QUESTION 1

Given the following conditions:

- The plant is operating at 100%
- A transient caused by a short in the reactor recirculation control circuitry occurs

Immediately following the transient, the plant stabilizes with the following parameters:

- Reactor Power 50%
- "A" Recirc pump Drive Motor breaker tripped
- "B" Recirc pump flow is 22 Kgpm
- Loop "A" total jet pump flow is 5 Mlbmlhr
- Loop "B" total jet pump flow is 36 Mlbmlhr
- Total indicated core flow 31 Mlbm/hr

What is actual core flow, and how will the loss of the "A" Recirc pump affect the APRM Scram setpoints?

A. 31 Mlbm/hr. Setpoint adjustment is NOT required.

B. 31 Mlbm/hr. Setpoint adjustment is required.

C. 41 Mlbm/hr. Setpoint adjustment is NOT required.

D. 41 Mlbm/hr. Setpoint adjustment is required.

K&A Rating: 295001AA2.03 (3.3/3.3)

K&A Statement: Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: **AA2.03** Actual Core Flow

Justification:

A. Incorrect but plausible: Jet pump flows must be added. Setpoints must be adjusted to single loop values within 4 hours.

B. **Incorrect but plausible**: Jet pump flows must be added.

C. Incorrect but plausible: - Setpoints must be adjusted to single loop values within 4 hours

D. Correct: Below 48% running recirc loop speed, Loop flow will be less than 23 Kgpm. Jet pump loop flows are both positive and added together. Setpoints must be adjusted to single loop values within 4 hours.

References: Student Ref: NONE

HC.OP-AB.RPV.0003,HC.OP-ST.BB-0007,

HC.OP-DL.ZZ-0026 Attach 3V

TS 2.2.1 and 3.4.1

Learning Objective: L/R/B/ Core flow determination following RR pump trip

Question Source: HC Bank #137

Question History: NRC 2002 Exam

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 2

Given the following conditions:

- The plant is in Operational Condition 5 with the Electrical Distribution System aligned in the Normal lineup.
- An internal short on Transformer 1BX-501 causes a sudden pressure fault on the transformer.

Which ONE of the following describes the resulting availability of Power for the Safe Shutdown Systems?

A. Power to both 4.16KV switchgear 10A402 and 10A404 fast transfers to Transformer 1AX501.
13 KV breaker BS 1-2 trips open.
B and D diesel generators START but their output breakers DO NOT CLOSE.

B. Power to both 4.16KV switchgear 10A402 and 10A404 fast transfers to Transformer 1AX501.
13 KV Breaker BS 1-2 trips open.
B and D diesel generators DO NOT START.

C. Power is lost permanently to both 4.16KV switchgear 10A401 and 10A403.
13 KV breaker BS 1-2 stays closed.
B and D Diesel Generators start but their output breakers DO NOT CLOSE.

D. Power is lost momentarily to both 4.16KV switchgear 10A402 and 10A404.
13 KV breaker BS 1-2 trips open.
Power is restored when the B and D Diesel generators output breakers close.

Question 2

K&A Rating: 295003 Partial or Complete Loss of AC Power AA2.05 (3.9)

K&A Statement: Ability to determine and/or interpret the following as they apply to Partial or Complete Loss of AC Power: Whether a partial or complete loss of A.C. Power has occurred.

Justification:

A. **Incorrect but plausible:** The B & D Diesel Generators DO NOT START

B. **Correct:** 13 Kv Breakers BS 2-3 and BS 1-2 trip open. Bus section 2 is de-energized, Bus section 1 remains energized. The bus infeed breaker swap to the AX501 feed. The loads remain energized. Because one infeed is always available, the Diesels do NOT start.

C. **Incorrect but plausible:** Power is NOT permanently lost to both 4.16KV switchgears. Power is restored when the bus infeed breaker swaps to the AX501 feed.

D**. Incorrect but plausible**: Power is NOT restored from the B & D Diesel Generators

References: Drawing E-0001 and 066-01: Class 1E AC Power Distribution
NOH01EAC00-02 - CLASS 1E AC POWER DISTRIBUTION,
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Student Ref: NONE

Learning Objective:

Question Source: Hope Creek Question Q76871 - Modified

Question History: 2005 HC Exam

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 3

Which ONE of the following is the expected plant response for a loss of the Channel "C" Class 1E 125 VDC System?

The loss of….

A. the ability to control RCIC components.

B. Reactor Feedwater Pump speed control.

C. "C" 4.16 KV Class 1E electrical breaker control.

D. automatic or remote manual operation of HPCI MOVs.

K&A Rating: 295004AK2.03 (3.3/3.3)

K&A Statement: **Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF D.C. POWER and the following: AK2.03** D.C. Bus Loads

Justification:

A. **Incorrect but plausible:** is powered from Channel B 125 VDC.

B. Incorrect but plausible: RFP controls receive control power from non-1E 125 VDC.

C. Correct: 'C' 1E 125 VDC supplies 4KV breaker control power. Without control power, remote breaker operation and automatic breaker trips are disabled.

D. Incorrect but plausible : HPCI MOVs receive control power from "A" bus of 125 VDC.

References: N/A Student Ref: NONE

Learning Objective: 0AB150E003

Question Source: HC Bank Q146

Question History: None

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR: CFR 41.7/45.8

Comments:

QUESTION 4

Following a main generator load rejection at full power, a reactor recirculation pump trip is initiated to reduce reactor power in anticipation of which ONE of the following:

A. Reactor Pressure Increase

B. Reactor Pressure Decrease

C. Reactor Water Level Increase

D. Reactor Water Level Decrease

K&A Rating: 295005AK1.01 (4.0/4.1)

K&A Statement: Knowledge of the operational implications of the following concepts as the apply to MAIN TURBINE GENERATOR TRIP: **AK1.01** Pressure effects on reactor power

Justification:

A. **Correct:** When a main generator load rejection signal is received the turbine is tripped. and a SCRAM signal will be generated. The SCRAM is initiated to reduce reactor power in anticipation of the reactor pressure increase and subsequent power increase due to void collapse. Tripping of a recirculation pump will also serve to reduce reactor power and minimize reactor pressure increase.

B. **Incorrect but plausible**: reactor pressure will increase, not decrease due to the turbine trip and control valve closure.

C. **Incorrect but plausible:** reactor level will decrease not increase due to the rising reactor pressure from the turbine trip and control valve closure.

D. **Incorrect but plausible:** reactor level will decrease due to the turbine trip and closure of the control valves, however the SCRAM and recirc pump trip is in anticipation of the pressure increase which will be more limiting than the level drop.

References: Main Turbine Construction and Components Lesson Plan

Learning Objective: R4

Question Source: Bank

Question History: Taken from HC Bank – Question # 214

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 5

Due to a spurious MSIV isolation, the Unit has tripped from 100% power.
Given the following conditions:

- All control rods are fully inserted
- HPCI is running in pressure control mode
- RCIC is running in level control
- Torus temperature is 135°F and rising slowly

Caution #4 of HC.OP-EO.ZZ-0101, RPV Control, warns against operating HPCI and RCIC with high suction temperatures due to:

A. Tripping the turbine(s) due to low suction pressure

B. Cavitation of the jockey fill pump

C. Inadequate condensation in the barometric condenser

D. Inadequate cooling to the lube oil cooler

K&A Rating: 295006 G2.4.20 (3.8/4.3)

K&A Statement: Knowledge of the operational implications of the EOP warnings, cautions, and notes

Justification:

A. **Incorrect but plausible:** if applicant believes that the purpose of the caution is to prevent elevated HPCI/RCIC suction temperatures causing cavitation of the HPCI/RCIC pumps and the accompanying pressure surges could lead to a low suction pressure trip

B. **Incorrect but plausible**: if applicant believes that the purpose of the caution is to prevent elevated torus temperatures from causing cavitation of the jockey fill pump

C. **Incorrect but plausible:** if the applicant believes that the purpose of the caution is to alert operators to the potential of inadequate condensation in the barometric condenser due to lower heat transfer caused by the elevated torus temperatures

D. **Correct:** HC.OP-EO.ZZ-0101, caution #4 states, "Operation of HPCI OR RCIC turbines with suction temperatures above 170°F may result in equipment damage". IAW with the bases document, it states, "Caution #4 warns against operating HPCI and RCIC with high suction temperatures due to higher than normal oil temperatures". This is caused due to the lube oil coolers being cooled by the suction source, resulting in less cooling to the lube oil.

References: HC.OP-EO.ZZ-0101, Rev. 11 Student Ref: NONE

Learning Objective: EO101PE006

Question Source: HC bank 109059

Question History: None

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.10/43.5/45.13

Comments:

QUESTION 6

Given the following conditions:

- Fire and smoke in the control room has caused a control room evacuation to occur.
- The Control Room is being evacuated per HC.OP-AB.HVAC-0002.
- HPCI and RCIC both automatically initiated and are injecting.
- Control has been established at the Remote Shutdown Panel (RSP).
- The RSP operator trips RCIC when reactor water level reaches +54 inches.

Reactor water level will:

A. lower until RCIC automatically re-initiates at -38 inches.

B. lower until HPCI automatically re-initiates at -38 inches.

C. lower until both HPCI and RCIC automatically reinitiate.

D. continue to rise due to HPCI injection.

K&A Rating: 295016 AK2.02 (4.0/4.1)

K&A Statement: Knowledge of the interrelations between CONTROL ROOM ABANDONMENT and the following: Local control stations: Plant-Specific

Justification:

A. **Incorrect but plausible:** Plausible if the applicant does not recall that RCIC auto start is disabled at RSP when the transfer switches are placed in the EMER.
B. **Correct**: HPCI will continue to cycle between -38 inches and +54 inches.
C. **Incorrect but plausible:** Plausible if the applicant does not recall that RCIC auto start is disabled at RSP when the transfer switches are placed in the EMER.
D. **Incorrect but plausible:** Plausible if the applicant does not recall that HPCI auto trip at +54 inches is still in effect.

References: HC.OP-IO.ZZ-0008(Q), Rev. 31 Student Ref: NONE
HC.OP-AB.HVAC-0002(Q), Rev. 7

Learning Objective: RCIC00E004

Question Source: New

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.7/45.8

Comments:

QUESTION 7

Given the following conditions:

- The plant is operating at 100% rated thermal power
- A service water pipe on the 77’ level of the Reactor Building develops a large flange leak
- The RACS ROOM FLOODED alarm is received on all channels
- All expected automatic actions occur
- The EO reports 2” of water covering the entire RACS Pump and HX room floor, with the rate of rise slowing

Which ONE of the following actions is required IAW HC.OP-AB.COOL-003 ‘Reactor Auxiliary Cooling’?

A. Begin a normal reactor shutdown at 15% per hour.

B. Manually close valve 1-EA-V453 SSW to RACS Outboard Isolation valve.

C. Remove the floor drain plugs and pump out the room via the SW Dewatering pump.

D. Reduce Reactor Recirc Pump Speed to minimum and lock the mode switch in SHUTDOWN.

K&A Rating: 295018AK2.02 (3.4)

K&A Statement: Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER and the following: **AK2.02** Plant Operations

Justification:

A. **Incorrect but plausible:** A total loss of RACS has occurred. The amount of water on the floor prevents recovery of SSW to RACS. Action for flooding in rooms from EOP-103 Table 2.
B. **Incorrect but plausible**: Manual closing of 1-EA-V453 directed if HV-2346 fails to close. Not true with given stem conditions.
C. **Incorrect but plausible:** Floor drains and SSW dewatering tank are not interconnected.
D. **Correct:** Since all automatic actions occurred, SSW to RACS is lost and a loss of RACS has occurred. Retainment override of AB-COOL-0003 reduce RRPs to minimum and lock Mode Switch in S/D.

References: AB-COOL-0003 Student Ref: NONE

Learning Objective: ABCOL3E001

Question Source: Bank

Question History: HC Bank #308

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 8

Given the following conditions:

Hope Creek is starting up from a Refueling outage, the plant is currently in Operational Condition 3 with temperature at 240°F and with the Instrument Air pressure at 105 psig.

The Instrument/Service Air Compressors are aligned as follows:

Compressor	Control Mode	Status
00K107	LEAD	Running
10K107	LAG	OFF
10K100	AUTO	OFF

A Maintenance Worker accidentally bumps into 7.2KV Bus 10A120 causing its input breaker to open and the bus to deenergize.

Assuming NO operator actions, which ONE of the following correctly states the expected response of the Instrument/Service Air systems?

A. Instrument Air header pressure remains at 105 psig.

B. Instrument Air header pressure drops to 92 psig, when Service Air Compressor 10K107 starts and returns pressure to ~105 psig.

C. Service Air receiver pressure drops to 92 psig, when Service Air Compressor 10K107 starts and returns pressure to ~105 psig.

D. Service Air receiver pressure drops to 85 psig when Emergency Air Compressor 10K100 starts and returns pressure to ~95 psig.

Question 8

K&A Rating: 295019 Partial or Complete Loss of Inst. Air AA1.03 (3.0)

K&A Statement: Ability to operate and/or monitor the following as they apply to Partial or Complete Loss of Inst. Air: Instrument Air Compressor power supplies.

Justification:

A. **Incorrect but plausible:** Power to SAC 10K107 is from 7.2 KV bus 10A110, NOT 10A120
B. **Incorrect but plausible**: SAC 10K107 will NOT start at 92 psig in the instrument air header. It starts when the service air receiver is 92 psig. I.

C. **Correct:** SAC 10K107 will start when the service air receiver pressure is 92 psig. .

D. **Incorrect but plausible:** Loss of Power to 10A120 causes a loss of Power to SAC 00K107, Instrument Air header will not drop to 85 psig, because 10K107 will prevent the pressure getting that low. Plausible because EIAC 10K100 would start at 85 psig.

References: NOH01SERAIR-01, SERVICE AIR SYSTEM, p.47-48
NOH01INSAIR-01, INSTRUMENT AIR SYSTEM, p15, 42

Student Ref: NONE

Learning Objective:

Question Source: New

Question History: NA

Cognitive Level:	Memory/Fundamental Knowledge:	
	Comprehensive/Analysis:	X
10CFR:	CFR 41.7/45.6	

Comments:

QUESTION 9

Given the following conditions:

- 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 1200 hours.
- All efforts to restore heat removal from the RPV have failed.
- Both Recirculation pumps have been secured.

Assuming NO additional operator action, when will the plant reach OPCON 3?

A. 1245

B. 1307

C. 1330

D. 1352

(Note: See attached Figure 1)

FIGURE 1

Total Loss of Heat Removal from Rx Vessel
1000 EFPD of Operations

** Represents initial starting temperature as listed in the Figure. Each line represents a different initial starting temperature

Question 9

K&A Rating: 295021 Loss of Shutdown Cooling AA2.01 (3.5)

K&A Statement: Ability to determine and/or interpret the following as they apply to Loss of Shutdown Cooling: Reactor water heatup/cooldown rate.

Justification:

A. **Incorrect but plausible:** 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 but plausible:** Value obtained by using the 120°F curve.
D. **Incorrect but plausible:** Value obtained by using the 100°F curve.

References: HC.OP-AB.RPV-0009, Figure 1and Technical Specification Table 1.2

Student Ref: Figure 1 of HC.OP-AB.RPV-0009

Learning Objective:

Question Source: HC.OP-AB.RPV-0009, Figure 1and Technical Specification Table 1.2

Question History: 2005 HC NRC Exam

Cognitive Level:	Memory/Fundamental Knowledge:	
	Comprehensive/Analysis:	X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 10

The plant is in OPCON 1 with irradiated fuel being shuffled in the Spent Fuel Pool when the following VALID alarms are received in the Control Room:

- RADIATION MONITORING ALARM/TRBL
- NEW FUEL CRITICALITY RAD HI
- REFUEL FLR EXH RAD ALARM/TRBL
- RB EXH RADIATION ALARM/TRBL

Which ONE of the following is the appropriate control room operator action IAW HC.OP-AB.CONT-0005, ‘IRRADIATED FUEL DAMAGE’?

A. Ensure Radwaste Ventilation Supply and Exhaust fans trip.

B. Verify the Drywell Integrity Airlock surveillance test is current.

C. Verify the start of the “A” and “C” SACS pumps if not already running.

D. Direct returning any fuel assembly attached to the fuel handling grapple to its original location in the fuel pool regardless of radiation levels.

K&A Rating: 295023AK3.01 (3.3/3.6)

K&A Statement: Knowledge of the reasons for the following responses as they apply to REFUELING ACCIDENTS: **AK3.03** Ventilation Isolation

Justification:

A. **Correct:** Hi alarms on Reactor building and RF floor indicate an isolation signal and supply and exhaust fans trip.
B. **Incorrect but plausible**: The concern is secondary not primary containment.
C. **Incorrect but plausible:** The “A” and “B” SACS pump will start if not running, not the “A” and “C” SACS pumps.
D. **Incorrect but plausible:** CONT-0005 Section B.1 states that damaged fuel should be placed in the spent fuel pool ONLY if radiation levels permit.

References: HC.OP-AB.CONT-0005, Rev 4 Student Ref: NONE

Learning Objective: ABCNT5E004

Question Source: Modified from HC Bank (Question #405)

Question History: Modified from bank question used on 2010 HC Exam

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 11

A transient has occurred. The current containment conditions are as follows:

- Drywell pressure: 4.5 psig rising
- Drywell temperature: 150 F rising
- Torus pressure: 4.0 psig rising
- Torus water temperature: 82 F steady
- Torus airspace temperature: 145 F rising

Which of the following events would explain the current plant conditions?

