURBINE
- C. HC.OP-AB.RPV-0006, SAFETY RELIEF VALVE
- D. HC.OP-AB.ZZ-0001, TRANSIENT PLANT CONDITIONS

Proposed Answer: C

Explanation (Optional):

A - INCORRECT - While "A" steam line's input to Total Steam flow could cause the difference in indicated Steam Flow, it would NOT cause Generator MW to decrease. Additionally this procedure has no actions for attempting to close an SRV

B - INCORRECT - While "A" Main stop valve failing closed would cause a decrease in MW, it would NOT cause Reactor pressure to decrease, it would increase.

C - CORRECT - A safety on "A" steam line would cause, "A"'s steam line flow to decrease, MW to decrease and Reactor Pressure to decrease. Entry and actions IAW AB-RPV-0006 is required.

D - INCORRECT - 6A's bleeder trip valve going closed would cause MW to go up NOT down. Additionally this procedure has no actions for attempting to close an SRV

Technical Reference(s): AB-RPV-0006 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: \_\_\_\_\_ (As available)

Question Source:	Bank #	<u>NRC 2005</u>	
	Modified Bank #	_____	(Note changes or attach parent)
	New	_____	

Question History: Last NRC Exam 2005

Question Cognitive Level:	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	<u>X</u>

10 CFR Part 55 Content:	55.41	_____
	55.43	<u>5</u>

Comments: \_\_\_\_\_

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	295002 2.4.45	
	Importance Rating		4.3

Emergency Procedures / Plan: Ability to prioritize and interpret the significance of each annunciator or alarm. (Loss of Main Condenser Vacuum)

Proposed Question: SRO 84

Given:

- A plant startup is in progress.
- Reactor power is 11 percent.
- Annunciator A4-D2 - SJAE TRAIN B TROUBLE is in alarm.
- Annunciator A4-D3 - OFF GAS RECOMB PNL 10C320 is in alarm.
- The Unit 1 Offgas Recombiner Train is NOT available.

The operators report that the Common Offgas Recombiner Train has isolated and CANNOT be re-established.

Which one of the following describes the initial actions required to be directed in order to maintain condenser vacuum?

- IAW HC.OP-AB.BOP-0006 "Main Condenser Vacuum", reduce reactor power to <5% for at least 20 minutes then place the Mechanical Vacuum Pumps in service.
- IAW HC.OP-AB.BOP-0006 "Main Condenser Vacuum", reduce reactor power by 5% for at least 20 minutes. Ensure Recirc Flow is at minimum then place the Mechanical Vacuum Pumps in service.
- IAW the "Degraded Condenser Vacuum Operation" section of HC.OP-SO.CG-0001 "Condenser Air Removal System Operation", start and stop the Mechanical Vacuum Pumps as necessary to control condenser vacuum.
- IAW the "Degraded Condenser Vacuum Operation" section of HC.OP-SO.CG-0001 "Condenser Air Removal System Operation", take control of one of the

SJAE first stage suction valves, CGHV-1968A1 or B1, in a jog mode to control condenser pressure for degraded vacuum requirements.

Proposed Answer: A

Explanation (Optional): IAW AB-BOP-0006 Section D.1

- A. Correct. IAW AB-BOP-0006 Section D.1
- B. Incorrect. Power must be reduced to <5%
- C. Incorrect. Power must be reduced to <5% for 20 minutes
- D. Incorrect. With Offgas isolated, the SJAE will not be able to control vacuum

Technical Reference(s) AB-BOP-0006 Section D.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: none

Learning Objective: ABBOP6E001 Recognize abnormal indications/alarms and/or procedural requirements for implementing Main Condenser Vacuum. (As available)

Question Source: Bank # 80656  
Modified Bank # (Note changes or attach parent)  
New

Question History: Last NRC Exam

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

10 CFR Part 55 Content: 55.41  
55.43 5

Comments:

Examination Outline Cross-reference:

Level

RO

SRO

Tier #

1

Group #

2

K/A #

295032, EA2.02

Importance Rating

3.5

Ability to determine and/or interpret the following as they apply to HIGH SECONDARY CONTAINMENT AREA  
TEMPERATURE : Equipment operability

Proposed Question: SRO 85

Given:

- The reactor is operating at rated power
- HPCI is in service for its quarterly surveillance test
- HPCI room temperature rises to 121° F due to a trip of both room cooler fans
- The HPCI room cooler fans cannot be restarted

The operators complete the HPCI surveillance and shutdown HPCI. All surveillance data is satisfactory, however, HPCI room temperature is still at 119 °F.

Then:

- Annunciator B1-B3 ( RCIC PUMP ROOM FLOODED ) alarms
- The Reactor Building Operator reports the leak is coming from the RCIC CST suction line upstream of the isolation valve and 'B' RCIC Room 4110 water level is 1.5 inches
- The operators close the CST suction valve to RCIC, BD-HV-F010- RCIC CST SUCTION VALVE
- The operators open the Torus suction valve to RCIC, BD-HV-F031- RCIC TORUS SUCTION VALVE

In addition to running the sump pumps and repairing the HPCI room coolers, which of the following action(s), if any, is (are) required?

- A. Continue plant operation and enter the TS LCO for HPCI being inoperable.
- B. Commence a normal shutdown. A TS LCO entry is required for RCIC and HPCI.
- C. Continue plant operation and enter the TS LCO for RCIC being inoperable.
- D. IAW EOP 103/4-Reactor Building and Rad Release Control, Runback reactor recirculation, manually scram the reactor and enter the TS LCO for RCIC and HPCI being inoperable.