A. A safety relief valve (SRV) has lifted and is discharging through a T-Quencher.

B. The containment is functioning as designed following a feedwater line break inside containment.

C. A main steam line break has occurred inside containment with a Torus to drywell vacuum breaker open.

D. The containment is functioning as designed following a total loss of drywell cooling.

QUESTION 11

K&A Rating: 295024 High Drywell Pressure EA2.05 (3.6)

K&A Statement: Ability to determine and/or interpret the following as they apply to HIGH DRYWELL PRESSURE: **EA2.05** Suppression chamber air-space temperature: Plant Specific.

Justification:

A. **Incorrect but plausible:** Since the Torus airspace temperature would not be rising with the discharge of the SRV into the water portion of the torus.
B. **Incorrect but plausible**: Since the Torus airspace temperature would not be rising if the containment was responding normally.
C. **Correct:** Drywell and torus air space trending together is indication that there is a bypass of the containment, which in this case is the torus to drywell vacuum breaker being open.
D. **Incorrect but plausible:** Since the Torus airspace temperature would not be rising with the loss of drywell cooling.

References: NOHOIPRICONC, "Primary Containment Structure"

Student Ref: NONE

Learning Objective: PRICONEOO8

Question Source: Mod INPO Bank PB2 Question

Question History: 2007 NRC Exam

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 12

Which ONE of the following describes the reason for sustained (vice intermittent) SRV openings during performance of HC.OP-EO.ZZ-0101, 'RPV CONTROL' if the pneumatic supply is lost to the SRVs?

A. Conserves SRV pneumatic supply for sufficient cooldown to less than the shutdown cooling high pressure interlocks.

B. Prevents exceeding the 100°F/hr cooldown limit during depressurization while conserving the SRV pneumatic supply.

C. Conserves SRV accumulator pneumatic supply for later use if an Emergency Depressurization is required.

D. Allows the operator to depressurize without regard to the Technical Specification cooldown limits before the pneumatic supply is depleted resulting in a loss of SRV control.

K&A Rating: 295025 2.4.49 (4.6)

K&A Statement: High Reactor Pressure **2.4.49:** Ability to perform without reference to procedures those actions that require immediate operation of system components and controls

Justification:

A. **Incorrect but plausible:** Sustained opening of the SRVs is specified in step RC/P-6 to conserve accumulator pressure for a subsequent Emergency Depressurization, NOT to allow for further cooldown.
B. **Incorrect but plausible**: Although there is a 100F/hr cooldown rate limit applied in step RC/P-6, sustained opening of the SRV vice intermittent opening is not used to control cooldown rate.
C. **Correct:** IAW HC.OP-EO.ZZ-0101 bases step RC/P-6, sustained SRV opening conserves accumulator pressure when the source of pressure to the SRV pneumatic supply is isolated or otherwise out of service. Such action to reduce the number of cycles on the SRVs prolongs SRV availability should more degraded conditions later required SRVs be opened for rapid depressurization of the RPV.
D. **Incorrect but plausible:** HC.OP-EO.ZZ-0101 step RC/P-6 limits cooldown rate to 100F/hr.

References: HC.OP-EO.ZZ-0101 Bases Document Student Ref: NONE

Learning Objective: EO101PE005

Question Source: HC Bank #131

Question History: Not used on previous 2 NRC exams

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 13

The plant is at rated power, conditions are as follows:

- HPCI testing is in progress IAW HC.OP-IS.BJ-0001 “HPCI Main and Booster Pump Set – 0P204 and 0P217 - Inservice Test”
- Torus level is 75.5 inches
- Div 1 SPOTMOS indicates 96ºF and slowly trending higher
- Div 2 SPOTMOS indicates 98ºF and slowly trending higher
- Highest individual suppression pool temperature sensor indicates 112ºF

WHICH ONE of the following describes the required action(s) at this time?

A. Enter HC.OP-EO.ZZ-0102 “Primary Containment Control” AND immediately suspend testing

B. Place the Mode Switch in Shutdown and place Suppression Pool cooling in service

C. Enter HC.OP-EO.ZZ-0102 “Primary Containment Control”.
Suspend testing before SPOTMOS temperature reaches 105ºF

D. Do NOT enter HC.OP-EO.ZZ-0102 “Primary Containment Control”. Suspend testing before SPOTMOS temperature reaches 105ºF

K&A Rating: 295026 EA1.03 (3.9/3.9)

K&A Statement: Ability to operate and/or monitor the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: **EA1.03 Temperature Monitoring**

Justification:

A. **Incorrect but plausible:** If applicant believes that EOP entry is required. EOP entry is not required until 105°F while performing testing IAW HC.OP-IS.BJ-0001. Additionally, testing is not required to be suspended until 105°F suppression chamber average water temperature IAW TS 3.6.2.1

B. **Incorrect but plausible:** If applicant believes that the Mode Switch is required to be placed in Shutdown due to one temperature above 110°F. This is only required if the Suppression Pool *average* water temperature exceeds 110°F

C. **Incorrect but plausible:** If applicant believes that EOP entry is required. EOP entry is not required until 105°F while performing testing IAW HC.OP-IS.BJ-0001.

D. **Correct:** EOP entry is not required until 105°F while performing testing IAW HC.OP-IS.BJ-0001. Additionally, testing is not required to be suspended until 105°F suppression chamber average water temperature IAW TS 3.6.2.1

References: HC.OP-IS.BJ-0001, Rev. 60 Applicant Ref: NONE
TS 3.6.2.1, Amendment 110

Learning Objective: NEED

Question source: Modified Limerick 2008

Question History: None

Cognitive level: Memory/Fundamental knowledge:
Comprehensive/Analysis: X

10CFR Part 55: 41.7/45.6

Comments:

QUESTION 14

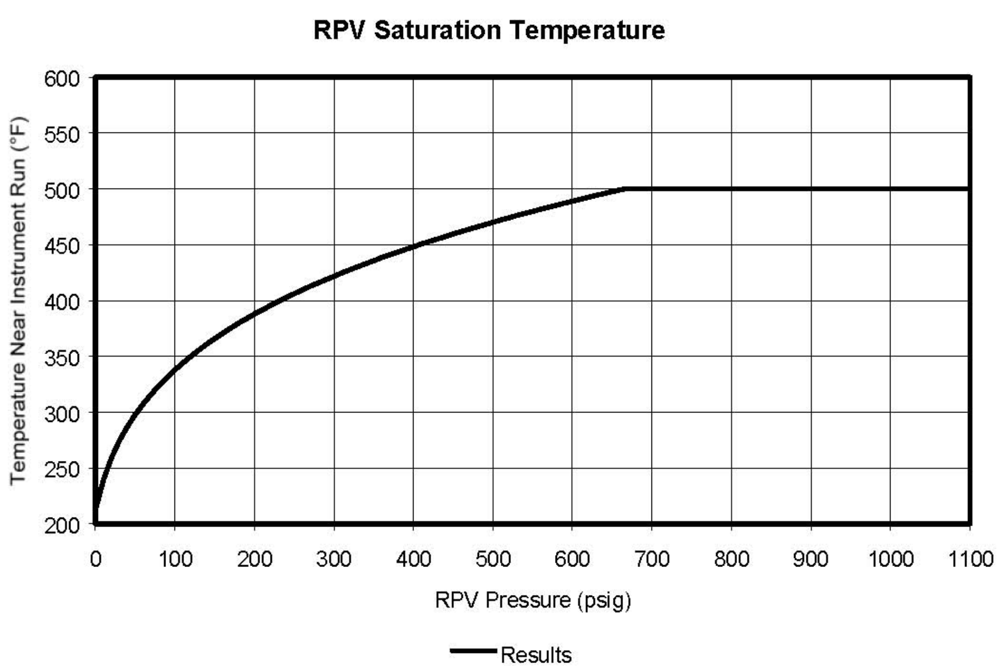
SELECT the reactor pressure, drywell temperature and level instrument that would allow valid determination of a reactor water level of -100 inches.

A. RPV pressure - 300 psig, Drywell temperature - 400 degrees F on SPDS point A2266, Narrow Range A

B. RPV pressure - 200 psig, Drywell temperature - 350 degrees F on SPDS point A2277, Wide Range B

C. RPV pressure - 100 psig, Drywell temperature - 350 degrees F on SPDS point A2281, Upset Range

D. RPV pressure - 100 psig, Drywell temperature - 250 degrees F on SPDS point A2280, Fuel Zone A



K&A Rating: 295028 EK1.01 (3.5/3.7)

K&A Statement: Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL TEMPERATURE: Reactor water level measurement

Justification:

A. **Incorrect but plausible:** RPV pressure - 300 psig, Drywell temperature - 400 degrees F on SPDS point A2266, Narrow Range A - Within the curve, but 100 inches is above the top of the narrow range band (0-60 inches).
B. **Correct**: pressure - 200 psig, Drywell temperature - 350 degrees F on SPDS point A2277, Wide Range B - Within the curve and A2277 is the nearest SPDS point to Wide Range B.
C. **Incorrect but plausible:** RPV pressure - 100 psig, Drywell temperature - 350 degrees F on SPDS point A2281, Upset Range - Outside of the curve.
D. **Incorrect but plausible:** RPV pressure - 100 psig, Drywell temperature - 250 degrees F on SPDS point A2280, Fuel Zone A - Within the curve, outside of the range of the Fuel Zone (-111 to -311inches).

References: EOP Caution 1
HC.OP-EO.ZZ-LIMITS-CONV, Rev. 5

Student Ref: NONE

Learning Objective: EO101LE007

Question Source: Bank # 33436

Question History:

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.8, 41.9, 41.10

Comments:

QUESTION 15

Given the following:

- A leak has developed in the Torus requiring emergency makeup
- Torus level is 71 inches and lowering slowly
- The Condensate transfer lines to Core Spray Suctions are NOT available

Emergency Makeup to the Suppression Pool via RCIC is accomplished by which ONE of the following?

A. Running RCIC with the full flow test flowpath open.

B. Running RCIC with the min flow discharge flowpath open.

C. Overriding and opening both RCIC suction MOVs simultaneously.

D. Running the RCIC Jockey Pump with the Suppression Pool suction MOV open.

K&A Rating: 295030 2.4.11 (4.0)

K&A Statement: Low Suppression Pool Water Level **2.4.11:** Knowledge of abnormal condition procedures.

Justification:

A. **Incorrect but plausible:** Running RCIC with the full flow test flowpath open would only recirculate CST water.
B. **Correct**: Running RCIC with the min flow discharge flowpath open, IAW EOP-313 will provide emergency makeup water to the suppression pool.
C. **Incorrect but plausible:** Overriding and opening both RCIC suction MOVs simultaneously will not provide emergency makeup water to the suppression pool. There is a check valve in the suppression pool suction path that prevents gravity draining the CST into the suppression pool.
D. **Incorrect but plausible:** Running the RCIC jockey pump with the suppression pool suction MOV open will not provide water to the suppression pool. There is a check valve between the suppression pool and the jockey pump suction line, and the flow direction of the jockey pump is incorrect.

References: EOP-313 Student Ref: NONE

Learning Objective: EOP300E004, EO101AE006

Question Source: HC Bank # 184

Question History: Used on 1999 Audit Exam

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 16

Given the following conditions:

- The plant has experienced a LOCA with a loss of ALL injection.
- All Control Rods have inserted.
- RPV pressure is being controlled with SRVs.
- RPV water level has lowered to -196 inches (Corrected Fuel Zone).

What is the status of core cooling?

Adequate core cooling exists . . .

A. only if injection is established at this water level.

B. only when the SRVs are closed.

C. at this RPV water level.

D. only if RPV water level is raised 10 inches.

K&A Rating: 295031EA2.04 (4.6/4.8)

K&A Statement: Ability to determine and/or interpret the following as they apply to Reactor Low Water Level E**A2.04** Adequate Core Cooling

Justification:

A. **Incorrect but plausible:** Injection at this level would reduce steam generation needed to assure adequate core cooling.
B. **Incorrect but plausible**: Adequate steam generation is present whether SRVs are open or closed.
C. **Correct:** At levels above -200 inches with no injection there is sufficient steam flow to provide adequate core cooling.
D. **Incorrect but plausible:** Because compensated level is above -200, adequate core cooling exists at this level.

References: Student Ref: NONE

Learning Objective: EO101LE006

Question Source: INPO Bank Q101 HC Bank

Question History: None

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR: CFR 41.10/43.3/45.13

Comments:

QUESTION 17

Unit 1 is at 100% power. Given the following conditions:

- A loss of the 10A102 bus resulted in the loss of two RFPTs.
- The remaining RFPT was unable to maintain RPV water level
- The reactor scrammed on RPV LVL 3.
- Numerous control rods remained withdrawn with power at 5%.
- RPV water level lowered to -110”
- HPCI and RCIC initiated, and RPV water level then started to rise

Current conditions are:

- Reactor power is 5% and rising 1% every two minutes due to RPV water injection
- RPV water level is -110” and rising at 15”/min.
- RPV pressure is 920 psig and steady
- NO operator actions are taken

Which ONE of the following describes the associated RRCS function status four minutes later?

A. A feedwater runback has <u>NOT</u> initiated, RPT breakers are closed

B. ARI valves are open, SLC pumps did <u>NOT</u> initiate

C. RPT breakers are tripped, SLC pumps have initiated

D. A feedwater runback has initiated, ARI valves are closed

K&A Rating: 295037EK2.02 (4.0/4.2)

K&A Statement: Knowledge of the interrelations between SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN and the following: RRCS

Justification:

A. **Incorrect but plausible:** The –38” RPT breaker trip signal is a seal in signal. 9 seconds after water level dropped below –38”, the RPT breakers will trip
B. **Incorrect but plausible**: The –38” level to the SLC pump initiation circuit does <u>NOT</u> seal in. However, starting from –110”, rising at 15” per minute, RPV water level will be –50” in four minutes. Since RPV water level will be below –38” when the 230 second timer times out, SLC pumps will initiate
C. **Correct:** The –38” RPT breaker trip signal is a seal in signal. 9 seconds after water level went below –38”, the RPT breakers will trip. The –38” level to the SLC pump initiation circuit does <u>NOT</u> seal in. However, starting from –110”, rising at 15” per minute, RPV water level will be –50” in 240 seconds. Since RPV water level will be below –38” when the 230 second timer times out, SLC pumps will initiate
D. **Incorrect but plausible:** A feedwater runback is initiated only by reactor pressure reaching 1071 psig. There is <u>NO</u> reason for reactor pressure to have reached 1071 psig during the lowering level transient. Additionally, ARI valves opened immediately at –38” and do <u>NOT</u> automatically reset

References: NOH04RRCS Student Ref: NONE

Learning Objective: RRCS00E007

Question Source: HC Bank (Question ID#65237)

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.7/45.8

Comments:

QUESTION 18

HC.OP-EO.ZZ-0103/4, Reactor Building & Rad Release Control, step RR-5, directs isolation of all primary systems discharging into areas outside Primary Containment or Reactor Building, except those systems required to assure adequate core cooling and/or shutdown the reactor.

In accordance with the EOP Bases document, HC.OP-EO.ZZ-103/4. Reactor Building & Rad Release Control, these systems are specifically exempted from isolation, because:

A. additional radiological consequences from them are unlikely.

B. they are required to support alternate reactor depressurization methods.

C. isolation of a EOP support system requires an upgrade of the Emergency Classification.

D. systems operated for RPV control are given a higher priority than stopping a rad release.

Question 18

K&A Rating: 295038 High Off-site Release Rate EK3.02 (3.9)

K&A Statement: Knowledge of the reasons for the following responses as they apply to High Off-Site Release Rate: System Isolations

Justification:

A. **Incorrect but plausible:** NOT in accordance with bases document
B. **Incorrect but plausible**: NOT in accordance with bases document
C. **Incorrect but plausible:** NOT in accordance with bases document
D. **Correct:** Per EOP Bases document 103/104: The objectives of RPV Control, Primary Containment Control, and the EPG contingencies are given higher priority than the steps of the objectives of Radioactivity Release Control. Systems that must be operated to perform other EPGs are therefore NOT isolated in this step.

References: BWROG, EPGs/SAGs Appendix B, section 9 Radioactivity Release control HC.OP-EO.ZZ-103/4. Reactor Building & Rad Release Control Bases Document - p. 13 & 14

Student Ref: NONE

Learning Objective: EOP103E006

Question Source: HC NRC Exam 2005

Question History: HC NRC Exam 2005

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 19

Given:

- The plant is operating at 100% power
- A loss of MCC 00B590 occurs.
- Field operator confirms NO fire onsite.

Based on this, it will be necessary to:

A. Secure the motor driven fire pump to prevent pumping down the fire water storage tank.

B. Manually start the electric fire pump due to a loss of the diesel driven fire pump battery chargers.

C. Manually start the diesel fire pump due to a loss of the motor driven fire pump power supply.

D. Secure the diesel driven fire pump to prevent pumping down the fire water storage tank.

K&A Rating: 600000 AK3.04 (2.8/3.4)

K&A Statement: Knowledge of the reasons for the following responses as they apply to PLANT FIRE ON SITE: Actions contained in the abnormal procedure for plant fire on site

Justification:

A. **Incorrect but plausible:** Plausible if the applicant does not recall that the motor driven fire pump has no power, it is not running.
B. **Incorrect but plausible:** Plausible if the applicant does not recall that the battery chargers are powered from 1AJ483.
C. **Incorrect but plausible:** Plausible if the applicant does not recall that the diesel driven fire pump auto starts on a loss of power to the motor driven fire pump.
D. **Correct:** The diesel driven fire pump auto starts on a loss of power to the motor driven fire pump. Since there is no fire, the fire water storage tank is being pumped down.