Proposed Answer: A

Explanation (Optional): IAW EOP 103/4

A. Correct – No area has reached max safe IAW EOP 103/104. HPCI surveillance was satisfactory however 2 room coolers are inoperable and IAW OP-HC-108-115-1001 Rev.2 page 41, HPCI must be declared inoperable. RCIC still has torus suction available, therefore no TS LCO is required (RCIC)

B. Incorrect – a shutdown is not required. Only HPCI must be declared inoperable

C. Incorrect. 2 areas are not above max safe, shutdown not required. RCIC still has torus suction available. Therefore no TS LCO is required

D. Incorrect. Primary system not discharging into containment. HPCI surveillance was satisfactory and RCIC still has torus pool suction available. Therefore no TS LCO is required

Technical Reference(s)      EOP 103/4 TS 3.7.4,      (Attach if not previously provided)  
   OP-HC-108-115-1001

Proposed references to be provided to applicants during examination:    none

Learning Objective:      EOP103E002 Given a set of      (As available)  
   plant conditions, analyze and  
   determine if entry conditions into  
   HC.OP-EO.ZZ-0103/4 exists.

Question Source:      Bank #      \_\_\_\_\_  
                                 Modified Bank #      \_\_\_\_\_ (Note changes or attach parent)  
                                 New        X  

Question History:      Last NRC Exam      \_\_\_\_\_

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

10 CFR Part 55 Content:    55.41      \_\_\_\_\_  
   55.43        2,5  

Comments:



Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	264000, A2.09	
	Importance Rating		4.1

Ability to (a) predict the impacts of the following on the EMERGENCY GENERATORS (DIESEL/JET) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of A.C. power.

Question: SRO 86

The plant has experienced a loss of off-site power.

The 10A401 4Kv bus is aligned:

40101 – CLOSED
40108 – OPEN
40107 - OPEN

All other systems have responded normally to these conditions.

What is the cause of the status of the “A” Emergency Diesel Generator (EDG) and the actions to be taken?

EDG “A” is running but UNLOADED \_\_\_\_\_.

- A. due to bus lockout. Perform actions of AB.ZZ-0135, Station Blackout /Loss of Off-Site Power / Diesel Generator Malfunction, Sect 4.4, open BKR 40101, reset the 86 Lock-Out Relays, then press the 40107 CLOSE pushbutton
- B. due to breaker malfunction. Perform actions of SO.KJ-0001, Emergency Diesel Generator Operation, Sect. 5.3, Manual Emergency Starting from Control Room to verify 10A401 voltage <2912 Volts, open BKR 40101, then press the 40107 CLOSE pushbutton
- C. due to bus lockout. Perform actions of SO.KJ-0001, Emergency Diesel Generator Operation, Sect. 5.3, Manual Emergency Starting from Control Room, open BKR 40101, reset the 86 Lock-Out Relays, then press the 40107 CLOSE pushbutton
- D. due to breaker malfunction. Perform actions of AB.ZZ-0135, Station Blackout /Loss of Off-Site Power / Diesel Generator Malfunction, Sect 4.4, open BKR 40101, reset the 86 Lock-Out Relays, Start Failure Relay (SFR) and Shutdown Relay (SDR), then press the 40107 CLOSE pushbutton

Proposed Answer: B.

Explanation (Optional):

A. Incorrect - A bus lockout is caused by overcurrent/differential overcurrent which do NOT exist for the given conditions. Therefore there is no need to reset the lockout. AB.ZZ-0135, Station Blackout /Loss of Off-Site Power / Diesel Generator Malfunction, Sect 4.4, covers a failure of the EDG to start or a trip if it does start.

B. Correct - Breaker 40107 cannot close on the bus with the 40101 closed. The procedure for starting the EDG under these conditions is SO.KJ-0001, Emergency Diesel Generators Operation, Sect. 5.3, Manual Emergency Starting from Control Room.

C. Incorrect - A bus lockout is caused by overcurrent/differential overcurrent which do NOT exist for the given conditions. Therefore there is no need to reset the lockout.

D. Incorrect - AB.ZZ-0135, Station Blackout /Loss of Off-Site Power / Diesel Generator Malfunction, Sect 4.4, covers a failure of the EDG to start or a trip if it does start. A bus lockout is caused by overcurrent/differential overcurrent which do NOT exist for the given conditions. Therefore there is no need to reset the lockout.

Technical Reference(s): SO.KJ-0001, Sect. 5.3 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed references to be provided to applicants during examination: None

Learning Objective: EDG000E006 From memory, (As available)  
recall the auto start signals  
associated with the Diesel  
Generators, including: a. Setpoints  
for LOP and Degraded Voltage  
signals. b. Setpoints for LOCA  
signals.

Question Source: Bank # \_\_\_\_\_  
Modified Bank # \_\_\_\_\_ (Note changes or  
attach parent)  
New X

Question History: Last NRC Exam \_\_\_\_\_

Question Cognitive Level: Memory or Fundamental Knowledge \_\_\_\_\_

Comprehension or Analysis

X

10 CFR Part 55 Content:

55.41

55.43

5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	211000, A2.07	
	Importance Rating		3.2

Ability to (a) predict the impacts of the following on the STANDBY LIQUID CONTROL SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Valve closures

K/A match justification – the only auto valve closures related to SLC injection are for RWCU isolation. That topic was covered on previous exams and in the simulator scenarios. This question deals with identifying that the injection valves (squibs) have not fired and remain closed, no injection is present. It also asks what compensatory actions can be performed under the stated condition

Question: SRO 87

Given:

- A plant transient has occurred
- A manual scram was attempted
- Reactor Power is at 19%
- EOP-101A is being implemented
- Direction has been given to initiate SLC
- An Alert has been declared
- The TSC has NOT been activated

The RO reports that for SLC:

- Squib Valve Continuity Lights are ON
- Both SLC pumps are running

Which describes whether SLC is injecting and actions required?

- SLC is injecting, IAW EOP 101A, continue to monitor SLC Tank level to verify the pumps trip at 0 inches.
- SLC is injecting but NOT at rated flow. NO further actions can be implemented unless approved by the TSC, after it's activated.
- SLC is NOT injecting. NO further actions can be implemented unless approved by the TSC, after it's activated.
- SLC is NOT injecting. Take actions for alternate boron injection to the vessel with Shift Manager approval.

Proposed Answer: D

Explanation (Optional):

A. Incorrect – With the squib valve continuity lights ON, the valves have not fired and SLC is not injecting. The RO does need to monitor the tank level and verify the pumps trip at 0 inches.

B. Incorrect - With the squib valve continuity lights ON, the valves have not fired and SLC is not injecting. Actions can be taken with emergency coordinator(EC) approval. With the TSC not activated, the SM is the EC. The EC can authorize alternate methods for injection

C. Incorrect – IAW the ECG Att.2, With the TSC not activated, the SM is the EC. The EC can authorize alternate methods for injection.

D. Correct - IAW the ECG Att.2, With the TSC not activated, the SM is the EC. The EC can authorize alternate methods for injection. Per the LP - SQUIB VALVE CONTINUITY (amber) - When illuminated indicates circuit continuity to primers of explosive valves F004 A and B. Therefore the valves are still closed and injection has not commenced.

Technical Reference(s): ECG. Att.2 (Attach if not previously provided)  
LP NOH01SLCSYSC—02  
OP-AM.TSC-0026

Proposed references to be provided to applicants during examination: None

Learning Objective: NOH01SLCSYSC—02 Section (As available)  
IV.A.1.a

Question Source: Bank #  
Modified Bank # (Note changes or attach parent)  
New X

Question History: Last NRC Exam

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

10 CFR Part 55 Content: 55.41  
55.43 1,5

Comments:

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Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	209001, 2.4.50	
	Importance Rating		4.0

Emergency Procedures / Plan: Ability to verify system alarm setpoints and operate controls identified in the alarm response manual. (Low Pressure Core Spray)

Question: SRO 88

Given:

- The plant was operating at rated power
- A small leak occurred the drywell
- A manual scram was initiated
- All Control Rods are Full In
- A Loss of Feedwater occurred on the scram initiation
- Drywell Pressure is 1.2 psig and is rising very slowly
- Annunciator A7-E4, Drywell Pressure HI/LO is NOT illuminated
- RPV level lowered to (-50") and is now 0" and slowly recovering
- RCIC & HPCI have just started to inject to the RPV

Then, these alarms annunciate:

B3-A3 CORE SPRAY PUMP B AUTO START  
B3-A4 CORE SPRAY PUMP D AUTO START

Core Spray pumps "B" and "D" are verified running The "B" and "D" EDGs are also running.

What describes the actions required in response to the above annunciators and any additional actions?

- Stop the pumps. IAW EOP-101, maintain RPV level between 12.5" and 54" using RCIC and/or HPCI.
- Do NOT stop the pumps. IAW EOP-101, maintain RPV level between 12.5" and 54" using RCIC and/or HPCI.
- Stop the pumps. Immediately secure the EDGs IAW HC.OP-SO.KJ-0001, Emergency Diesel Generators Operation.
- Do NOT stop the pumps. Align Condensate Transfer to maintain RPV level >(-129") IAW HC.OP-EO.ZZ-309, Alternate Injection Using Condensate Transfer.



Proposed Answer: A

Explanation (Optional):

A. Correct – The ARP direction is to verify an initiation signal is present (129" or 1.68 psig dw pressure). Because no signal is present the direction is to stop the pumps. EOP 101 guidance (step RC/L-4) given the loss of feedwater would be to maintain RPV level 12.5" to 54" using the available system (RCIC/HPCI).

B. Incorrect – The pumps must be secured.

C. Incorrect – There is no direction in the given Annunciator response to immediately secure the EDGs. Additionally, given the stem conditions with RPV level rising, HPCI is not required.

D. Incorrect - The pumps must be secured. Additionally condensate transfer would not be required until it is determined that RPV level cannot be maintained between 12.5" and 54".

Technical Reference(s): EOP-101 (Attach if not previously provided)  
ARPs B3-A3, B3-A4

Proposed references to be provided to applicants during examination: None

Learning Objective: CSSYS0E003 From memory, (As available)  
summarize/identify the two (2)  
signals which will cause the  
Core Spray System to  
automatically initiate, IAW the  
Core Spray System Lesson  
Plan.

Question Source: Bank #  
Modified Bank # (Note changes or  
attach parent)  
New X

Question History: Last NRC Exam

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

10 CFR Part 55 Content:	55.41	<hr/>
	55.43	<hr/> 5 <hr/>

Comments:

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Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	262001, 2.2.36	
	Importance Rating		4.2

Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. (AC Electrical Distribution)

Question: SRO 89

The plant is operating at 100% reactor power with all systems in a normal lineup except "C" Emergency Diesel Generator which was tagged for maintenance 2 hours ago.

Then:

- Annunciator E1-C5 - 500KV SWITCHYARD TROUBLE, alarms
- 500 Kv Bus 10x lockout relay actuates.
- Electrical maintenance is investigating the cause of the Bus 10X lockout.
- All other plant equipment is OPERABLE.

Which one of the following describes the Shift Managers responsibility for making reports to internal organizations or external agencies for this condition IAW OP-AA-106-101 "Significant Event Reporting" and why?

- First attempt to notify the Duty Station Manager that an event has occurred that forced entry into a 72 hours or less shutdown LCO.
- First attempt to notify the Duty Station Manager that an event has occurred that has resulted in an unplanned load reduction.
- First notify the Corporate Duty Officer, then the Operations Director, that an event has occurred that forced entry into a 72 hours or less shutdown LCO.
- First notify the Corporate Duty Officer, then the Operations Director, that an event has occurred will result in an unplanned load reduction.