References: HC.OP-AR.QK-0002 Student Ref: NONE

Learning Objective: FIRPROE008

Question Source: HC Bank

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.7/45.8

Comments:

QUESTION 20

Given the following conditions:

- The plant is operating at 100% power
- LAC Police report a marsh fire directly beneath the New Freedom (5023) 500kV line
- 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, Salem Unit 2, or Hope Creek can result

B. armed, a trip of either Salem Unit 1 or Salem Unit 2 ONLY can result

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

D. NOT armed, a trip of either Salem Unit 1 or Salem Unit 2 ONLY can result

K&A Rating: 700000 AK2.02 (3.1/3.3)

K&A Statement: Knowledge of the interrelations between GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES and the following: **AK2.02** Breakers, Relays

Justification:

A. **Incorrect but plausible:** Potential trip of Salem Unit 1 or Salem Unit 2 can occur if cross trip circuits are armed, but Hope Creek is not affected
B. **Correct**: Per caution 2 on pg. 12 of HC.OP-AB.BOP-0004, removing a 500kV line from service can result in a trip of Salem 1 or 2 **IF** the cross tripping circuits are armed.
C. **Incorrect but plausible:** If applicant does not understand the purpose and design of the cross tripping circuits, may believe that having the circuit disarmed would cause a trip of Salem Unit 1, Salem Unit 2, or Hope Creek
D. **Incorrect but plausible:** If applicant does not understand the purpose and design of the cross tripping circuits, may believe that having the circuit disarmed would cause a trip of Salem Unit 1, Salem Unit 2, or Hope Creek

References: HC.OP-AB.BOP-0004, Rev. 21 Student Ref: NONE

Learning Objective: ABBOP4E007

Question Source: HC Bank ID 120366

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.4/41.5/41.7/41.10/45.8

Comments:

QUESTION 21

Given the following:

- The reactor has scrammed on high Drywell pressure.
- Drywell Floor Drain Sump pumps (CP267/DP267) have stopped running.
- Drywell pressure continues to rise.
- No operator actions have been taken.

Under these conditions, which ONE of the following caused the Drywell Floor Drain Sump pumps to stop running?

A. The Reactor Recirc Seal Staging flow is isolated.

B. The HB-HV-5258 DRYWELL FLOOR DRN PMPS DSCH VLV has failed closed.

C. The Drywell Leak Detection (DLD) Sump Monitoring System has failed.

D. The power source to the pumps is load shed.

K&A Rating: 295010AA1.02 (3.6/3.6)

K&A Statement: Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE : **AA1.02** Drywell floor and equipment drain sumps

Justification:

A. **Incorrect but plausible:** Reactor Recirc Seal Staging flow is directed to the Drywell Equipment Drain Sump. Loss of this flow input would have no effect on the DWFDS.
B. **Incorrect but plausible**: The HV-5258 is interlocked to open on a start of either CP267 or DP267; however, it is NOT a permissive for the pumps to run. If it failed shut it would prevent the pumps from pumping, but it would NOT prevent them from running. (The pumps DO receive a permissive to run from the drywell containment isolation valves HV-F003/F004).
C. **Incorrect but plausible:** The DLD SMS does not control operation of the drywell sump pumps.
D. **Correct:** The power supply to the CP267 and DP267 are 252064 and 262064, respectively. These MCCs are load shed on High Drywell Pressure.

References: E-0023-1 Sheet 1 Student Ref: NONE

HC.OP-SO.SM-0001 Table SM-20

HC.OP-AR.ZZ-0014 Attachment D3-C3 and D2363.

Learning Objective: L/R/A/ Drywell Floor Drain Sump pumps trip

Question Source: HC Bank #58

Question History: NRC EXAM 2002

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.7/45.6

Comments:

QUESTION 22

Given the following conditions:

- A plant startup is in progress following a forced outage.
- The plant has been operating with a known fuel leak.
- The plant scrammed 40 hours ago.
- The “A” Mechanical Vacuum Pump (MVP) is placed in service with the suction valve throttled.
- The Main Condenser Vacuum Breakers are closed.

Which ONE of the following actions is required IAW HC.OP-SO.CG-0001, ‘Condenser Air Removal Operation’ if the South Plant Vent (SPV) RMS Effluent monitor reaches the ALERT alarm set point and condenser vacuum cannot be maintained?

A. Stop the MVP to stop release to the SPV.

B. Open the Main Condenser Vacuum Breakers to stop release to the SPV.

C. Throttle the MVP Suction valve further closed to reduce effluent levels in the SPV.

D. MVP flow may be increased to the High Alarm setpoint to establish condenser vacuum.

K&A Rating: 295017AK1.02 (3.8)

K&A Statement: Knowledge of the operational implications of the following concepts as they apply to HIGH OFF-SITE RELEASE RATE: **AK1.02** Protection of the general public

Justification:

A. **Incorrect but plausible:** Stopping of the MVP would only be required if the HIGH SPV RMS Effluent monitor set point were reached.
B. **Incorrect but plausible:** Not required per HC.OP-SO.CG-0001. Additionally, opened the Main Condenser Vacuum Breakers would *increase* effluent flow.
C. **Incorrect but plausible:** IAW HC.OP-SO.CG-0001, Caution 5.8.13, the MVP does not need to be stopped if the MVP suction is throttled until the HIGH alarm setpoint is reached.
D. **Correct**: IAW HC.OP-SO.CG-0001, Caution 5.8.13, if condenser vacuum cannot be maintained with the flow reduced such that the SPV RMS Effluent ALERT setpoint is not exceeded, flow may be increased but not to exceed the HIGH alarm setpoint (which ensures that ODCM release rate limits are not exceeded).

References: HC.OP-SO.CG-0001, Rev 45, Section 5.8.13 Student Ref: NONE

Learning Objective: ABBOP6E001

Question Source: Modified from HC Bank (Question #261)

Question History: Original question used on 2003 NRC Exam

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 23

Plant was operating at 100% power when an inadvertent PCIG Isolation occurred due to multiple instrument failures.

Assuming NO SCRAM ACTIONS and NO OTHER OPERATOR ACTIONS for 40 minutes, which ONE of the following, if any, is available to initiate a controlled RPV depressurization per T-101 “RPV Control”?

A. Manual operation of SRVs only.

B. Manual operation of Bypass Valves only.

C. Both SRVs and Bypass Valves.

D. Neither SRVs or Bypass Valves.

K&A Rating: 295020 AK2.01 (3.6/3.7)

K&A Statement: Knowledge of the interrelations between INADVERTENT CONTAINMENT ISOLATION and the following: Main steam system

Justification:

A. **Correct:** Inboard MSIVs will close due to their accumulators bleeding down (~ 30 min), rendering the Bypass Valves unable to support pressure control. However, the (ADS) SRVs can be operated manually due to the pneumatic supply accumulators.
B. **Incorrect but plausible:** Plausible if candidate does not know that Inboard MSIVs will close due to loss of Instrument Nitrogen. Inboard MSIVs will close due to their accumulators bleeding down (~ 30 min), rendering the Bypass Valves unable to support pressure control.
C. **Incorrect but plausible:** Plausible if candidate does not know that Inboard MSIVs will close due to loss of Instrument Nitrogen. Inboard MSIVs will close due to their accumulators bleeding down (~ 30 min), rendering the Bypass Valves unable to support pressure control.
D. **Incorrect but plausible:** Plausible if candidate does not know that Inboard MSIVs will close due to loss of Instrument Nitrogen. Inboard MSIVs will close due to their accumulators bleeding down (~ 30 min), rendering the Bypass Valves unable to support pressure control.

References: NOH01MSTEAMC-08
NOH01PCIG00C-06
NOH04NSSSS0C-04

Student Ref: NONE

Learning Objective: MSTEAME003, PCIG00E008,

Question Source: New

Question History: None

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR: CFR 41.7/45.8

Comments:

QUESTION 24

Following a plant transient caused by a feedwater leak in the Drywell, Torus water level begins to rise. Torus water level continues to rise, reaches 110 inches and CANNOT be lowered. RPV pressure is 1020 psig.

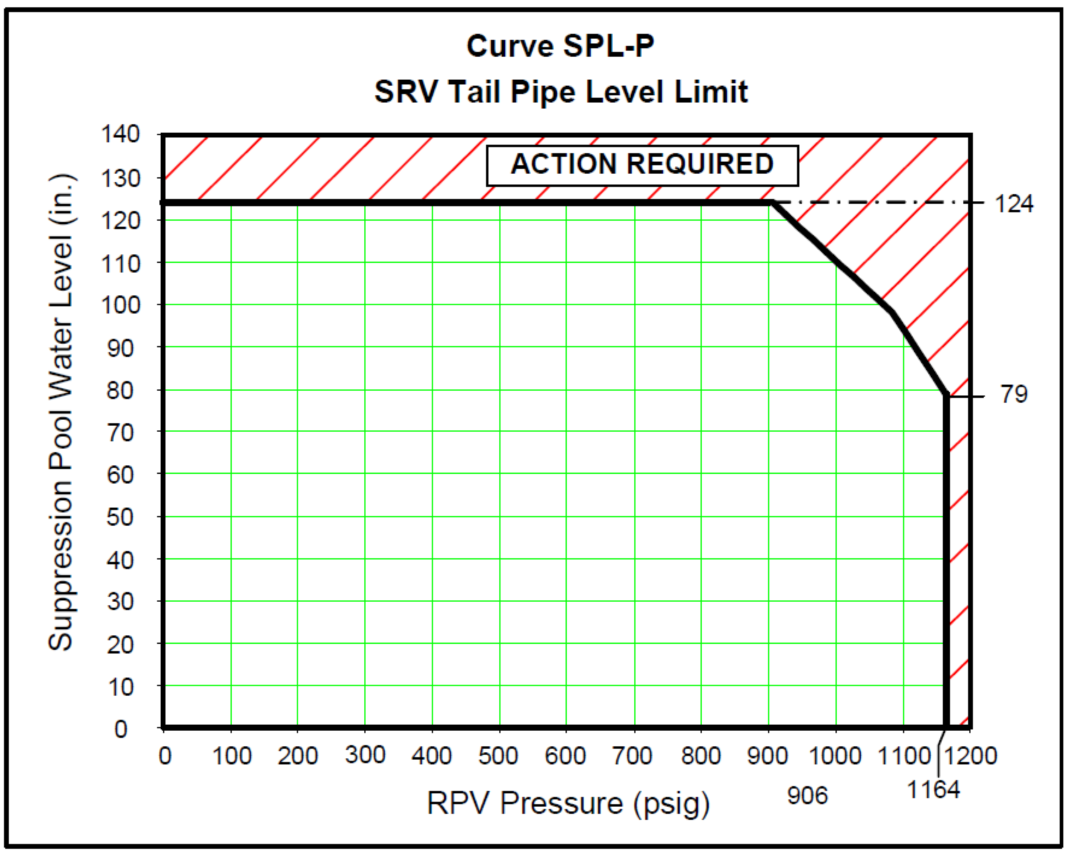
Which ONE of the following states the action required per the Emergency Operating Procedures and the reason for that action?

A. An RPV Blowdown is required to protect the integrity of the Primary Containment

B. Rapidly depressurize the RPV using the Bypass Valves to prevent exceeding SRV Tail Pipe Level Limit

C. Commence a normal plant shutdown and cooldown to limit Torus level rise from external sources

D. Terminate external injection sources even if adequate core cooling is challenged, to limit torus level rise



K&A Rating: 295029 EK3.01 (3.5/3.9)

K&A Statement: Knowledge of the reasons for the following responses as they apply to HIGH SUPPRESSION POOL WATER LEVEL: **EK3.01** Emergency Depressurization

Justification:

A. **Correct:** Per HC.OP-EO.ZZ-0102, Primary Containment Control, step SP/L-24, "SRV operation with suppression pool water level above the SRV Tail Pipe Level Limit (STPLL) could damage the SRV discharge lines. This, in turn, could lead to containment failure from direct pressurization and damage to equipment inside the containment (ECCS piping, RPV water level instrument runs, wetwell-to-dry well vacuum breakers, etc.) from pipe-whip and jet-impingement loads. The RPV is therefore not permitted to remain at pressure if suppression pool water level and RPV pressure cannot be restored and maintained below the STPLL."

B. **Incorrect but plausible**: For the given conditions, entry into HC.OP-EO.ZZ-0202, Emergency RPV Depressurization is necessary; depressurization through the bypass valves is no longer permitted

C. **Incorrect but plausible:** HC.OP-EO.ZZ-0102, Primary Containment Control, step SP/L-15 requires a reactor scram, not a normal plant shutdown

D. **Incorrect but plausible:** External injection sources are permitted if required to maintain adequate core cooling

References: HC.OP-EO.ZZ-0102, Rev. 12 Student Ref: NONE

Learning Objective: EOP102E009

Question Source: Bank, NMP1 2000 Exam

Question History: None

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.5/45.6

Comments:

QUESTION 25

Hope Creek is at 50% power when a fire is reported in the HPCI pump room.

Current conditions are:

- The smoke and heat has spread to the RCIC room as a result of fire fighting efforts.
- HPCI and RCIC have isolated due to high temperatures.
- Temperatures in both the HPCI room and RCIC room are at 275 °F.
- Fire fighting efforts have been hampered due to previously tagged fire suppression systems.

Which ONE of the following actions is required?

A. Bypass High Room Temperature isolations for RCIC and restore to standby lineup.

B. Shutdown the reactor and commence a normal cooldown.

C. Runback reactor recirculation and manually scram the reactor.

D. Scram the reactor and emergency depressurize.

K&A Rating: 295032EA2.01 (3.8/3.8)

K&A Statement: Ability to determine and/or interpret the following as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE:**EA2.01** Area Temperature

Justification:

A. **Incorrect but plausible:** Actions for RCIC Hi room temps driven by Station Blackout.
B. **Correct:**: A reactor coolant system is not discharging into the Reactor Building and the Max Safe Operating Limit in 2 areas has been exceeded.
C. **Incorrect but plausible:** A reactor coolant system is not discharging into the Reactor Building, IAW EOP-103 step RB-15. Runback recirc and manually scram the reactor is not required.

D. **Incorrect but plausible:** A reactor coolant system is not discharging into the Reactor Building, IAW EOP-103 step RB-15. Emergency depressurization is not required.

References: EOP 103 Student Ref: NONE

Learning Objective:

Question Source: HC Bank Q78

Question History: NA

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 26

Given the following conditions:

- Reactor Building Ventilation is in a normal lineup.
- Reactor Building differential pressure is negative at 0.55 inches water gauge.

Which ONE of the following will cause a degradation of Reactor Building differential pressure?

A. Level 3 Low RPV water level.

B. Inadvertent actuation of the “A” RHR Room Blowout Panel.

C. Inadvertent closure of GUD-925, ‘RX BLDG SUP HAND DAMPER’.

D. Refuel Floor Vent Exhaust effluent monitor reading 1.5 x 10^{-3} μCi/cc.

K&A Rating: 295035 2.2.44 (4.2)

K&A Statement: Secondary Containment High Differential Pressure: **2.2.44** Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.

Justification:

A. **Incorrect but plausible:** RBVS automatically isolates at Level 2 low Reactor Water level (-38”), not Level 3.
B. **Incorrect but plausible**: The ECCS blowout panels relieve pressure from the ECCS spaces to the torus space, where increased pressure can be manually vented out of the steam vent. An inadvertent opening of the ‘A’ RHR blowout panel will not change the overall pressure inside the secondary containment.
C. **Correct:** Inadvertent closure of GUD-925 will trip the RBVS Supply fans causing degradation in secondary containment D/P. This is an actual event documented in LER-00-009 and specifically covered in training material (NOHO1SECCONC-04).
D. **Incorrect but plausible:** The Refuel Floor Vent Exhaust monitor automatically isolates RBVS at 2.0×10^{-3} μCi/cc. The Reactor Building Vent Exhaust monitor automatically isolates RBVS at 1.0×10^{-3} μCi/cc.

References: HC.OP-SO.GR-0001
LER 00-009 — Student Ref: NONE

Learning Objective: SECCONE004-008

Question Source: New

Question History: N/A

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 27

Given the following:

- A large LOCA has occurred with the unit initially operating at 100% power
- All control rods are fully inserted
- Operators are currently evaluating post-LOCA H_2 and O_2 concentrations

Which ONE of the following is indicative of conditions that could potentially lead to a deflagration event and loss of primary containment integrity?

	Drywell H_2 (%)	Drywell O_2 (%)	Torus H_2 (%)	Torus O_2 (%)
A.	7	4	5	4
B.	0	6	5	6
C.	0	4	6	5
D.	5	5	4	5

K&A Rating: 500000 EK1.01 (3.3/3.9)

K&A Statement: Knowledge of the operational implications of the following concepts as they apply to HIGH CONTAINMENT HYDROGEN CONCENTRATION: **EK1.01** Containment Integrity

Justification:

A. **Incorrect but plausible:** does not meet the requirements for deflagration and potential loss of primary containment integrity
B. **Incorrect but plausible:** does not meet the requirements for deflagration and potential loss of primary containment integrity
C. **Correct:** IAW HC.OP-EO.ZZ-0102 bases, “excessive hydrogen concentration (≥6%), mixed with high oxygen concentration (≥5%) and ignited in the confined space of the primary containment generates peak pressures which may exceed the structural capability of the drywell, suppression chamber or drywell-suppression chamber boundary.”
D. **Incorrect but plausible:** does not meet the requirements for deflagration and potential loss of primary containment integrity

References: HC.OP-EO.ZZ-0102 Bases, Rev. 4 Student Ref: NONE
NOH01PRICONC LP, Rev. 6

Learning Objective: NOH01PRICONC-6

Question Source: New

Question History: None

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.8-41.10

Comments:

QUESTION 28

Given the following conditions:

- The reactor is in cold shutdown with loop "B" of RHR in shutdown cooling.
- A break results in a loss of reactor coolant inventory.
- Water level has lowered to -150 inches.

Select the correct RHR loop "B" status for these conditions.

A. RHR pump (BP202) will be running.
RHR Injection Valve (HV-F017B) will be full open.
RHR Suppression Pool Suction Valve (HV-F004B) will be full open.

B. RHR pump (BP202) will be tripped.
RHR Injection Valve (HV-F017B) will be full closed.
RHR Suppression Pool Suction Valve (HV-F004B) will be full closed.

C. RHR pump (BP202) will be running
RHR Injection Valve (HV-F017B) will be full closed.
RHR Suppression Pool Suction Valve (HV-F004B) will be full open.

D. RHR pump (BP202) will be tripped.
RHR Injection Valve (HV-F017B) will be full open.
RHR Suppression Pool Suction Valve (HV-F004B) will be full closed.

K&A Rating: 203000A4.01 (4.3/4.1)

K&A Statement: Ability to manually operate and/or monitor in the control room:**A4.01** Pumps

Justification:

A. **Incorrect but plausible:** Suction valves being closed will prevent the pump starting. Suppression pool suction will not receive an open signal.
B. **Incorrect but plausible**: LPCI signal will open the Injection Valve.
C. **Incorrect but plausible:** LPCI signal will open the Injection Valve. Suction valves being closed will prevent the pump starting. Suppression pool suction will not receive an open signal.
D. **Correct:** Closing the SDC suction valves on the isolation signal will trip the RHR pump. The LPCI signal will open the RHR Injection Valve. The Suppression Pool Suction valve does not receive an open signal on a LPCI signal.

References: HC.OP-SO.BC-0001 Student Ref: NONE

Learning Objective:

Question Source: HC Bank #209

Question History: NA

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.7/43.5/45.8

Comments:

QUESTION 29

Given the following:

- The reactor has been in COLD SHUTDOWN for two (2) days following power operation
- Reactor vessel water level is +30 inches
- Neither Reactor Recirculation pump is available

Due to several component failures, Shutdown Cooling is lost, and alternate decay heat removal using D to B cross-tie is established IAW HC.OP-AB.RPV-0009, "Shutdown Cooling".

After establishing alternate decay heat removal, RPV level indication for Ch C and D indicates +12".

WHICH ONE of the following describes the status of the "D" RHR Pump and HV-F015B, RHR LOOP B RET TO RECIRC one minute later?

	"D" RHR Pump	HV-F015B
A.	Running	open
B.	Running	closed
C.	Tripped	open
D.	Tripped	closed

K&A Rating: 205000 A2.05 (3.5/3.7)

K&A Statement: 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 or operations: System isolation

Justification:

A. **Incorrect but plausible:** Plausible if the applicant correctly determines that RHR pump trips is bypassed when alternate decay heat removal using D to B cross-tie is established IAW HC.OP-AB.RPV-0009; however, HV-F015B auto closure due to level is not bypassed.
B. **Correct:** RHR pump trips is bypassed when alternate decay heat removal using D to B cross-tie is established IAW HC.OP-AB.RPV-0009; therefore pump D would remain running, and due to the level below auto isolation setpoint 12.5", HV-F015B would close.
C. **Incorrect but plausible:** Plausible if the applicant does not recall that RHR pump trips is bypassed when alternate decay heat removal using D to B cross-tie is established IAW HC.OP-AB.RPV-0009, and does not recall the auto isolation setpoint.
D. **Incorrect but plausible:** Plausible if the applicant does not recall that RHR pump trips is bypassed when alternate decay heat removal using D to B cross-tie is established IAW HC.OP-AB.RPV-0009, and determines that due to the level below auto isolation setpoint 12.5", HV-F015B would close.

References: NOH01RHRSYSC-10 Student Ref: NONE
NOH04NSSSS0C-04

Learning Objective: NSSSS0E014, RHRSYSE011

Question Source: New

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.5/45.6

Comments:

QUESTION 30

HPCI is injecting to the Reactor Vessel with the Flow Controller in MANUAL at 5600gpm.
Reactor Pressure rises from 850 psig to 950 psig.

Which ONE of the following describes the effect on HPCI, steady-state to steady-state?

A. RPM will RISE, pump flow will RISE.

B. RPM will RISE, pump flow will REMAIN CONSTANT.

C. RPM will REMAIN CONSTANT, pump flow will LOWER.

D. RPM will REMAIN CONSTANT, pump flow will REMAIN CONSTANT.

K&A Rating: 206000K5.01 (3.3)

K&A Statement: Knowledge of the operational implications of the following concepts as they apply to HIGH PRESSURE COOLANT INJECTION SYSTEM: **K5.01** Turbine Operation

Justification:

A. **Incorrect but plausible:** With FIC-R600 HPCI controller in MANUAL, pump speed is maintained at a constant speed without operator action.
B. **Incorrect but plausible**: With FIC-R600 HPCI controller in MANUAL, pump speed is maintained at a constant speed without operator action.
C. **Correct:** With FIC-R600 HPCI controller in MANUAL, pump speed is maintained at a constant speed without operator action. If Reactor Pressure rises, pump speed remains constant and pump flow will lower due to increased backpressure (more resistance).
D. **Incorrect but plausible:** With FIC-R600 HPCI controller in MANUAL, pump speed is maintained at a constant speed without operator action. However, if Reactor Pressure rises, pump flow will lower due to increased backpressure, not remain constant.

References: NOH01HPCI100-10 Student Ref: NONE

Learning Objective: Obj 6a,b,c,d

Question Source: New

Question History: N/A

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 31

While responding to a Loss of Coolant Accident, the Plant Operator (PO) notices that the “A” Core Spray Loop fails to initiate automatically (the ‘Initiation Logic Seal-In’ lights are NOT illuminated). The PO manually starts both “A” Loop pumps, and then attempts to open inboard isolation valve HV-F005A.

Which ONE of the following describes the expected response of HV-F005A?

A. HV-F005A will open if outboard isolation valve HV-F004A is closed.

B. HV-F005A will open provided the PO also depresses AUTO OPEN OVRD.

C. HV-F005A will open immediately upon both ‘A’ loop pumps starting.

D. HV-F005A will open when RPV pressure is less than 461 psig.

K&A Rating: 209001K4.01 (3.2/3.4)

K&A Statement: Knowledge of LOW PRESSURE CORE SPRAY SYSTEM design feature(s) and/or interlocks which provide for the following: **K4.01** Prevention of over pressurization of core spray piping

Justification:

A. **Correct:** Without an auto initiation signal, HV-F005A will only open if outboard isolation valve HV-F004A is closed to prevent over pressurization of the core spray piping.
B. **Incorrect but plausible**: The AUTO OPEN OVRD, is only active with an initiation signal present and allows the operator to close the valve, there is no initiation signal as evident by ‘Initiation Logic Seal-In’ lights are not illuminated.
C. **Incorrect but plausible:** The auto open signal requires an initiation signal and RPV pressure < 461 psig, there is no initiation signal as evident by ‘Initiation Logic Seal-In’ lights are not illuminated.
D. **Incorrect but plausible :** The auto open signal requires an initiation signal, with ‘Initiation Logic Seal-In’ lights are not illuminated, the valve will not open.

References: NA Student Ref: NONE

Learning Objective:

Question Source: HC Bank Q#72

Question History: NA

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR: CFR 41.07

Comments:

QUESTION 32

Given the following conditions:

- The Reactor scrammed from 100% power on turbine stop valve closure
- All control rods have NOT fully inserted
- APRMs are reading 12%
- The RO manually starts both SLC pumps at the direction of the CRS
- Initial SLC tank level is 4850 gallons

Assuming NO further operator actions, 45 minutes following system initiation, the SLC pumps should be:

A. Tripped on SLC tank low level

B. Running with the SLC tank empty

C. Tripped with the reactor shutdown

D. Running and injecting to the vessel

K&A Rating: 211000 A1.01 (3.6/3.7)

K&A Statement: Ability to predict and/or monitor changes in parameters associated with operating the STANDBY LIQUID CONTROL SYSTEM: **A1.01** Tank Level

Justification:

A. **Incorrect but plausible:** The SLC pumps would still be running because level would be >325 gal after 45 minutes

B. **Incorrect but plausible**: The SLC tank will be above the low level trip. The Low level trip would not be bypassed when started from the Control Room

C. **Incorrect but plausible:** The reactor would be shutdown because <1100 gal remain in the tank but the SLC pumps would still be running

D. **Correct:** Pumps auto trip on low level at 325 gals remaining provided the pumps were not running in test. Min required capacity (2 pumps) = 84.2 gpm (OP-IS-BH-0001/0002), (4850 – 325) / 84.2 = 53.2 minutes. Max acceptable flow rate = 48.6 gpm X 2 = 97.2 gpm. 4850 -325/ 97.2 = 46.6 minutes. Therefore the pumps should still be running at the 45 minute mark

References: NOH01SLCSYSC, Rev. 4 Student Ref: NONE
HC.OP-AR.ZZ-0008 Att. E1, Rev. 43

Learning Objective: SLCSYSE0018/E007

Question Source: Modified from PB Bank (Question #1)

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.5/45.5

Comments:

QUESTION 33

Given the following conditions:

- The Reactor scrammed on low Reactor water level
- All rods failed to insert
- SLC was initiated
- RPV level was lowered IAW HC.OP-EO.ZZ-0101A, ATWS-RPV Control
- RPV level is being maintained between -150" and -185"
- The "A" RPS Bus is de-energized and cannot be restored
- The implementation of HC.OP-EO.ZZ-0301, "Bypassing MSIV Isolation Interlocks" and reopening of the Main Steam Isolation Valves (MSIVs) has been directed

Which ONE of the following describes the ability to operate MSIVs following completion of HC.OP-EO.ZZ-0301 for these conditions?

A. None of the eight MSIVs can be reopened.

B. Only the four outboard MSIVs can be reopened.

C. All eight of the MSIVs can be reopened.

D. Only the four inboard MSIVs can be reopened.

K&A Rating: 212000K1.14 (3.6/3.7)

K&A Statement: Knowledge of the physical connections and/or cause-effect relationships between REACTOR PROTECTION SYSTEM and the following: **K1.14**: Main Steam system.

Justification:

A. **Correct:** Both A and B RPS buses must be energized to allow NSSSS logic to be reset. EO-301 only bypasses the Lo-Lo-Lo level isolation.
B. **Incorrect but plausible**: Because both A and B busses need to be energized. Plausible if the candidate thinks that one RPS is enough power to open the outboard valves.
C. **Incorrect but plausible:** Because both A and B busses need to be energized. Plausible if the candidate thinks that bypassing the LO-LO-LO logic is all that is required to reopen the MSIV's.
D. **Incorrect but plausible:** Because both A and B busses need to be energized. Plausible if the candidate thinks that one RPS is enough power to open the inboard valves.

References: HC.OP-EO.ZZ-0301, Section 2.6 Student Ref: NONE

Learning Objective: NA

Question Source: Bank (Question #255)

Question History: NA

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.2 to 9/43.7/45.8

Comments:

QUESTION 34

Given the following conditions:

- The Mode Switch is in STARTUP
- A half SCRAM has been inserted on RPS “B” due to a Reactor Vessel Water Level instrumentation malfunction.
- APRM “C” is BYPASSED

IRM “E” fails such that annunciator IRM A/B/E/F UPSCALE INOP/TRIP is received.

Which ONE of the following describes the plant condition after the IRM “E” malfunction?

A. A rod block is generated by the Rod Block circuitry; A full SCRAM is received.

B. A rod block is generated by the Rod Block circuitry; A full SCRAM is NOT received.

C. A rod block is NOT generated by the Rod Block circuitry; A full SCRAM is received.

D. A rod block is NOT generated by the Rod Block circuitry; A full SCRAM is NOT received.

K&A Rating: 215003K1.02 (3.6)

K&A Statement: Knowledge of the physical connections and/or cause effect relationship between INTERMEDIATE RANGE MONITOR (IRM) SYSTEM and the following: **K1.02** Reactor manual control

Justification:

A. **Correct:** RPS "B" has a half SCRAM as stated in the stem. With the mode switch in startup, the IRM "E" malfunction and IRM A/B/E/F UPSCALE INOP/TRIP alarm is an indication of a half SCRAM on RPS "A" AND a rod block will be generated by the Rod Block circuitry. A half SCRAM on both channels of RPS satisfies the conditions for a full reactor SCRAM.
B. **Incorrect but plausible**: A rod block IS generated, but a full SCRAM is also generated, not a half SCRAM.
C. **Incorrect but plausible:** A rod block IS generated as evidenced by the IRM "E" malfunction and IRM A/B/E/F UPSCALE INOP/TRIP alarm stated in the stem.
D. **Incorrect but plausible:** A rod block IS generated as evidenced by the IRM "E" malfunction and IRM A/B/E/F UPSCALE INOP/TRIP alarm stated in the stem.

References: NOH01RPS00C-09 Student Ref: NONE
HC.OP-AR.ZZ-0009(Q)

Learning Objective: RPS000E007

Question Source: New

Question History: N/A

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 35

Given the following conditions:

- A Reactor Startup is in progress following the replacement of all fuel bundles
- The Reactor Protection System shorting links are removed
- Reactor power is increasing with a stable positive period of 150 seconds
- The SRM Channel ‘A’ detector is stuck and will NOT withdraw
- The SRM Channel ‘A’ indication increases to 2×10^5 cps

Assume NO operator actions are performed.

Which ONE of the following subsequently describes SRM Channel ‘A’ indicated Reactor power and Reactor period?

Indicated Reactor power will:

A. continue to increase and Reactor period will remain positive.

B. decrease and Reactor period will be negative.

C. continue to increase and Reactor period will become shorter.

D. decrease and Reactor period will initially go to infinity.

K&A Rating: 215004K6.04 (2.9/2.9)

K&A Statement: Knowledge of the effect that a loss or malfunction of the following will have on the SOURCE RANGE MONITOR (SRH) SYSTEM: **K6.04** Detectors

Justification:

A. **Incorrect but plausible:** The Reactor SCRAM will result in a lowering count rate and negative period.
B. **Correct**: The Reactor will SCRAM, causing a lowering count rate and a negative period.
C. **Incorrect but plausible:** The Reactor SCRAM will result in a lowering count rate and negative period.
D. **Incorrect but plausible:** The Reactor SCRAM will result in a negative period.

References: HC.OP-SO.SB-0001 Student Ref: NONE
HC.OP-SO.SE-0001

Learning Objective: SRMSYSSE010

Question Source: Bank

Question History: HC Bank # 164

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.7/45.7

Comments:

QUESTION 36

Given the following conditions:

- The plant is in OPERATIONAL CONDITION 1 at 2112 megawatts thermal
- Control rod 30-31 is selected
- Recirculation Flow Unit "A" fails downscale due to an electrical malfunction in the drawer

Which ONE of the following correctly describes all of the Scram and Rod Block signals generated from this failure?

A. Control Rod withdrawal block signals are generated by APRM Channels A, C, and E, and RBM Channel B, and the A and B Recirculation Flow Units. ONLY

B. Control Rod withdrawal block signals are generated from APRM Channels A, C, and E, RBM Channel A, and the A and B Recirculation Flow Units. ONLY

C. APRM Channel A, C, and E generate Scram signals. Control Rod withdrawal block signals are generated by APRM Channel A, C, and E and Recirculation Flow Unit A. ONLY

D. APRM Channels A, C, and E generate Scram signals. Control rod withdrawal block signals are generated from APRM Channels A, C, and E, RBM Channel A, and B, and the A and B Recirculation Flow Units

Question 36

K&A Rating: 215005 K4.01 (3.7/3.7)

K&A Statement: Knowledge of AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM design feature(s) and/or interlocks which provide for the following: **K4.01** Rod withdrawal blocks

Justification:

A. **Incorrect but plausible:** RBM channel B is not affected by flow converter A failure. Plausible if applicant does not know which flow converters input into which RBM.
B. **Correct:** The APRM flow biased rod block setpoint at zero flow is 53%. The reactor power is 2112/3840 which is 55% therefore Control Rod withdrawal block signals are generated from APRM Channels A, C, and E. RBM Channel A zero flow setpoint on the low range is 49%. A and B Recirculation Flow Units with 10% difference between flow comparators will generate a rod block.
C. **Incorrect but plausible:** The APRM flow biased scram setpoint at zero flow is 58%. The reactor power is 2112/3840 which is 55% and therefore no scram signal will be generated.
D. **Incorrect but plausible:** The APRM flow biased scram setpoint at zero flow is 58%. The reactor power is 2112/3840 which is 55% and therefore no scram signal will be generated.

References: HC.OP-SO.SF-0002 – RBM Student Ref: NONE

Learning Objective: NA

Question Source: HC BANK #64976

Question History: NA

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.7

Comments:

QUESTION 37

The plant was operating at 80% power when a transient occurred requiring a manual initiation of RCIC. Approximately 15 minutes later the PO notes that HV-F031 RCIC PUMP SUCTION FROM THE SUPPRESSION POOL has drifted to a 50% OPEN position.

Which ONE of the following describes the expected system response?