Proposed Answer: A.

Explanation (Optional):

A. Correct - T.S. 3.8.11.c States that one required offsite A.C. source and one diesel generator inoperable must restore the two offsite circuits and all four of the diesel generators to OPERABLE status within 72 hours from time of the initial loss or be in at least HOT SHUTDOWN within the next 12 hours. Then going to OP-AA-106-101, Step 4.2.2 and Attachment 1, the SM will notify the Duty Station Manager that an event has occurred that forced entry into any of the events listed in Attachment 1 of OP-AA-106-101, Significant Event Reporting. One category in Attachment 1 is forced entry into a 72 hours or less shutdown LCO.

B. Incorrect - the Duty Station Manager is notified and the event may not require a shutdown or load reduction.

C. Incorrect - the Duty Station Manager is notified. If the Duty Station Manager cannot be reached, then the Shift Manager shall ensure notifications are made in accordance with Attachment 1.

D. Incorrect - the Duty Station Manager is notified. If the Duty Station Manager cannot be reached, then the Shift Manager shall ensure notifications are made in accordance with Attachment 1 the event may not require a shutdown or load reduction.

Technical Reference(s):    Tech Specs 3.8.1.1.c.                      (Attach if not previously provided)  
   OP-AA-106-101 step 4.2.2 and  
   att.1

Proposed references to be provided to applicants during examination:    3.8.1.1

Learning Objective:            TECSPCE010 Given specific plant                      (As available)  
   operating conditions and a copy of  
   the Hope Creek Generating Station  
   Technical Specifications, evaluate  
   plant/system operability and  
   determine required actions (if any)  
   to be taken.

Question Source:            Bank #                      Audit 2009  
   Modified Bank #                      (Note changes or  
   attach parent)  
   New

Question History:            Last NRC Exam

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 1, 2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	1
	K/A #	259002, 2.4.11	_____
	Importance Rating	_____	4.2

Emergency Procedures / Plan: Knowledge of abnormal condition procedures. (Reactor Water Level Control)

Question: SRO 90

Given:

- Reactor power is 75%
- Plant conditions are normal
- All three feed pumps are in service

Then, the RFP TURBINE AUTO XFR TO MANUAL annunciator alarms and the RO reports:

- A control signal failure is indicated.
- RPV level is 50 inches and slowly rising.

Which one of the following describes how speed for the affected RFP can be controlled and other actions which must be directed?

- A. Control RFPT speed using REACTOR FEED PUMP A(B,C) SPEED CONTROLLER DMND INC OR DEC pushbuttons . IAW HC.OP-AB.RPV-0004, Reactor Level Control, direct a reactor scram and entry to HC.OP-AB.ZZ-0000, Reactor Scram.
- B. Control RFPT speed using REACTOR FEED PUMP A(B,C) SPEED CONTROLLER DMND INC OR DEC pushbuttons. Direct Recirc Pump speed be reduced to minimum IAW HC.OP-AB.RPV-0004, Reactor Level Control.
- C. Control RFPT speed using TURB CONTROL INC SPEED DEC SPEED pushbuttons. IAW HC.OP-AB.RPV-0004, Reactor Level Control, direct a reactor scram and entry to HC.OP-AB.ZZ-0000, Reactor Scram.
- D. Control RFPT speed using TURB CONTROL INC SPEED OR DEC SPEED pushbuttons. Direct Recirc Pump speed be reduced to minimum IAW HC.OP-AB.RPV-0004, Reactor Level Control.

Proposed Answer:

C

Explanation (Optional):

A. Incorrect – IAW the annunciator response TURB CONTROL INC SPEED DEC SPEED will not function with a control signal failure.

B. Incorrect – IAW the annunciator response TURB CONTROL INC SPEED DEC SPEED will not function with a control signal failure. Reducing recirc pump speed is not directed per the abnormal

C. Correct – IAW the Annunciator response, you must control RFPT speed using REACTOR FEED PUMP A(B,C) SPEED CONTROLLER DMND INC OR DEC pushbuttons. Per the abnormal, with RPV level  $\geq 50$  inches, a reactor scram is required IAW the retainment override

D. Incorrect - Per the abnormal, with RPV level  $\geq 50$  inches, a reactor scram is required IAW the retainment override

Technical Reference(s): HC.OP-AB.RPV-0004 (Attach if not previously provided)  
Ann. B3-F3 RFP TURBINE  
AUTO XFR TO MANUAL

Proposed references to be provided to applicants during examination: None

Learning Objective: ABRPV4E007 Given plant conditions and plant procedures, determine required actions of the retainment override(s) and subsequent operator actions in accordance with Reactor Level Control . (As available)

Question Source: Bank # \_\_\_\_\_  
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New X

Question History: Last NRC Exam \_\_\_\_\_

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



10 CFR Part 55 Content:	55.41	<hr/>
	55.43	<hr/> 5 <hr/>

Comments:

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Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	290001 A2.02	
	Importance Rating		3.7

Ability to (a) predict the impacts of the following on the SECONDARY CONTAINMENT ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Excessive outleakage

Question: SRO 91

Given:

- The plant is operating at 100 percent power.
- The Steam Vent Blowout Panel 1AS224 indicates open on the RM-11.
- Visual observation confirms that 1AS224 is NOT fully closed.
- Reactor Building d/p is holding steady at  $-.28''$  WG

What describes the operational impact and actions, if any, required?