A. HV-F010 PUMP SUCTION VALVE FROM CST will immediately CLOSE.

B. HV-F022 RCIC PUMP DISCHARGE TEST RETURN TO CST valve will receive an OPEN signal.

C. HV-F010 PUMP SUCTION VALVE FROM CST will remain OPEN until CST Level reaches ~22,500 gallons.

D. HV-F010 PUMP SUCTION VALVE FROM CST will remain OPEN until CST Level reaches ~70,000 gallons.

K&A Rating: 217000K2.02 (2.6)

K&A Statement: Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC): **K6.04** Condensate storage and transfer system

Justification:

A. **Incorrect but plausible:** HV-F010 will immediately close if HV-F031 goes FULL OPEN. Since HV-F031 is only partially open, HV-F010 will not immediately close.
B. **Incorrect but plausible**: HV-F022 receives a CLOSE signal, not an OPEN signal when HV-F031 is not full CLOSE.
C. **Incorrect but plausible:** HV-F010 will automatically close when CST level reaches ~70,000 gallons. The setpoint was changed from ~22,500 gallons due to pump vortexing concerns.
D. **Correct:** HV-F010 will automatically close when CST level reaches ~70,000 gallons

References: NOH04RCICOO-10 Student Ref: NONE

Learning Objective: RCIC00EE05, RCIC00EE09

Question Source: New

Question History: N/A

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.13

Comments:

QUESTION 38

OP-EO.ZZ-103, Reactor Building Control, has been entered due to an unisolable primary coolant leak in the RWCU Non-Regenerative Heat Exchanger Room. The following conditions exist:

- RPV pressure is 725 psig and slowly lowering
- RPV water level is -140 inches
- Drywell Pressure is 0.5 psig and steady
- ADS LOGIC CH B MANUAL INHIBIT Switch is in “INHIB”
- ADS LOGIC CH D MANUAL INHIBIT Switch has failed in the “NORM” position
- All low pressure ECCS Pumps are running with normal indications

At 395 seconds after reaching RPV Level 1, the LOGIC D/H INIT RESET Pushbutton is depressed and released.

Which ONE of the following identifies the effect on the ADS valves?

A. Valves will close and re-open 300 seconds later

B. Valves will close and re-open 405 seconds later

C. Valves will remain closed; valves will auto open 405 seconds later

D. Valves will remain closed; valves will NOT auto open on any time delay

K&A Rating: 218000 A3.09 (4.2/4.3)

K&A Statement: Ability to monitor automatic operations of the AUTOMATIC DEPRESSURIZATION SYSTEM including: Reactor vessel water level

Justification:

A. **Incorrect but plausible:** Plausible if the applicant does not understand ADS Initiation Logic and System response with respect to (1) operation of the 300 second ADS High Drywell Bypass Timer and the 105 second Logic D/H (CH D) ADS Initiation Timer, and (2) manipulation of the Manual Inhibit Switches and the Logic Reset Pushbuttons. See Answer 'C' discussion.

B. **Incorrect but plausible:** Plausible if the applicant does not understand ADS Initiation Logic and System response with respect to (1) operation of the 300 second ADS High Drywell Bypass Timer and the 105 second Logic D/H (CH D) ADS Initiation Timer, and (2) manipulation of the Manual Inhibit Switches and the Logic Reset Pushbuttons. See Answer 'C' discussion.

C. **Correct:** The LOGIC D/H INIT RESET Pushbutton is depressed 10 seconds prior to ADS initiation (auto initiation occurs at 405 seconds). The 300 second ADS High Drywell Bypass Timer will be reset. The CH D ADS Initiation Timer will also be reset. The ADS valves never opened because the auto initiation at 305 seconds (105 seconds after the 300 second ADS High Drywell Bypass Timer times out) was interrupted when the LOGIC D/H INIT RESET Pushbutton was depressed at time 395 seconds. The ADS valves will open 405 seconds later when both the ADS High Drywell Bypass Timer (300 seconds) and the Logic D/H (CH D) ADS Initiation Timer (105 seconds) successfully time out (300 + 105 = 405 seconds) after having been reset.

D. **Incorrect but plausible:** Plausible if the applicant does not understand ADS Initiation Logic and System response with respect to (1) operation of the 300 second ADS High Drywell Bypass Timer and the 105 second Logic D/H (CH D) ADS Initiation Timer, and (2) manipulation of the Manual Inhibit Switches and the Logic Reset Pushbuttons. See Answer 'C' discussion.

References: NOH04ADSSYSC-08 Student Ref: NONE

Learning Objective: Obj. 2 of NOH04ADSSYSC-08

Question Source: New

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:

	Comprehensive/Analysis:	X
10CFR:	CFR 41.7	

Comments:

QUESTION 39

Given the following conditions:

- A reactor startup is in progress
- Reactor pressure 750 psig
- The Reactor Mode Switch is in “Startup/Hot Standby”
- The main turbine is tripped
- A valid Group 1 MSIV isolation has occurred
- No conditions to cause a reactor scram have been generated
- All systems operated as designed

Which ONE of the following plant parameters generated the Group 1 MSIV isolation signal?

A. Reactor water level

B. Main steam line pressure

C. Main steam line radiation

D. Main steam line tunnel temperature

K&A Rating: 223002K1.03 (3.0/3.2)

K&A Statement: Knowledge of the physical connections and/or cause-effect relationships between PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF and the following: **K1.03** Plant Ventilation.

Justification:

A. **Incorrect but plausible:** Since a low level scram did not occur, reactor watr level is >12.5 inches and will not cause an isolation.
B. **Incorrect but plausible**: Because the mode switch would have to be in run to enable the low pressure isolation.
C. **Incorrect but plausible:** Main Steam Line Radiation does not cause a group 1 isolation. Plausible because it does cause a group 2 isolation.
D. **Correct:** High Main Steam Line temperature will cause an isolation in these plant conditions.

References: HC.OP-SO.SM-0001 Student Ref: NONE
B21-1090-0062

Learning Objective:

Question Source: Bank #82

Question History: NA

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.2 to 9/45.7 to 8

Comments:

QUESTION 40

Given the following:

- The ADS Manual Initiation Channel D and H pushbuttons (S6D and S6H) have been armed and depressed
- There is NO Safety Relief Valve response

Which ONE of the following failures would cause this system response?

A. 125 VDC bus 1BD417

B. 125 VDC bus 1DD417

C. 120 VAC bus 1BJ481

D. 120 VAC bus 1DJ481

K&A Rating: 239002 K2.01 (2.8/3.2)

K&A Statement: Knowledge of electrical power supplies to the following: **K2.01** SRV Solenoids

Justification:

A. **Incorrect but plausible:** If applicant does not recall power supply to ADS logic D&H; this is the power supply to ADS logic B&F

B. **Correct**: This is the power supply to ADS logic D&H

C. **Incorrect but plausible:** If applicant does not understand effect of this loss. This will result in a loss of automatic initiation of ADS channel B, but will not prevent a manual initiation

D. **Incorrect but plausible:** If applicant does not understand effect of this loss. This will result in a loss of automatic initiation of ADS channel D, but will not prevent a manual initiation

References: NOH04ADSSYSC Rev. 8 Student Ref: NONE
HC.OP-AB.ZZ-0136, Rev. 19

Learning Objective: ADSSYSE006

Question Source: New

Question History: None

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.7

Comments:

QUESTION 41

Given the following conditions:

- The plant is at 100% power
- The 'C' Steam Flow detector for the Feedwater Level Control System fails low (its output indicates 0 lbm/hr steam flow)

Which ONE of the following describes the automatic plant response with NO operator action?

ACTUAL reactor water level will:

A. Remain the same. The Feedwater Level Control System will shift to single element control.

B. Decrease and stabilize at a lower than normal value. The Feedwater Level Control System will shift to single element control.

C. Decrease and stabilize at a lower than normal value. The Feedwater Level Control System will remain in three element control.

D. Increase and stabilize at a higher than normal value. The Feedwater Level Control System will remain in three element control.

K&A Rating: 259002A1.01 (3.8/3.8)

K&A Statement: Ability to predict and/or monitor changes in parameters associated with operating the REACTOR WATER LEVEL CONTROL SYSTEM controls including: **A1.01** Reactor Water Level

Justification:

A. **Correct:** The system transfers to single element control. With stable conditions, single and three element control should control level at the same setpoint.
B. **Incorrect but plausible**: Level should not decrease.
C. **Incorrect but plausible:** Level should not decrease. The system will shift to single element control.
D. **Incorrect but plausible:** Level should not increase. The system will shift to three element control.

References: DWG H-1-AE-ECS-0128-0 Student Ref: NONE

Learning Objective: FWCONTE012

Question Source: HC Bank # 233

Question History: Used on 2003 NRC Exam

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.5/45.5

Comments:

QUESTION 42

Given the following conditions:

- The plant is at 50% power
- The FRVS Recirculation Fans are in AUTO

Subsequently, a Loss of Offsite Power (LOOP) occurs:

- HPCI and RCIC are manually initiated
- The minimum water level reached was -32 inches

SELECT the total FRVS recirculation flow 3 minutes after the LOOP. Assume NO other operator actions.

A. 0 cfm

B. 60,000 cfm

C. 120,000 cfm

D. 180,000 cfm

K&A Rating: 261000A2.10 (3.1/3.2)

K&A Statement: Ability to (a) predict the impacts of the following on the STANDBY GAS TREATMENT SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: **K2.10** Low reactor water level: Plant-Specific

Justification:

A. **Correct:** There are no automatic isolation signals present; No FRVS fans are running.
B. **Incorrect but plausible**: All six FRVS recirculation fans start at RPV level 2 (-38 inches). Plausible if the applicant believes that some combination of FRVS fans would be running given the stem conditions.
C. **Incorrect but plausible:** All six FRVS recirculation fans start at RPV level 2 (-38 inches). Plausible if the applicant believes that some combination of FRVS fans would be running given the stem conditions.
D. **Incorrect but plausible:** All six FRVS recirculation fans start at RPV level 2 (-38 inches). Plausible if the applicant believes that some combination of FRVS fans would be running given the stem conditions.

References: HC.OP-AB.CONT-0003 Student Ref: NONE
HC.OP-SO.GR-0001

Learning Objective: RBVENTE004

Question Source: Bank

Question History: HC Bank # 130

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.5/45.6

Comments: Question meets part (a) of K/A.

QUESTION 43

What function does opening the toggle switch associated with the 500KV breaker Emergency Trip handle accomplish?

A. Transfers all control functions to the blockhouse.

B. Prevents the Emergency Trip function.

C. Removes control power for the breaker.

D. Enables removal of kirk key at the breaker.

K&A Rating: 262001 K5.02 (2.6)

K&A Statement: Knowledge of the operational implications of the following concepts as they apply to A.C. ELECTRICAL DISTRIBUTION. **K5.02** Breaker Control

Justification:

A. **Incorrect but plausible:** No local control at the breaker except for test.
B. **Incorrect but plausible**: Opening the toggle switch does not prevent emergency operation of the breaker.
C. **Correct:** Interrupts breaker control circuit to prevent electrical operation.
D. **Incorrect but plausible:** Kirk Key can be removed with toggle in either position.

References: NOH01MNPWR0-04, MAIN POWER SYSTEM, p21

Student Ref: NONE

Learning Objective: MNPWR0E014

Question Source: Hope Creek Question - Q68164

Question History: 2005 NRC Exam

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR: CFR 41.5/45.3

Comments:

QUESTION 44

A UPS Manual Bypass Switch has been repositioned from “BYPASS TO ALTERNATE” to “ISOLATED TO PREFERRED” for testing on a faulty Static Switch.

Which ONE of the following describes the system response if a loss of offsite power occurs, and the MCCs for the Preferred and Backup power are NOT 1E switchgear supplied?

The input to the Regulator/Static Switch Cabinet will be supplied by ________.

A. 125 VDC power, maintaining system loads

B. 125 VDC power, but supply to the system loads will be lost

C. normal 480 VAC power, but supply to the system loads will be lost

D. backup 480 VAC power, but supply to the system loads will be lost

K&A Rating: 262002A4.01 (2.8/3.1)

K&A Statement: Ability to manually operate and/or monitor in the control room: **A4.01** Transfer from alternative source to preferred source.

Justification:

A. **Correct:** Taking the Manual Bypass Switch to "ISOLATED TO PREFERRED" places the load directly on the preferred (inverter output) power source and all power is removed from the static switch. The preferred power source consists of the DC output of the rectifier cabinet which comes from the auctioneered high input. The inputs to the rectifier cabinet are normal 480 VAC or 125 VDC (alternate preferred source). In the case of a LOP on a non 1E switchgear, power will be supplied to the regulator cabinet via the preferred source powered by 125 VDC.

B. **Incorrect but plausible**: Supply to the system loads will not be lost, the static switch is de-energized to the preferred source position, which will be powered by 125 VDC.

C. **Incorrect but plausible:** The output of the rectified cabinet will take auctioneered high power source -> 125VDC since 480 VAC normal will be lost.

D. **Correct:** Backup 480 VAC power will only be supplied to the regulator/static switch cabinet if the static switch was in the alternate power position.

References: NOH01EAC00-04 Student Ref: NONE

Learning Objective: NON1E0E003

Question Source: New

Question History: N/A

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.7/45.5 to 45.8

Comments:

QUESTION 45

Given the following condition:

- 125 VDC Bus B (1BD417) tripped off due to a bus fault.

Which ONE of the following describes the location(s) from which SRV 'F' can be opened if needed?

A. NOT available from any location.

B. Available from the Main Control Room <u>ONLY</u>.

C. Available from the Remote Shutdown Panel <u>ONLY.</u>

D. Available from the Main Control Room <u>AND</u> the Remote Shutdown Panel.

Question 45

K&A Rating: 263000 K2.01 (3.2/3.3)

K&A Statement: Knowledge of electrical power supplies to the following: **K2.01:** Major D.C. loads

Justification:

A. **Correct :** 1BD417 feeds all of the SRV "A" solenoids. SRV F is a non-ADS SRV, so it only has one solenoid and it is an 'A' solenoid. SRV F has one control station in the MCR and one at the RSP; however, the valve cannot be opened from either location since both locations use the same 'A' solenoid and there is no power available.
B. **Incorrect but plausible**: Will not open due to no power.
C. **Incorrect but plausible:** Will not open due to no power.
D. **Incorrect but plausible :** Will not open due to no power

References: NA Student Ref: NONE

Learning Objective: loss of 1BD417

Question Source: Bank HC #191

Question History: NA

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.7

Comments:

QUESTION 46

One second after paralleling the ‘A’ EDG to the 10A401 bus, a Loss of Offsite Power occurs, and the ‘A’ EDG output breaker trips (its indication is flashing). After inspection, the SM directs reclosing the ‘A’ EDG output breaker.

Which ONE of the following operator actions will energize the 10A401 4.16 KV bus?

A. Depress the TRIP Pbs on the Normal and Alternate supply breakers, then allow the EDG output breaker to auto close.

B. Locally reset the EDG output breaker, then using the EDG output breaker CLOSE Pb, reenergize the 10A401 bus.

C. Reset the Test Lockout relay, then using the EDG output breaker CLOSE Pb, reenergize the 10A401 bus.

D. Acknowledge the flashing TRIP Pb on the EDG output breaker, then allow the EDG output breaker to auto close.

K&A Rating: 264000 G2.1.28 (4.1/4.1)

K&A Statement: 2.1.28 Knowledge of the purpose and function of major system components and controls.

Justification:

A. **Incorrect but plausible:** Depress the TRIP Pbs on the Normal and Alternate supply breakers, then allow the EDG output breaker to auto close.Will prevent the EDG from loading AB-135 Note 4.2.

B. **Incorrect but plausible:** Locally reset the EDG output breaker, then using the EDG output breaker CLOSE Pb, reenergize the 10A401 bus. Cannot be reset locally.

C. **Incorrect but plausible:** Reset the Test Lockout relay, then using the EDG output breaker CLOSE Pb, reenergize the 10A401 bus. Test LO would not be tripped.

D. **Correct:** Acknowledge the flashing TRIP Pb on the EDG output breaker, then allow the EDG output breaker to auto close. AB-135 5.16 - The Anti-pump circuitry on the D/G output breaker could cause the output breaker to fail open, if a LOP were to occur within 2 seconds of closing the output breaker when testing and loading the D/G to the grid. To load the D/G under this condition the operator must wait a minimum of 2 seconds from the time the breaker was originally closed, then depress the TRIP push-button (even though the breaker is already tripped) to reset the logic. When the TRIP push-button is released, then the breaker will close and the D/G will load.

References: NOH04EDG000C-03, ABZZ-0135 Student Ref: NONE

Learning Objective: EDG000E020, 0AB135E004

Question Source: Bank # 33519

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.7

Comments:

QUESTION 47

The 10K107 Service Air Compressor is in service in the LEAD mode of operation. The following conditions are present:

- 2ND INTERCOOLER HIGH LEVEL alarm is in on the 10K107 local control panel
- AFTERCOOLER AIR OUTLET HIGH TEMP SHUTDOWN alarm is in on the 10K107 local control panel
- Lube Oil pressure is 25 psig

Which ONE of the following correctly describes the status of the 10K107 Service Air Compressor?

A. 10K107 tripped on low oil pressure.

B. 10K107 tripped on high demister level

C. 10K107 has continued normal operations.

D. 10K107 tripped on aftercooler air outlet temperature.

K&A Rating: 300000K5.01 (2.5/2.5)

K&A Statement: Knowledge of the operational implications of the following concepts as they apply to the INSTRUMENT AIR SYSTEM: **K5.01** Air Compressors

Justification:

A. **Incorrect but plausible:** The low oil pressure trip occurs at 10psig.
B. **Incorrect but plausible**: While there is an alarm for high demister level, there is no associated compressor trip.
C. **Correct:** None of the conditions listed in the question stem will result in a Service Air Compressor trip.
D. **Incorrect but plausible:** While there is an alarm for high aftercooler air outlet temperature, there is no associated compressor trip. An aftercooler air outlet high temperature of 115F NO LONGER will cause its associated compressor to trip.