- Loss of secondary containment integrity. Take actions IAW HC.OP-AB.CONT-0003, Reactor Building.
- Loss of secondary containment integrity. Take actions IAW EOP-103/4, Reactor Building and Rad Release Control.
- Potential loss of secondary containment. Start an additional RBVS exhaust fan IAW HC.OP-SO.GR-0001, Reactor Building Ventilation System Operation.
- Potential loss of secondary containment. NO additional actions are required unless Reactor Building d/p is greater than  $-.30''$  WG.

Proposed Answer: A

Explanation (Optional):

A. Correct. By TS definition, TS 3.6.5.1, secondary containment integrity is lost because the blowout panel is not closed and sealed. AB.CONT-0003, Reactor Building discusses mitigation actions.

B. Incorrect – No entry condition exists for EOP 103/4

C. Incorrect - secondary containment integrity is lost because the blowout panel is not closed and sealed.

D. Incorrect - secondary containment integrity is lost because the blowout panel is not closed and sealed

Technical Reference(s)      TS 3.6.5.1      (Attach if not previously provided)  
   AB.CONT-0003  
   \_\_\_\_\_  
   \_\_\_\_\_

Proposed references to be provided to applicants during examination: none

Learning Objective:      ABCNT3E007 Given plant      (As available)  
   conditions and plant procedures,  
   determine required actions of  
   the retainment override(s) and  
   subsequent operator actions in  
   accordance with Reactor  
   Building Integrity.  
   \_\_\_\_\_

Question Source:      Bank #      80648 minor  
        modification  
   Modified Bank #      \_\_\_\_\_ (Note changes or attach parent)  
   New      \_\_\_\_\_

Question History:      Last NRC Exam      2003 – minor modification

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

10 CFR Part 55 Content:      55.41      \_\_\_\_\_  
   55.43      5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	272000 2.1.32	
	Importance Rating		4.0

Conduct of Operations: Ability to explain and apply all system limits and precautions. (Radiation Monitoring)

K/A match justification -- this question addresses a limitation on the Offgas Pre-treatment rad monitors and subsequent required actions contained in the abnormal and TS. Although not referenced specifically as a precaution, it is a limitation for system operability.

Question: SRO 92

Given:

- A plant startup is in progress.
- "B" SJAE is in service in Degraded Condenser Vacuum Operation.
- Degraded Vacuum Control is NOT from the Main Control Room
- Off-Gas Flow has just exceeded 75 scfm.

Which one of the following describes the status of the Offgas Pre-Treatment RMS and any required actions?

- Offgas Pre-Treatment RMS is INOPERABLE at higher flow rates. A Correction Factor must be applied to restore TS operability.
- Offgas Pre-Treatment RMS is INOPERABLE at higher flow rates. The ALERT setpoint must be changed to restore TS operability.
- Offgas Pre-Treatment RMS is OPERABLE. A Correction Factor must be applied within the next 24 hours to maintain operability.
- Offgas Pre-Treatment RMS is OPERABLE. The ALERT setpoint must be changed within the next 24 hours to maintain operability.

Proposed Answer: A

Explanation (Optional):

A. Correct. IAW HC.OP-AB.BOP-0006 Note 4, at flows above 75 scfm the Offgas Pretreatment RMS monitors should be considered INOPERABLE. To restore the monitors to OPERABLE status with flows above 75 scfm, a correction factor must be applied IAW HC.RP-GP.SP-0001.

B. Incorrect. To restore the monitors to OPERABLE status with flows above 75 scfm, a correction factor must be applied IAW HC.RP-GP.SP-0001.

C. Incorrect. There is no grace period for Offgas Pre-Treatment RMS. 24 hours is the LAOT time to reset Main Steam line RMS setpoints when changing HWCI status.

D. Incorrect. There is no grace period for Offgas Pre-Treatment RMS. 24 hours is the LAOT time to reset Main Steam line RMS setpoints when changing HWCI status. Additionally, to restore the monitors to OPERABLE status with flows above 75 scfm, a correction factor must be applied IAW HC.RP-GP.SP-0001.

Technical Reference(s): HC.OP-AB.BOP-0006 Note 4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: TS 3.3.7.1 with tables but trip setpoints deleted

Learning Objective: ABBOP6E007 Given plant conditions and plant procedures, determine required actions of the retainment override(s) and subsequent operator actions in accordance with Main Condenser Vacuum. (As available)

Question Source: Bank # 84469  
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_

Question History: Last NRC Exam

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 2,5  
\_\_\_\_\_

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	241000 2.1.20	
	Importance Rating		4.6

Conduct of Operations: Ability to interpret and execute procedure steps. (REACTOR/TURBINE PRESSURE REGULATOR)

Question: SRO 93

The plant was in OPCON 2 with a startup in progress:

- Reactor power: 4%
- Reactor pressure: 920 psig
- RPV level: 35"
- 'A' RFPT I/S in Startup Valve Single Element control

Then, a failure caused the #1 and #2 Turbine bypass valves to fail open.

Plant conditions are now:

- Reactor power: 4%
- Reactor pressure: 500 psig lowering at 1psig/sec
- RPV level: 75" rising at 1"/minute
- 'A' RFPT tripped on RPV LVL 8

What actions are required?

- A. Notify the NRC Operations Center within one hour AND IAW Technical Specifications, be in at least HOT SHUTDOWN within two hours. Plot the cooldown rate.
- B. IAW HC.OP-AB.RPV-0005, Reactor Pressure, lock the Mode Switch in SHUTDOWN, Close the MSIVs when RPV level reaches 90". Control pressure using MSL drains.
- C. Notify the NRC Operations Center within one hour AND start the standby EHC pump. Control level with HPCI IAW its system operating procedure.
- D. IAW HC.OP-AB.RPV-0005, Reactor Pressure, lock the Mode Switch in SHUTDOWN, Close the MSIVs and Main Steam Line Drains HV-F016 AND HV-F019. Control pressure using SRVs.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. These are the actions for a violation of Safety Limits. The only Safety Limit related to low pressure (2.1.1) requires reactor power to be above 25%. The T/S cooldown limit has not yet been exceeded.