References: NOH01SERAIR-05 Student Ref: NONE

Learning Objective: Obj 3

Question Source: New

Question History: N/A

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.5/45.3

Comments:

QUESTION 48

Given the following conditions:

- Reactor power is 83%
- Normal electrical lineup
- TACS is being supplied from the ‘A’ SACS loop

Which ONE of the following describes the response of the SACS to depressing the TRIP pushbutton for breaker 40108 (10A401 Normal Feeder Breaker)?

A. The ‘A’ SACS Pump AP210 will trip, TACS swaps to initially supply system loads

B. The ‘A’ SACS Pump AP210 will trip, loop ‘A’ will remain online supplying both SACS and TACS loads at a reduced flow

C. The ‘C’ SACS Pump CP210 will trip, loop ‘A’ will remain online supplying both SACS and TACS loads at a reduced flow

D. The ‘A’ SACS Pumps AP210 and the ‘C’ SACS Pump CP210 with both instantly trip, the TACS swaps to supply system loads

K&A Rating: 400000 A3.01 (3.0/3.0)

K&A Statement: Ability to monitor automatic operations of the CCWS including: **A3.01** Setpoints on instrument signal levels for normal operations, warnings, and trips that are applicable to the CCWS

Justification:

A. **Correct:** Pump AP210 will trip on undervoltage, which closes the associated SACS to TACS isolation, causing a low flow condition in the ‘A’ loop. The low flow will start the AUTO pump in the ‘B’ loop, and open the ‘B’ loop isolation valves
B. **Incorrect but plausible**: Pump AP210 will trip on undervoltage, which will close the SACS to TACS isolation
C. **Incorrect but plausible:** If applicant does not recall correct pump power supplies. ‘C’ SACS pump is supplied from the 10A403 bus
D. **Incorrect but plausible:** If applicant does not recall correct pump power supplies. ‘C’ SACS pump is supplied from the 10A403 bus

References: NOH04STACS0C, Rev. 8 Student Ref: NONE

Learning Objective: STACS0E004

Question Source: HC Bank 33814

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.7/45.7

Comments:

QUESTION 49

Given the following:

- I&C is performing testing on HPCI TURBINE EXHAUST DIAPHRAGM RUPTURE transmitter PISH-N655A

- A ZERO psig signal is set on the calibration device

- The following Alarms/ Status lights from the testing are received in the Control Room:

  - HPCI SYSTEM OUT OF SERVICE - LIT

  - IN TEST STATUS on Logic Channel "A" - LIT

  - TRIP UNIT IN CAL OR GROSS FAIL on Logic Channel "A" - LIT

  - HPCI TURBINE EXHAUST DIAPHRAGM RUPTURED - Extinguished

With this configuration, how will HPCI respond to an actual HPCI Initiation with a subsequent diaphragm rupture?

A. "A" channel isolation valves only will isolate. HPCI Turbine will NOT trip.

B. "C" channel isolation valves only will isolate. HPCI Turbine will trip.

C. "A" and "C" channel isolation valves will isolate. HPCI Turbine will trip.

D. "A" and "C" channel isolation valves will isolate. HPCI Turbine will NOT trip.

K&A Rating: 206000 A3.07 (3.9/3.8)

K&A Statement: Ability to monitor automatic operations of the HIGH PRESSURE COOLANT INJECTION SYSTEM including: Lights and alarms

Justification:

A. **Incorrect but plausible:** Plausible if the applicant does not understand that Channel "A" Logic will not trip due to the 655A transmitter is in test with a zero psig signal.

B. **Correct:** "C" Channel transmitters PISH -655C & G will still respond properly to a valid diaphragm rupture. HPCI Turbine will trip. The Channel "A" Logic will not trip due to the 655A transmitter is in test with a zero psig signal. 2 of 2 transmitters are required per logic channel to actuate.

C. **Incorrect but plausible:** Plausible if the applicant does not understand that Channel "A" Logic will not trip due to the 655A transmitter is in test with a zero psig signal and determines that both “A” and “C” logic will trip.

D. **Incorrect but plausible:** Plausible if the applicant does not understand that Channel "A" Logic will not trip due to the 655A transmitter is in test with a zero psig signal and determines that both “A” and “C” logic will trip.

References: HC.OP-SO.BJ-0001 Student Ref: M-56-1
NOH01HPCI00-10

Learning Objective: HPCI00E007

Question Source: Bank # 34121

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.7 / 45.7

Comments:

QUESTION 50

Hope Creek is shutdown with refueling in progress.

Which ONE of the following will occur if the "A" Source Range Monitor (SRM) drawer mode switch is taken out of the OPERATE position?

	Alarm Status	Block/RPS Status
A.	A SRM downscale alarm	Rod Block and Reactor Scram will occur
B.	A SRM downscale alarm	Rod Block occurs, Reactor Scram will **NOT** occur
C.	A SRM Upscale/Inop alarm	Rod Block occurs, Reactor Scram will **NOT** occur
D.	A SRM Upscale/Inop alarm	Rod Block and Reactor Scram will occur

Question 50

K&A Rating: 295004 K3.01 (3.4)

K&A Statement: Knowledge of the effect that a loss or malfunction of the source range monitor system (SRM) will have on the following: **K3.01** RPS

Justification:

A. **Incorrect but plausible:** Plausible if the applicant determines that placing the drawer mode switch out of Operate creates a SRM downscale trip, and determines that full scram will occur based on SRM downscale condition.
B. **Incorrect but plausible**: Plausible if the applicant determines that placing the drawer mode switch out of Operate creates a SRM downscale trip, and determines that rod block will occur.
C. **Correct:** Placing the drawer mode switch out of Operate creates a SRM Inoperative trip causing Upscale/Inop alarm, and due to the upscale/inop alarm a rod block will also occur.
D. **Incorrect but plausible:** Plausible due to partially correct that Placing the drawer mode switch out of Operate creates a SRM Inoperative trip causing Upscale/Inop alarm, however SRM channels generate a scram signal on an INOP condition for loss of power only condition.

References: Student Ref: NONE

Learning Objective:

Question Source: New

Question History: NA

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.7/43.5/45.4

Comments:

QUESTION 51

Given the following conditions:

- The plant is at 85% power
- All three Reactor Feed Pumps are in AUTO
- RPV Narrow Range Level instruments indicate:
    - N004A=34 inches
    - N004B=35 inches
    - N004C=35.5 inches

Which ONE of the following describes the expected response of ACTUAL Reactor water level if a slow leak developed through the N004B detector equalizing valve, eventually causing a gross failure of N004B?

ACTUAL Reactor water level would:

A. LOWER 0.5 inch, then RISE 1.5 inches

B. RISE 1.0 inch, then LOWER 0.5 inches

C. LOWER 1.0 inch, then RISE 0.5 inches

D. RISE 0.5 inch, then LOWER 1.5 inches

K&A Rating: 259002K3.02 (3.8/3.8)

K&A Statement: Knowledge of the effect that a loss or malfunction of the REACTOR WATER LEVEL CONTROL SYSTEM will have on the following: **K3.01** Reactor Water Level

Justification:

A. **Correct:** Initially, N004B is selected since DFCS selects the MEDIAN RPV level signal when 3 good signals are available. With a leak through the N004B equalizing valve, N004B indicated level would begin to rise, resulting in a lowering of actual RPV level. As soon as N004B exceeded 35.5 inches indicated, N004C would become the median RPV level signal. Actual RPV level would have lowered 0.5 inch during this transition. When N004B gross fails, N004A (the lowest of the two remaining signals) will become the controlling level signal. RPV water level will then rise since indicated level on N004A is 34 inches. This is a 1.5 inch rise from the previous level.

B. **Incorrect but plausible**: Initially lowers 0.5 inches, then rises 1.5 inches.

C. **Incorrect but plausible:** Initially lowers 0.5 inches, then rises 1.5 inches.

D. **Incorrect but plausible:** Initially lowers 0.5 inches.

References: DWG H-1-AE-ECS-0128-0 Student Ref: NONE

Learning Objective: FWCONTE010

Question Source: HC Bank # 95

Question History: Used on 2009 NRC Exam

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.7/45.4

Comments:

QUESTION 52

125VDC bus 1CD417 is de-energized when an Emergency Diesel Generator start signal is received.

Diesel Generator 1CG400 will:

A. NOT automatically start

B. automatically start but the output breaker can only be shut manually

C. automatically start but in the DROOP mode

D. automatically start but all trips will be disabled

K&A Rating: 263000 K3.01 (3.4/3.8)

K&A Statement: Knowledge of the effect that a loss or malfunction of the D.C. ELECTRICAL DISTRIBUTION System will have on the following: **K3.01** Emergency Generators: Plant-Specific

Justification:

A. **Correct:** The diesel generator will NOT automatically start; power is lost to the air start solenoids
B. **Incorrect but plausible**: The diesel generator will NOT automatically start
C. **Incorrect but plausible:** The diesel generator will NOT automatically start
D. **Incorrect but plausible:** The diesel generator will NOT automatically start

References: NOH01DCELEC, Rev. 3 Student Ref: NONE

Learning Objective: DCELECE003

Question Source: HC Bank 33239

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.7/45.4

Comments:

QUESTION 53

Which ONE of the following conditions (signals) will cause a trip of the Emergency Instrument Air Compressor?

A. Instrument Air Header pressure of 70 psig

B. RACS cooling water return from compressor temperature of 135° F

C. RPV level of -129"

D. Emergency Instrument Air Receiver pressure of 110 psig

K&A Rating: 300000 K1.04 (2.8/2.9)

K&A Statement: Knowledge of the connections and / or cause effect relationships between INSTRUMENT AIR SYSTEM and the following: Cooling water to compressor

Justification:

A. **Incorrect but plausible:** Low Instrument Air Header pressure 70 psig. Isolates the service air header.

B. **Correct:** RACS cooling water return from compressor high temperature of 135° F will cause auto trip of emergency instrument air compressor.

C. **Incorrect but plausible:** Low RPV level of -129" indicated. A LOCA will trip open the 1E feeder breaker. There is no override.

D. **Incorrect but plausible:** High Pressure in the Emergency Instrument Air Receiver 70 psig. Actual trip occurs at 120 psig.

References: HC.OP-SO.KB-0001 Student Ref: NONE

Learning Objective: INSAIRE003

Question Source: Modified Bank # 34761

Question History: None

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR: CFR 41.2 - 41.9

Comments:

QUESTION 54

Which ONE of the following is an indication that a control rod has become uncoupled and stuck?

A. A red full-out indication on the full core display.

B. NO response on nuclear instrumentation when the control rod is being withdrawn from fully inserted.

C. A "--" indication on the Four Rod Display for that control rod when a withdraw signal is applied at position 48.

D. Control rod position indication does NOT change when a withdraw signal is applied to a control rod at position 48.

K&A Rating: 201003 K4.02 (3.8)

K&A Statement: Knowledge of CONTROL ROD AND DRIVE MECHANISM design feature(s) and/or interlocks which provide for the following **K4.02** Detection of an uncoupled rod

Justification:

A. **Incorrect but plausible:** A red full out indication is indication that the rod is overtraveled and uncoupled but does not mean that the rod is stuck**.**
B. **Correct**: No response on NI's during rod withdrawal is an indication the rod is not moving. The rod position indication (Reed Switches) are in the mechanism which is moving, however the control rod is uncoupled and stuck.
C. **Incorrect but plausible:** A coupled rod during coupling checks will indicate – and is indication that the rod is coupled.
D. **Incorrect but plausible:** A coupled rod at 48 will not move beyond 48 and is indication that the rod is coupled.

References: NA   Student Ref: NONE

Learning Objective: 000005E006

Question Source: HC Bank 56330

Question History: NA

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.74

Comments:

QUESTION 55

The Reactor is operating normally at 90% power when the CP501 Circ Water Pump trips due to an electrical fault (AP501, BP501, and DP501 Circ Water Pumps remain in service).

Condenser pressure was steady at 5.0” HgA BEFORE the pump trip.

Which ONE of the following describes the expected response of the Reactor Recirculation System?

A. The MG Set Drive Motor Breaker will trip.

B. A full recirc pump runback to 30% speed will occur.

C. An intermediate recirc pump runback to 45% speed will occur.

D. The Recirculation System will maintain recirc pumps at their current speed.

K&A Rating: 202002 2.1.7 (4.4/4.7)

K&A Statement: Recirculation Flow Control **2.1.7** Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.

Justification:

A. **Incorrect but plausible:** Plausible if the examinee mistakes the MG Set Drive Motor Breaker trip conditions with the Recirc Runback conditions.
B. **Incorrect but plausible**: Plausible if the examinee believes that a full Recirc Pump Runback would occur on the loss of 1 Circ Water Pump with 4 running. (A full runback to 30% occurs only on the loss of 1 Circ Water Pump with 3 running AND Condenser pressure >5.8" HgA.)
C. **Correct:** An intermediate Recirc Pump runback to 45% speed will occur on the loss of 1 Circ Water Pump with 4 Circ Water Pumps running AND Condenser pressure > 4.5" HgA.
D. **Incorrect but plausible:** Plausible if the examinee believes that the plant can take the loss of 1 Circ Water pump with 4 running without a Recirc Runback. Condenser pressure being given as 5.0" HgA in the stem may lead the examinee to believe that the loss of 1 Circ water Pump intermediate runback will not be active.

References: HC.OP-SO.BB-0002 Student Ref: NONE
NOH01RECCON

Learning Objective: R11, R15
Question Source: New

Question History: N/A

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.5/43.5/45.12/45.13

Comments:

QUESTION 56

Given the following:

- OPCON 1 at 100% power.
- All control rods are fully withdrawn.
- An "A" side half SCRAM is in due to performance of HC.OP-ST.SF-003, "RPS Manual SCRAM Test – Weekly".
- Coincidentally, the PILOT SCRAM VALVE TRIP ACTUATOR LOGIC Group 4B SOLENOIDS LOGIC B NORMAL light extinguishes at 10C651C. This was NOT caused by the previous Operator action.

Which ONE of the following describes the indications on the full core display based solely on the INITIAL RPS response?

A. Control Rod Groups 1, 2 & 3 RED lamps are lit, and Control Rod Group 4 GREEN, BLUE, & AMBER lamps are lit

B. All Control Rods have RED lamps lit

C. All Control Rods have GREEN, BLUE, & AMBER lamps lit

D. Control Rod Group 1 & 4 GREEN, BLUE, & AMBER lamps are lit, and Control Rod Groups 2 & 3 have RED lamps lit

K&A Rating: 214000 A4.02 (4.0/4.1)

K&A Statement: Ability to manually operate and/or monitor in the control room: Control rod position

Justification:

A. **Correct:** The Operator's action causes an "A" side half scram and all "A" side scram pilot solenoids de-energize. No rod motion occurs. Now, the Group 4B solenoid logic status light extinguishes indicating a loss of power to "B' side scram pilot solenoids for all control rods in Group 4 only. So, the "A" and "B" scram pilot solenoid valves are both de-energized on all control rods in Group 4, and this vents air from all scram valves for control rods in Group 4 ONLY. The Full Core Display will show RED (full out indication) for rods in Groups 1,2, & 3, and Group 4 control rods will display GREEN (full in), BLUE (scram valves open), and AMBER (rod drift).
B. **Incorrect but plausible**: Plausible if the applicant determines that sufficient logic did not complete to cause any of the rods to scram. RED indicates full out position. Group 4 control rods went full in, so this answer is incorrect.
C. **Incorrect but plausible:** Plausible if the applicant determines that sufficient logic is made up to cause full core scram.
D. **Incorrect but plausible:** Plausible if the applicant determines that the control rods associated with Groups 1 & 4 scrammed (A1 manual pushbutton was depressed and the Group 4B logic power failure, i.e. RPS A & B de-energized on Groups 1 & 4).

References: HC.OP-STSF-0003, "RPS Manual Scram Test - Weekly" Student Ref: NONE
NOH01RPS00C-09
NOH04MANCONC-07

Learning Objective: MANCONE002

Question Source: NRC HC 2007

Question History: None

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.7/45.7

Comments:

QUESTION 57

Given the following conditions:

- The plant is at full power
- A TIP system trace is in progress
- An instrument technician error causes actuation of the NSSSS Channel A manual isolation switch
- The inserted TIP detector becomes stuck in the core

Which ONE of the following describes the TIP system response to this condition?

A. The TIP Shear Valve automatically fires to cut the detector cable and seal the guide tube.

B. The TIP Guide Tube Ball Valve automatically closes, cutting the detector cable and sealing the guide tube.

C. The inserted TIP detector will receive a signal to automatically withdraw to the “in-shield” position; The TIP Guide Tube Ball Valve automatically closes.

D. The inserted TIP detector will receive a signal to automatically withdraw to the “in-shield” position; The TIP Guide Tube Ball Valve will NOT automatically close.

K&A Rating: 215001A1.02 (2.5/2.4)

K&A Statement: Ability to predict and/or monitor changes in parameters associated with operating the TRAVERSING IN-CORE PROBE controls including **A1.02** Detector Position

Justification:

A. **Incorrect but plausible:** The Shear Valves must be manually initiated.
B. **Incorrect but plausible**: The Ball Valve will not close with the cable inside the valve.
C. **Incorrect but plausible:** the TIP Guide Tube Ball Valve will not automatically close due to the detector being stuck and not at the "in-shield" limit, the ball valve will not close with the cable inside the valve.
D. **Correct:** The TIP detector not at its "in-shield" position will receive a signal to automatically withdraw to the "in-shield" position, and the TIP Guide Tube Ball Valve will not automatically close due to the detector being stuck and not at the "in-shield" limit, the ball valve will not close with the cable inside the valve.

References: NOH0TIPS00-02
HC.OP-SO.SM-0001
HC.RE-SO.SE-0001

Student Ref: NONE

Learning Objective: TIPS00E006

Question Source: Bank

Question History: HC # 328

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.5/45.5

Comments:

QUESTION 58

Given the following conditions:

- HC.OP-ST.BJ-0002, HPCI System Functional Test, has just been completed
- ‘A’ loop of RHR is in Suppression Pool cooling mode
- ‘A’ EDG is in Emergency Takeover
- Normal feed breaker to bus 10A401 (40108) spuriously trips
- Alternate feed breaker to bus 10A401 (40101) fails to automatically close
- 5 seconds later, an operator manually closes the 40101 breaker

Which ONE of the following describes: (1) The status of the ‘A’ EDG, and (2) if ‘A’ loop of RHR can immediately be restored to Suppression Pool cooling mode?

A. (1) Not running
   (2) Can immediately be restored

B. (1) Not running
   (2) Can NOT immediately be restored

C. (1) Running
   (2) Can immediately be restored

D. (1) Running
   (2) Can NOT immediately be restored

K&A Rating: 219000 K3.01 (3.9/4.1)

K&A Statement: Knowledge of the effect that a loss or malfunction of the RHR/LPCI: TORUS/SUPPRESSION POOL COOLING MODE: **K3.01:** Suppression pool temperature control

Justification:

A. **Incorrect but plausible:** If candidate does not understand the implications of the 'A' EDG being in Emergency Takeover, and does not recall that the RHR loop must be filled and vented prior to being restored.
B. **Incorrect but plausible**: If candidate does not understand the implications of the 'A' EDG being in Emergency Takeover.
C. **Incorrect but plausible:** If candidate does not recall that the RHR loop is in a drain-down condition, and must be filled and vented prior to being restored.
D. **Correct:** Due to the 'A' EDG being in Emergency Takeover, it will start on LOP of the bus <u>alone</u> vice with concurrent low voltages on the offsite source(s). The EDG will start but run unloaded. 'A' loop of RHR was running in Suppression Pool cooling mode when the 'A' RHR pump lost power. This results in the loop valves being open with no flow, and a drain-down condition. Per HC.OP-AB.ZZ-0170, attachment 2, "<u>IF</u> the pump was running in Suppression Pool Cooling, <u>THEN</u> CLOSE the BC-HV-F024A. FILL <u>AND</u> VENT the A RHR Loop prior to restarting".

References: NOH01EAC00, Rev. 4
NOH04EDG000C, Rev. 3
HC.OP-AB.ZZ-0170, Rev. 7

Student Ref: NONE

Learning Objective: 1EAC00E005, EDG00E006

Question Source: New

Question History: New

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.7/45.4

Comments:

QUESTION 59

Which ONE of the following is a function of the Suppression Chamber-to-Drywell Vacuum Breakers?

A. To prevent low Suppression Chamber pressure from damaging the drywell after a LOCA.

B. To allow hot liquid to enter the Suppression Chamber during the blowdown phase of a LOCA.

C. To prevent a negative pressure from occurring in the Suppression Chamber following a LOCA.

D. To allow non-condensable gasses to reenter the drywell to prevent exceeding the drywell external pressure limit.

K&A Rating: 293001K5.01 (3.1/3.3)

K&A Statement: Knowledge of the operational implications of the following concepts as they apply to PRIMARY CONTAINMENT SYSTEM AND AUXILIARIES : **K5.01** Vacuum breaker/relief operation

Justification:

A. **Incorrect but plausible:** Suppression chamber pressure is relieved back to the drywell after steam condensation to protect the drywell from implosion.
B. **Incorrect but plausible**: Hot liquid from the blowdown will gravity drain from the drywell to the suppression chamber through the downcomers.
C. **Incorrect but plausible:** The reactor building to suppression pool vacuum breakers prevent a negative pressure from occurring in the suppression chamber following a LOCA not the suppression chamber to drywell vacuum breakers.
D. **Correct:** The suppression chamber to drywell vacuum breakers purpose is to prevent exceeding design external pressures of the drywell.

References: NOH01PRICONC Student Ref: NONE

Learning Objective: PRICONE003

Question Source: Bank

Question History: HC Bank # 79

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.5/45.3

Comments:

QUESTION 60

Given the following conditions:

- Following completion of a HPCI surveillance test, Reactor Power was at 85%
- "B" RHR loop was in Suppression Pool Cooling mode
- A high DW pressure condition occurs
- “B” RHR and “B” Core Spray pumps failed to start automatically (both have been placed in service manually IAW plant procedures)
- 10 minutes has elapsed since the LOCA
- “A” RHR has been placed in Suppression pool cooling and spray
- Torus pressure is 9.5 psig and continues to slowly rise
- The order has been given to place “B” loop of RHR in Drywell Spray
- The “B” RHR Loop Inboard Spray Valve (HV-F021B) will open but the Outboard Drywell Spray Valve (HV-F016B) remains closed (electrical power is available)

Which ONE of the following conditions is preventing the opening of the “B” RHR Outboard Drywell Spray Valve (HV-F016B)?

A. The HX Bypass valve (HV-F048A) is not fully closed.

B. The “B” channel Drywell pressure instrument is failed low.

C. The RHR Full Flow test Valve (HV-F024B) is not fully closed.

D. The “B” channel RPV water level indicates above -129 inches.

K&A Rating: 226001K3.02 (2.9/2.9)

K&A Statement: Knowledge of RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE design feature(s) and/or interlocks which provide for the following: **K4.12** Prevention of Inadvertent Containment Spray Activation

Justification:

A. **Incorrect but plausible:** There is no interlock between these valves.
B. **Correct**: A high drywell pressure signal is required to open F016B. (ALL of the following conditions must be satisfied to allow both F016B RHR LOOP B OUTB CONT SPRAY ISLN MOV AND F021B RHR LOOP B INBD CONT SPRAY MOVs to open simultaneously: LPCI initiation signal present, High drywell pressure signal present, and F-17B RHR LOOP B LPCI INJ MOV CLOSED.)
C. **Incorrect but plausible:** There is no interlock between these valves.
D. **Incorrect but plausible:** Manual initiation will seal in the LPCI initiation signal.

References: HC.OP-SO.BC-0001 Student Ref: NONE
RHRSYSE008

Learning Objective: RHRSYSE008

Question Source: Bank

Question History: HC Bank # 329

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.7

Comments:

QUESTION 61

Fuel handling activities are being conducted in the Spent Fuel Pool in preparation for the upcoming refuel outage. The following conditions occur:

- A Spent fuel bundle was physically damaged during a moving evolution to a new pool location during the lift and was later discovered
- The fuel bundle is currently over an area of empty fuel storage racks
- The Refuel Floor Exhaust Radiation Monitor is reading 2.3×10^{-3} μCi/cc
- The Refuel Floor Area Radiation Monitor is reading 2.3×10^{-3} μCi/cc

Per HC.OP-AB.CONT-0005(Q) “Irradiated Fuel Damage”, which ONE of the following immediate actions is required?

A. Place spent fuel bundle in its new designated storage location.

B. Place spent fuel bundle in the nearest storage location.

C. Start Filtration, Recirculation and Ventilation System (FRVS) fans.

D. The spent fuel bundle shall remain in its present suspended location.

K&A Rating: 234000 A1.02 (3.3/3.8)

K&A Statement: Ability to predict and/or monitor changes in parameters associated with operating the FUEL HANDLING EQUIPMENT controls including: Refuel floor radiation levels/ airborne levels

Justification:

A. **Incorrect but plausible:** Plausible if the applicant determines that placing spent fuel bundle in its new designated storage location is an immediate safe action.
B. **Incorrect but plausible**: Plausible if the applicant determines that placing spent fuel bundle in the nearest storage location is the safest immediate action based on stem condition indicating fuel bundle over empty storage location.
C. **Incorrect but plausible:** Plausible due to Refuel Floor Exhaust Radiation Monitor reading > 2.0 x 10-3 µCi/cc, however, Filtration, Recirculation and Ventilation System (FRVS) fans start automatically.
D. **Correct:** HC.OP-AB.CONT-0005(Q) “Irradiated Fuel Damage” directs suspending of the handling of Irradiated Fuel/Components based on entry conditions due to refuel floor radiation alarm.

References: HC.OP-AB.CONT-0005(Q) “Irradiated Fuel Damage” Student Ref: NONE

Learning Objective:

Question Source: New

Question History: None

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR: CFR 41.5/45.5

Comments: Changed from A4.01 to A1.02, due to Q 56 change to balance sample plan.

QUESTION 62

Given the following conditions:

- Alarm D3-C5 TURBINE GENERATOR VIB HI is in
- CRIDS point A2529 MAIN TURBINE BEARING 11 VIB indicates 9 mils and steady
- Reactor power is steady at 35%

Which ONE of the following is required IAW HC.OP-AB.BOP-0002 ‘MAIN TURBINE’?

A. With system operator concurrence, adjust MVAR loading.

B. Lock the Mode Switch in SHUTDOWN and them immediately trip the Main Turbine.

C. Monitor CRIDS or Main Control Room System 1 Computer for further bearing degradation.

D. Reduce Recirc. Pump speed to minimum, then lock the Mode Switch in SHUTDOWN and immediately trip the Main Turbine.

K&A Rating: 241000A1.23 (2.8/2.8)

K&A Statement: Ability to predict and/or monitor changes in parameters associated with operating the REACTOR/TURBINE PRESSURE REGULATING SYSTEM controls including: **A1.23** Main Turbine Vibration

Justification:

A. **Incorrect but plausible:** Plausible if the operator does not recall that the bearing vibration magnitude does not meet the immediate action criteria (Bearing 1-10 must be >= 12 mils for tripping the reactor and turbine). Section B.1 of HC.OP-AB.BOP-0002 directs the operator to adjust MVAR loading.
B. **Correct**: IAW HC.OP-AB.BOP-002 Immediate Actions, if bearing 11-12 Vibration >= 8 mils @ 1800rpm AND reactor power is >+ 24%, then lock the mode switch in shutdown and immediately trip the main turbine.
C. **Incorrect but plausible:** Plausible if the operator does not recall that the bearing vibration magnitude does not meet the immediate action criteria (Bearing 1-10 must be >= 12 mils for tripping the reactor and turbine).
D. **Incorrect but plausible:** Plausible if the operator does not recall that the bearing vibration magnitude does not meet the immediate action criteria. The HC.OP-AB.BOP-002 Retainment Override states that if bearing 11-12 Vibration >= 7 mils @ 1800rpm AND reactor power is >+ 24%, then reduce recirc pump speed to minimum and then lock the mode switch in shutdown and immediately trip the main turbine. The immediate action criteria (>=8mils, no recirc pump speed reduction) overrides the retainment override.

References: HC.OP-AB.BOP-0002 Student Ref: NONE
HC.OP-AR.ZZ-0014

Learning Objective: MNTURBE019

Question Source: New

Question History: N/A

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.5/45.5

Comments:

QUESTION 63

Given the following conditions:

- The Reactor failed to SCRAM when the Mode Switch was placed in Shutdown
- Reactor power is 14% and Reactor pressure is 1105 psig
- The ‘A’ RFP speed has slowed to approximately 2500 rpm and remains steady
- The RFP TURBINE AUTO XFR TO MANUAL (B3-F3) annunciator is in alarm

Which ONE of the following describes the reason for the ‘A’ RFP speed reduction?

The ‘A’ RFP is responding to _________.

A. a control signal failure

B. a gross failure of a Main Steam Flow transmitter

C. a Redundant Reactivity Control System runback

D. the Setpoint Setdown feature of Digital Feedwater Control

K&A Rating: 259001A3.11 (3.2/3.7)

K&A Statement: Ability to monitor automatic operations of the REACTOR FEEDWATER SYSTEM including: **A3.11** Reactor feedpump runbacks: Plant-Specific

Justification:

A. **Incorrect but plausible:** Speed will remain essentially constant with a Control Signal failure.
B. **Incorrect but plausible**: A single steam flow transmitter failure changes control to single element.
C. **Correct:** With RPV pressure at 1105psig, RRCS will swap the RFP to manual, initiate a RFP Runback signal and lower speed to 2500rom (RRCS Setpoint: >1071psig w/ .4% pwr for 25 seconds)
D. **Incorrect but plausible:** Calling for a lower level RFP speed would not stabilize pump speed at 2500 rpm and a transfer to manual control would not occur..

References: HC.OP-SO.SA-0001 Student Ref: NONE

Learning Objective: FWCONTE011

Question Source: Bank

Question History: HC Bank #318

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.7/45.7

Comments:

QUESTION 64

A plant startup is in progress when the 'A' RPS Motor-Generator Voltage Regulator fails causing generator output voltage to decrease to approximately 100VAC.

Which ONE of the following describes the effect of this condition on the Main Steam Line (MSL) Radiation Monitors?

A. The reduced voltage causes a DOWNSCALE trip of MSL Radiation Monitors RE-N006A and RE-N006B.

B. The reduced voltage causes a DOWNSCALE trip of MSL Radiation Monitors RE-N006A and RE-N006C.

C. Power is lost to MSL Radiation Monitors RE-N006A and RE- N006C, resulting in an INOP trip.

D. Power is lost to MSL Radiation Monitors RE-N006A and RE-N006B, resulting in an INOP trip.

K&A Rating: 272000K4.01 (3.7/4.1)

K&A Statement: Knowledge of RADIATION MONITORING System design feature(s) and/or interlocks which provide for the following: **K4.02** Automatic actions to contain radioactive release in the event that the predetermined release rates are exceeded.

Justification:

A. **Incorrect but plausible:** Any voltage reduction would be momentary due to the UV trip of the EPA breakers; an INOP trip occurs on a loss of power to the MSL Rad Monitors. This would result in an INOP trip of MSL Rad Monitors RE-N006A & C since they are powered from RPS Bus 'A'
B. **Incorrect but plausible**: Any voltage reduction would be momentary due to the UV trip of the EPA breakers;
C. **Correct:** When the 'A' RPS MG output is less than 108 VAC, the EPA breakers on the MG output to the 'A' RPS Bus trip on undervoltage, causing a loss of the 'A' RPS bus. This results in an INOP trip of the MSL Rad monitors RE-N006A & C since they are powered from RPS Bus 'A'.
D. **Incorrect but plausible:** RE-N006A & C trip, not A & B. See 'C' for additional explanation.

References: HC.OP-SO.SB-0001 Student Ref: NONE
HC.OP-SO.SP-0001

Learning Objective: RMSYSOE002

Question Source: Bank

Question History: HC Bank #52

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.7

Comments:

QUESTION 65

Given the following conditions:

- The Diesel Generator Room Carbon Dioxide Fire protection system is aligned for automatic operation.
- A valid EDG room high temperature condition has just occurred.

Which ONE of the following describes how the Diesel Generator Room Carbon Dioxide Fire protection system responds?

A. A discharge alarm occurs; CO2 with a wintergreen scent is discharged into the room immediately.

B. A pre-discharge alarm is activated; After a time delay, CO2 with a wintergreen scent is discharged into the room.

C. A pre-discharge alarm is activated; No CO2 is discharged into the room until a valid smoke detector alarm is received.

D. A pre-discharge alarm is activated and a wintergreen scent is discharged into the room; After a time delay, CO2 is discharged into the room.

K&A Rating: 286000A4.01 (3.3/3.2)

K&A Statement: Ability to manually operate and/or monitor from the control room **A4.01** System alarms and indicating lights.

Justification:

A. **Incorrect but plausible:** A pre-discharge alarm is activated. After a time delay, CO2 with a wintergreen scent is discharged into the room, not immediately.

B. **Correct**: IAW HC.OP-SO.KC-0002, Section 3.2.3 and 5.2, a pre-discharge alarm is activated. After a time delay, CO2 with a wintergreen scent is discharged into the room. (The wintergreen scent comes from the odorizer bottle which is activated by the CO2 flow.)

C. **Incorrect but plausible:** A pre-discharge alarm is activated. After a time delay, CO2 with a wintergreen scent is discharged into the room. The EDG room alarm actuates on Hi Temp, not a smoke detector alarm.

D. **Incorrect but plausible:** A pre-discharge alarm is activated. After a time delay, CO2 with a wintergreen scent is discharged into the room. The wintergreen scent comes in with the CO2, not before.

References: HC.OP-SO.KC-0002 Student Ref: NONE

Learning Objective: FIRPROE015

Question Source: Bank

Question History: HC Bank # 229

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.7/45.5 to 45.8

Comments:

QUESTION 66

Station procedures require licensed personnel in the Control Room and “At the Controls” at all times and allows specific exceptions to these requirements.

IAW OP-AA-103-101, CONTROL ROOM ACCESS CONTROL, and OP-AA-101-111, ROLES AND RESPONSIBILITIES OF ON-SHIFT PERSONNEL, which ONE of the following statements satisfies these requirements?

A. During a Reactor Startup the CRS shall limit access to the “At the Controls Area” to Licensed Personnel only.

B. In any OPCON with only 2 SROs on duty, the on duty SM may exit the protected area, as long as the other SRO on the shift is qualified as SM.

C. A minimum of 1 NCO will be “At the Controls” in OPCON 1, 2, or 3. It may be lowered to 0 if properly relieved by the CRS.

D. In OPCON 1 with only 2 NCOs assigned to the control room, when the PO is in the computer room retrieving a P-1, the "at the controls" RO is not allowed to initiate drywell makeup on the 10C650 panel.