B. Incorrect. The Retainment Override of HC.OP-AB.RPV-0005 requires closing the MSIVs, HV-F016, and HV-F019 if there is an uncontrolled lowering of pressure and the reactor is shutdown. The reactor would then be isolated, and with the high RPV level, pressure control

would be with SRVs.

C. Incorrect. Wrong action for uncontrolled cooldown. With the high RPV level, pressure control would be with SRVs. HPCI would be tripped on high level.

D. Correct. Immediate Operator Action IAW HC.OP-AB.RPV-0005 requires locking the Mode Switch in SHUTDOWN if there is an uncontrolled lowering of pressure and the reactor is not shutdown. The Retainment Override requires closing the MSIVs, HV-F016, and HV-F019 if there is an uncontrolled lowering of pressure and the reactor is shutdown. The reactor would then be isolated, and with the high RPV level, pressure control would be with SRVs.

Technical Reference(s)      HC.OP-AB.RPV-0005      (Attach if not previously provided)

Proposed references to be provided to applicants during examination:    none

Learning Objective:      ABRPV5E007 Given plant conditions and plant procedures, determine required actions of the retainment override(s) and subsequent operator actions in accordance with Reactor Pressure.      (As available)

Question Source:      Bank #      64754  
Modified Bank #      (Note changes or attach parent)  
New

Question History:      Last NRC Exam

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

10 CFR Part 55 Content:      55.41  
55.43      5



Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	G2.1.41	
	Importance Rating		3.7

Knowledge of the refueling process.

Question: SRO 94

Given:

- A new fuel bundle is grappled and lifted in the Spent Fuel Pool for placement in the RPV.
- The "Slack Cable" light remains lit.
- The refueling platform main hoist load cell indicates 0 pounds.
- The bundle is lowered, reseated, and released.

Which of the following operations can continue IAW OP-HC-108-115-1001-Operability Assessment and Equipment Control Program?

- Fuel transfer within the Spent Fuel Pool using the monorail auxiliary hoist.
- Fuel transfer within the Spent Fuel Pool using the frame mounted auxiliary hoist.
- Control rod removal from the Spent Fuel Pool using the refueling bridge main hoist.
- Control rod removal from the Spent Fuel Pool using the frame mounted auxiliary hoist.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect – not IAW OP-HC-108-115-1001 requirements. The main hoist cannot be used for fuel movement.
- B. Incorrect – Fuel movement is not permitted per OP-HC-108-115-1001
- C. Incorrect – IAW OP-HC-108-115-1001, the use of the main hoist is not permitted
- D. Correct - The slack cable indicates a problem with the main hoist load cell which is reading "0". OP-HC-108-115-1001 & the USFSAR requires suspension of inoperable equipment use involving control rod or fuel assembly movement . Continued control rod movement with aux hoist is allowed.

Technical Reference(s):    OP-HC-108-115-1001 Rev 10    (Attach if not previously provided)  
   Page 56  
   UFSAR Section 9.1.4.2.12.3  
\_\_\_\_\_

Proposed references to be provided to applicants during examination:    None

Learning Objective:            IOP009E006 Analyze plant            (As available)  
   conditions and parameters to  
   determine if plant operation is in  
   accordance with the  
   REFUELING OPERATIONS  
   Integrated Operating Procedure,  
   supporting System Operating  
   Procedures and Technical  
   Specifications  
\_\_\_\_\_

Question Source:            Bank #            56966  
   Modified Bank #            \_\_\_\_\_ (Note changes or  
   New            \_\_\_\_\_ attach parent)

Question History:            Last NRC Exam            \_\_\_\_\_

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

10 CFR Part 55 Content:    55.41            \_\_\_\_\_  
   55.43            1,7  
   \_\_\_\_\_

Comments:



Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		2
	K/A #	G2.2.1	
	Importance Rating		4.4

Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.

Question: SRO 95

Given:

- The reactor is critical with all IRMs operable and on-scale on range 7.
- Reactor pressure is 60 psig.
- Heat-up is in progress

Then, the startup is suspended for an equipment issue.

20 minutes later, conditions:

- All IRMs are on-scale on range 3.
- SRM period indicators are reading infinity.
- Estimated time to repair the equipment issue is 1 hour from now.

What action is required?

- IAW IO.ZZ-0002, Preparation For Plant Startup, lock the Mode Switch in Shutdown because sustained subcritical conditions have been reached.
- IAW IO.ZZ-0002, Preparation For Plant Startup, insert control rods IAW the Shutdown Sequence.
- IAW IO-ZZ-0003, Startup From Cold Shutdown To Rated Power, lock the Mode Switch in Shutdown because sustained subcritical conditions have been reached.
- IAW IO.ZZ-0003, Startup From Cold Shutdown To Rated Power, insert control rods IAW the Shutdown Sequence.

Proposed Answer: D

Explanation (Optional):

A. Incorrect – Actions for moving control rods are not in IO.ZZ-0002. The action required is to insert control rods per the shutdown sequence

B. Incorrect - Actions for moving control rods are not in IO.ZZ-0002.

C. Incorrect – Per IO.ZZ-0003 with the IRMs all indicating >range2, insert control rods IAW the shutdown sequence

D. Correct Per IO.ZZ-0003 Step 5.2.19.e - IF plant parameters impacting Reactivity are not stable OR actions to regain Critical Conditions will not commence in the next 30 minutes OR Sustained Subcritical Conditions have been indicated for more than 30 minutes, **PERFORM** the following: Starting with the last completed Step Number on the Rod Pull Listing, **INSERT** control rods IAW the Shutdown Sequence until the step designated “Subcritical Hold Point” is completed.