K&A Rating: 2.1.1 (3.8/4.2)

K&A Statement: **2.1.1** Knowledge of conduct of operations requirements.

Justification:

A. **Incorrect but plausible:** OP-AA-103-101 lists personnel who are allowed in the control room for a startup including QA and the NRC.
B. **Incorrect but plausible**: OP-AA-103-101 states that the on duty SM and CRS shall remain in the Protected Area unless properly relieved.
C. **Incorrect but plausible:** OP-AA-101-111, Section 4.9 states that the assigned RO(s) are required to remain in the control room when on shift as necessary to meet Tech Spec minimum requirements. The CRS may relieve one of the two NCOs but the second NCO must remain at the controls.
D. **Correct:** IAW OP-AA-101-111, section 4.9, it is expected that three On-duty Licensed Operators will be in the Control Room boundary at all times in OPERATIONAL CONDITIONS 1, 2 and 3, except that one NCO may go to the Computer Room to retrieve the printouts from the PPC (Plant Process Computer) or CMS (Core Monitoring System) as long as the other NCO is “at the controls” in the Inner Horseshoe and is within view of the control panels.

References: OP-AA-101-111, Section 4.9 Student Ref: NONE

Learning Objective: ADMPRO5CE008

Question Source: Bank

Question History: HC Bank # 123

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.10/45.13

Comments:

QUESTION 67

A main generator hydrogen leak has occurred. Hydrogen pressure has stabilized at 65 psig. The plant is operating with 300 Mvars overexcited. (Lagging)

Which ONE of the following is the main generator power output limit, based on these conditions?

A. 1000 Mw

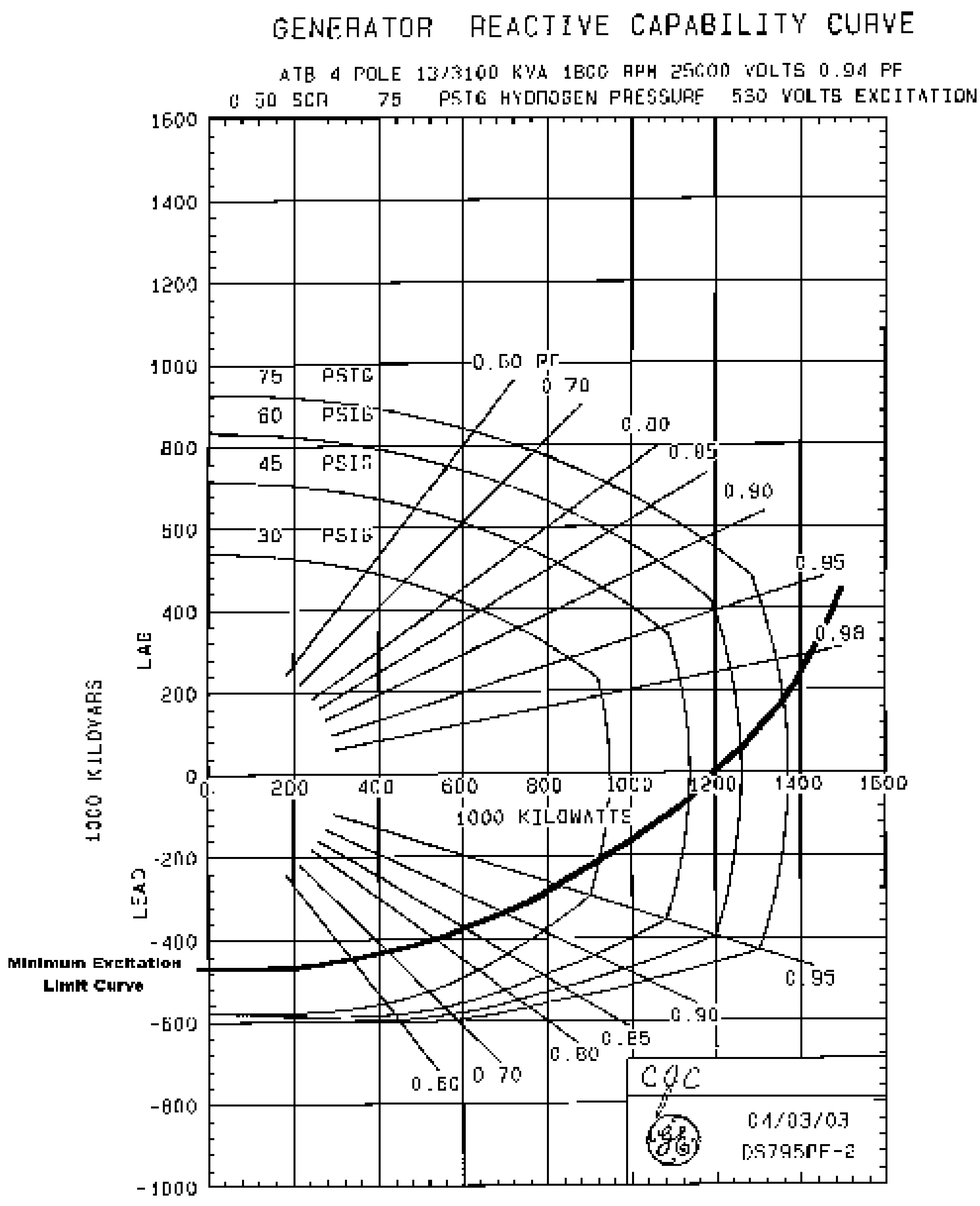
B. 1150 Mw

C. 1250 Mw

D. 1325 Mw

(Note: See attached graph)

ATTACHMENT 1
POWER CHANGES DURING OPERATION
GENERATOR REACTIVE CAPABILITY AND MINIMUM EXCITATION LIMIT CURVE



K&A Rating: G 2.1.25 (3.9/4.2)

K&A Statement: Ability to interpret reference materials, such as graphs, curves, tables, etc.

Justification:

A. **Incorrect but plausible:** Based on 400 Mvar line and 45 PSIG pressure curve.
B. **Incorrect but plausible**: Based on 300 Mvar line and 45 PSIG pressure curve.
C. **Correct :** based on 300 Mvar line intersecting the 65 PSIG curve.
D. **Incorrect but plausible:** based on 300 Mvar line and 75 PSIG pressure curve

References: HC.OP-SO.MA-0001 attachment #1 Student Ref: Att #1

Learning Objective: MNGEN0E010

Question Source: HC Bank Q#214

Question History: N/A

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR: CFR 41.10/43.5/45.12

Comments:

QUESTION 68

Which ONE of the following correctly fills in the blanks in the following statement regarding the THERMAL POWER, LOW PRESSURE OR LOW FLOW SAFETY LIMIT?

Thermal Power SHALL NOT EXCEED 24% of RATED THERMAL POWER with the Reactor Vessel Steam Dome Pressure LESS THAN _____a_____ psig OR Core Flow LESS THAN ____b____% OF Rated Flow.

	a	b
A.	756	15
B.	756	10
C.	785	15
D.	785	10

K&A Rating: 2.2.22 (4.0/4.7)

K&A Statement: 2.2.22 Knowledge of limiting conditions for operations and safety limits.

Justification:

A. **Incorrect but plausible:** Pressure too low and flow too high.
B. **Incorrect but plausible**: Pressure too low.
C. **Incorrect but plausible:** Flow too high.
D. **Correct:** IAW Tech Spec 2.1.1, thermal power shall not exceed 24% of rated thermal power with the reactor vessel steam dome pressure less than 785psig or core flow less than 10% or rated flow.

References: TS 2.1.1 Student Ref: NONE

Learning Objective: TECSPECE001

Question Source: Bank

Question History: HC Bank #11

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.5/43.2/45.2

Comments:

QUESTION 69

Given the following conditions:

- A Reactor Startup is in progress.
- The Mode Switch in Startup/Hot Standby.
- SLCS TANK TROUBLE (C1-E1) annunciator alarms.
- The EO isolates a severely leaking drain line.
- 4450 gallons remains in the storage tank.
- A Chemistry sample has determined that current boron concentration is 13.7%.

Based on this information, the SLC system storage tank sodium pentaborate solution volume/concentration Technical Specification requirement:

A. is being met.

B. needs to have only water added to bring it into specification.

C. needs to have only boron added to bring it into specification.

D. needs to have both boron AND water added to bring it into specification.

K&A Rating: 2.2.42 (3.9/4.6)

K&A Statement: 2.2.42 Ability to recognize system parameters that are entry-level conditions for Technical Specifications.

Justification:

A. **Incorrect but plausible:** Total volume is below limits. The question stem indicates that the plant is in Mode 2 (mode switch in Startup/Hot Standby), therefore the applicability statement applies (3.1.5 applies in Modes 1 and 2). Plausible if the applicant believes that the Tech Spec does not apply given that a Reactor startup is in progress.
B. **Incorrect but plausible**: Adding water only will dilute the concentration below 13.6%.
C. **Incorrect but plausible:** Adding boron only will not bring the total volume above limits.
D. **Correct:** TS 3.1.5 requires a minimum volume of ~4746.5 gallons at a concentration of 13.7%. (4782-4640=142 gallons between 13.6% and 14.0%. Subtract ¼ of this to estimate minimum requirement at 13.7% due to linear slope of line.) Water must be added to bring level up to the minimum. (~296 gallons.) Starting at 13.7%, this would dilute the concentration down to ~ 12.8%, less than the minimum required (4450/4746x13.7%). Therefore, boron must also be added to bring the concentration volume within acceptable limits.

References: TS 3.1.5 Student Ref: Tech Spec 3.15

Learning Objective: SLCSYSE027

Question Source: Modified

Question History: Modified from HC Bank #115

Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: 41.7 / 41.10 / 43.2 / 43.3 / 45.3

Comments:

QUESTION 70

Which process or tag should be used when a vent or drain valve is to be worked on and it is the only vent or drain valve capable of removing stored energy or preventing energy build up in the system?

A. A White Caution Tag (WCT) is applied to the vent or drain and the work is conducted on the valve with the WCT attached.

B. The Clearing Agent and the Tagging Authority agree that the valve can be VER, and the work is conducted on the valve.

C. A Worker’s Blocking Tag (WBT) is applied to the vent or drain and the work is conducted on the valve with the WBT attached

D. An Information Tag (INF) is applied to the vent or drain and the work is conducted on the valve with the INF attached.

Question 70

K&A Rating: 2.2.13 (4.1)

K&A Statement: Knowledge of tagging and clearance procedures.

Justification:

A. **Incorrect but plausible:** Not in accordance with the procedure**.**
B. **Correct:** Per component and tagging rules this is the correct process to control the valve.
C. **Incorrect but plausible:** Not in accordance with the procedure.
D. **Incorrect but plausible:** Not in accordance with the procedure

References: OP-AA-109-115 Student Ref: NONE
Attachment 2 Component Tagging Rules

Learning Objective: NA0015E004

Question Source: HC Bank Q#62

Question History: N/A

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.10/45.13

Comments:

QUESTION 71

Given:

- The Refueling SRO reports he is ready to commence core alterations.
- Radiation Protection has been notified and are Evacuating the upper regions of the Drywell.

IAW RP-AA-403, ‘Administration of the Radiation Work Permit Program’, which ONE of the following controls satisfies the requirements if rad levels in the upper regions of the Drywell are determined to be 1100 mrem/hr?

A. The area is roped off, conspicuously posted and a flashing light provided as a warning device.

B. Qualified personnel providing direct or remote (e.g., closed circuit TV) roving surveillance, the area is conspicuously posted.

C. The area is conspicuously posted and qualified personnel providing direct or remote (e.g., closed circuit TV) continuous surveillance.

D. Qualified personnel providing direct or remote (e.g., closed circuit TV) continuous surveillance to ensure positive control over the area.

K&A Rating: 2.3.12 (3.2/3.7)

K&A Statement: **2.3.12** 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.

Justification:

A. **Correct:** Correct IAW RP-AA-403
B. **Incorrect but plausible**: Requires continuous surveillance
C. **Incorrect but plausible:** Combination of incorrect statements.
D. **Incorrect but plausible:** This is used in lieu of stay time.

References: RP-AA-403 Student Ref: NONE
RP-AA-406

Learning Objective: NOH04ADM024E

Question Source: Bank

Question History: HC Bank #26

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.12,45.9,45.10

Comments: Learning objective NOH04ADM024 – E001
From Memory Describe what the worker is acknowledging when signing a RWP prior to use. IAW RP-AA-403, Administration of the Radiation Work Permit Program

QUESTION 72

Given the following conditions:

- The Reactor core has been operating with one or more known fuel pin leaks
- A Reactor SCRAM occurred from 100% power
- Both SCRAM Discharge Volume Drain Valves did NOT go full close
- The Reactor Building HVAC Exhaust Rad monitor is reading 4E-5 μCi/mL and steady

Which ONE of the following rooms would become the most significant radiological hazard AND what action would be directed by the CRS?

A. Reactor Building South Equipment Sump Room 4106; Enter EOP 103/4.

B. Reactor Building North Equipment Sump Room 4115; Enter EOP 103/4.

C. Reactor Building South Equipment Sump Room 4106; Reset the Reactor SCRAM.

D. Reactor Building North Equipment Sump Room 4115; Reset the Reactor SCRAM.

K&A Rating: 2.2.37 (3.8/4.3)

K&A Statement: Ability to control radiation releases.

Justification:

A. **Incorrect but plausible:** The South Sump Room will experience rising rad levels as described in answer choice 'C'. However, the entry condition for EOP 103/4 is Reactor Building HVAC exhaust rad levels above 5E-5 μCi/mL. The stem indicated that current Reactor Building HVAC exhaust levels are currently reading 4E-5 μCi/mL. Therefore, EOP 103/4 entry is NOT required.
B. **Incorrect but plausible**: The North Sump Room will NOT experience rising rad levels as described in answer choice 'C'. The entry condition for EOP 103/4 is Reactor Building HVAC exhaust rad levels above 5E-5 μCi/mL. The stem indicated that current Reactor Building HVAC exhaust levels are currently reading 4E-5 μCi/mL. Therefore, EOP 103/4 entry is NOT required.
C. **Correct:** The North and South SCRAM discharge volumes drain through a common line to the Reactor Building Equipment Drain Sump (1BT266) located in the South Reactor Building Sump Room (54' elevation). If the drain valves did not close (as stated in the stem), a LOCA would exist discharging into the South Sump Room. The leaking fuel would severely raise rad levels in that room. With drain valves open, resetting the SCRAM will reclose the valves and terminate the LOCA.
D. **Incorrect but plausible:** With drain valves open, resetting the SCRAM will reclose the valves and terminate the LOCA. However, the North Sump Room will NOT experience rising rad levels as described in answer choice 'C'.

References: EOP 103/4 Student Ref: NONE

Learning Objective: CRDHYDE010

Question Source: Bank

Question History: HC Bank #205

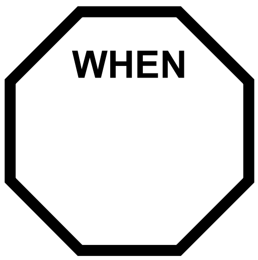
Cognitive Level: Memory/Fundamental Knowledge:
Comprehensive/Analysis: X

10CFR55: CFR 41.11/43.4/45.10

Comments: This question is RO level. The first part of the two part answer choice can be answered solely by system knowledge. Direct EOP entry conditions are considered RO level knowledge. Understanding that resetting the Reactor SCRAM will reduce radiation levels can be answered solely by system knowledge.

QUESTION 73

Concerning the EOPs, which ONE of the following is the correct name for this EOP symbol?



A. Decision Step

B. Entry Condition

C. Contingent Step

D. Execute Concurrently Step

K&A Rating: 2.4.17 (3.9/4.3)

K&A Statement: Knowledge of EOP terms and definitions.

Justification:

A. **Incorrect but plausible:** Contains a question the answer to which determines the next step. All decision steps require a choice between two opposite possibilities, for example “YES/NO” or “HIGH/LOW”.
B. **Incorrect but plausible**: Entry conditions or symptoms are generally brief noun phrases that initiate the EOP actions. The entry conditions are located at the top of each flowchart within entry condition symbols.
C. **Correct:** A contingent action step indicates that until the expected condition contained within the step is met, the corresponding action cannot be performed. Once operators reach a contingent action step, they wait until the expected condition is met before proceeding.
D. **Incorrect but plausible:** Requires the operator to enter the designated procedure and perform the stated actions while continuing in the existing flow path. The execute concurrently symbol is used when an operator is to enter another procedure while at the same time continuing in the current flow path. The symbol contains the number of the concurrent procedure.

References: EOP Bases Student Ref: NONE

Learning Objective: INTEOPE001

Question Source: Bank

Question History: HC Bank #78

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.10/45.13

Comments:

QUESTION 74

Gross mechanical damage has occurred at the top of the Reactor core. Attempts are being made to determine the full extent of the mechanical damage.

Which ONE of the following systems can be used to determine the full extent (axial AND radial location) of the mechanical damage?

A. TIP

B. SRM

C. LPRM

D. IRM

K&A Rating: 2.4.3 (3.7/3.9)

K&A Statement: **2.4.3** Ability to identify post-accident instrumentation.

Justification:

A. **Correct:** The driving range of the TIP detectors can be used to determine the axial and radial distribution of damage. TIP detector position is read from the TIP Drive Control Units. Axial position above BAF (in inches) can be determined by subtracting the core bottom limit from the detector reading. Radial location can be determined from Drive Control Unit and Indexer position assignment to LPRM strings.

B. **Incorrect but plausible**: SRMs and IRMs axial position can be determined as a distance from the detector full-in or full-out position. Since there is no definite