Technical Reference(s): IO.ZZ-0003 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: IOP003E004 Apply (As available)  
Precautions, Limitations and  
Notes while executing the  
STARTUP FROM COLD  
SHUTDOWN TO RATED  
POWER Integrated Operating  
Procedure.

Question Source: Bank # 67138  
Modified Bank # \_\_\_\_\_ (Note changes or  
attach parent)  
New \_\_\_\_\_

Question History: Last NRC Exam

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

10 CFR Part 55 Content: 55.41

55.43	<u>5</u>
	<u>          </u>

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		3
	K/A #	G2.3.11	
	Importance Rating		4.3

Ability to control radiation releases.

Proposed Question: SRO 96

Given:

- A plant startup is in progress following a forced outage.
- The plant had been operating with a known fuel leak.
- The plant scrammed 40 hours ago.
- 'A' Mechanical Vacuum Pump (MVP) is placed in service with the suction valve throttled.
- Total Plant Vent release rate is  $5.00\text{E}+4$  uci/sec Total Noble Gas
- Radiation Protection has NOT completed the dose assessment

The South Plant Vent (SPV) RMS has been in High Alarm for 70 minutes.

What action must taken for the release IAW AB.CONT-0004 "Radioactive Gas Release" and how is the event classified in the ECG?

- The MVP must be stopped. Declare an ALERT.
- The MVP must be stopped. Declare an UNUSUAL EVENT.
- The MVP Suction valve must be throttled further closed to reduce effluent levels in the SPV. Declare an ALERT.
- The MVP Suction valve must be throttled further closed to reduce effluent levels in the SPV. Declare an UNUSUAL EVENT.

Proposed Answer: B

Explanation (Optional):.

A. Incorrect. Declare a UE

B. Correct. IAW ECG Section 6.1.1.d and AB.CONT-0004 Step C.1

C. Incorrect. Stop the MVP and declare a UE

D. Incorrect. Stop the MVP.

Technical Reference(s) ECG Section 6.1.1.d (Attach if not previously provided)  
AB-CONT-0004

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Proposed references to be provided to applicants during examination: ECG

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Learning Objective: ABCNT4E007 Given plant (As available)  
conditions and plant procedures,  
determine required actions of  
the retainment override(s) and  
subsequent operator actions in  
accordance with Radioactive  
Gaseous Release.

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Question Source: Bank # 80608

Modified Bank # \_\_\_\_\_ (Note changes or attach parent)

New \_\_\_\_\_

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Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41

55.43 1,4

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.6	
	Importance Rating		4.7

Knowledge of EOP Mitigation Strategies

Question: SRO 97

Given:

- \* A large break LOCA has occurred inside the Drywell with:
- Multiple equipment failures.
  - Drywell pressure is 15 psig.
  - Steam cooling was required until water level was restored above TAF with Fire Water.
  - The Containment H<sub>2</sub>/O<sub>2</sub> Analyzers were placed in-service 2 hours ago.
  - The containment H<sub>2</sub>/O<sub>2</sub> Analyzers have just alarmed on High Drywell H<sub>2</sub> Concentration and the trend is upward at 0.5%/hr.
  - H<sub>2</sub> concentration is at 2.1% and O<sub>2</sub> concentration is 1.3%.
  - The H<sub>2</sub> Recombiners are currently NOT in service.

What actions are required and why?

- Exit EOP-102 and enter SAG since core damage is in excess of what the Emergency Operating Procedures were typically designed to handle.
- Place the H<sub>2</sub> Recombiners in service IAW EOP-102 since there are sufficient quantities of H<sub>2</sub> & O<sub>2</sub> to support effective recombination.
- Exit EOP-102 and enter SAG since the H<sub>2</sub> detonation limit has been reached and containment failure may occur with known fuel damage.
- Immediately vent containment via the Suppression Chamber to reduce Drywell H<sub>2</sub> concentration since the Recombiners could initiate an H<sub>2</sub> detonation at these concentrations.

Proposed Answer: A

Explanation (Optional):

A. Correct: EOP-102 PC/H-1 directs that the EOP be exited and SAG entered is H2 concentration exceeds 2%. In addition, the bases states that a 2% H2 concentration confirms fuel damage above 10 CFR 50.46 ECCS design requirements and beyond what the EOPs were typically designed to handle.

B. Incorrect: With concentrations above 2%, the direction is to exit the EOP and transition to SAG. The Recombiners could have potentially been placed in service earlier in accordance with EOP-102, but the stem indicates that the recombiners are currently out of service. Now that H2 concentration is above 2%, EOP-102 must be exited. Recombiner operations will be governed by SAG at this point NOT EOP-102.

C. Incorrect: Correct action but wrong reason. H2 and O2 concentrations are well below the LEL for H2.

D. Incorrect: Venting is not an option in EOP-102 under the current conditions.

Technical Reference(s): EOP-102 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: EO102PE007 Given any step of the procedure, determine the reason for performance of that step and/or predict expected system response to control manipulations prescribed by that step IAW the Primary Containment Control - Drywell Lesson Plan. (As available)

Question Source: Bank # NRC 2007  
Modified Bank # (Note changes or attach parent)  
New

Question History: Last NRC Exam 2007

Question Cognitive Level:	Memory or Fundamental Knowledge	<u>          </u>
	Comprehension or Analysis	<u>  X  </u>
10 CFR Part 55 Content:	55.41	<u>          </u>
	55.43	<u>    5    </u>
		<u>          </u>
Comments:		

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		2
	K/A #	G2.2.21	
	Importance Rating		4.1

Knowledge of pre- and post-maintenance operability requirements.

Question: SRO 98

Tags for the “A” RHR outage were just released and the system fill and vent are completed.

When completing plant system checks IAW HC.OP-IO.ZZ-0002 “Preparation For Plant Startup”, which one of the following describes requirements for the “A” RHR subsystem to be considered “available for operation”?

- A. The in-service test for the “A” RHR pump must be complete.  
The valve and electrical lineups must be current.
- B. The in-service test for the “A” RHR pump must be complete.  
The system and all support systems are capable of performing their support functions.
- C. The valve and electrical lineups must be current.  
The system and all support systems are capable of performing their support functions.
- D. The valve and electrical lineups must be current.  
ALL related Technical Specification LCOs have been exited.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. In service test not required to be completed
- B. Incorrect. In service test not required to be completed
- C. Correct. IAW HC.OP-IO-ZZ-0002, Step 3.1.6
- D. Incorrect. No requirement for all TS LCOs to be exited.

Technical Reference(s): HC.OP-IO-ZZ-0002 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: IOP002E003 Apply Precautions, (As available)  
Limitations and Notes while  
executing the PREPARATION  
FOR PLANT STARTUP  
Integrated Operating Procedure.

Question Source: Bank # 57044  
Modified Bank #                      (Note changes or  
attach parent)  
New                     

Question History: Last NRC Exam                     

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

10 CFR Part 55 Content: 55.41                       
55.43 1  
                    

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	G2.1.39	
	Importance Rating		4.3

Knowledge of conservative decision making practices.

Question: SRO 99

Given:

- Power is 89%
- At 1200 on 2/16, due to a recent procedure change, it was determined that part of a TS required surveillance was NOT performed.
- The incomplete surveillance was performed on 2/13
- The last complete satisfactory surveillance was completed at 1200 on 1/15.
- The surveillance is required to be performed at least once per 31 days

The action statement requires that inoperable equipment must be restored within 72 hrs, or be in Hot Shutdown within the next 12 hrs and in Cold Shutdown within the following 24 hours.

At 1600 on 2/16, the surveillance is performed, and is determined to be UNSAT.

Which of the following is required?

- A. Be in Hot Shutdown by NO later than 0400 on 2/17.
- B. Be in Cold Shutdown by NO later than 1600 on 2/17.
- C. Be in Hot Shutdown by NO later than 0400 on 2/20.
- D. Be in Cold Shutdown by NO later than 1600 on 2/20.

Proposed Answer: C

Explanation (Optional):

A. Incorrect – An additional 72 hours is allowed by the LCO before beginning the clock toward Hot and Cold Shutdown requirements

B. Incorrect - An additional 72 hours is allowed by the LCO before beginning the clock toward Hot and Cold Shutdown requirements -

C. Correct – the surveillance was completed within the required surveillance time of 31 days. Therefore, A 72 hour clock starts before the 12 hour clock begins for the requirement to be in Hot Shutdown. This would be a total of 84 hours resulting in a time of 0400 on 2/20.

D. Incorrect – Cold shutdown is required within the 24 hours following when Hot shutdown is achieved

Technical Reference(s): TS 4.0.1 and 4.0.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: TECSPCE006 Given Technical Specifications, discuss the specifications contained in the APPLICABILITY sections (3.0 and 4.0) of Hope Creek Technical Specifications. (As available)

Question Source: Bank # 53354  
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_

Question History: Last NRC Exam

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 2  
\_\_\_\_\_

Comments:





Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.25	
	Importance Rating		3.7

Knowledge of Fire Protection procedures

Question: SRO 100

An Unusual Event has been declared due a fire in the Turbine Building.

Who, by title, can be assigned as the Fire Brigade Liaison IAW OP-AA-101-111, Roles and Responsibilities of On-Shift Personnel, and what would be the responsibility of that person IAW HC.FP-EO.ZZ-0001, Nuclear Fire Protection Fire and Medical Emergency Response Manual?

- A. The Work Control Supervisor who would ONLY communicate to the control room the status of the fire and equipment affected.
- B. The Shift Technical Advisor who would ONLY communicate to the control room the status of the fire and equipment affected.
- C. The Work Control Supervisor who would make recommendations to the SM what equipment needs to be removed from service to mitigate the fire and/or help stabilize the plant.
- D. The Shift Technical Advisor who would make recommendations to the SM what equipment needs to be removed from service to mitigate the fire and/or help stabilize the plant.

Proposed Answer: C

Explanation (Optional):

A. Incorrect – IAW HC.FP.EO.ZZ-0001, the fire liaison shall make recommendations to the SM what equipment needs to be removed from service to mitigate the fire and/or help stabilize the plant.

B. Incorrect – the STA would remain in the control room to backup the SM for any ECG classifications or other EOP requirements IAW HC.FP.EO.ZZ-0001, the fire liaison shall make recommendations to the SM what equipment needs to be removed from service to mitigate the fire and/or help stabilize the plant.

C. Correct – The work control supervisor has no initial control room assignments and will be dispatched to Turbine Building to serve as the liason per OP-AA-101-111

D. Incorrect – the STA would remain in the control room to backup the SM for any ECG classifications or other EOP requirements

Technical Reference(s): HC.FP-EO.ZZ-0001 Step 2.6 (Attach if not previously provided)  
OP-AA-101-111 step 4.3.7

Proposed references to be provided to applicants during examination: None

Learning Objective:	ADMPRO5CE001 Summarize the responsibilities of the following personnel: a. Shift Manager, b. Control Room Supervisor/ Field Supervisor, c. Shift Technical Advisor, d. Licensed Operators [RO/PO]	(As available)
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Question Source:	Bank #	68919	
	Modified Bank #		(Note changes or attach parent)
	New		

Question History: Last NRC Exam 2002

Question Cognitive Level:	Memory or Fundamental Knowledge	<u>          </u>
	Comprehension or Analysis	X

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 1 \_\_\_\_\_

Comment: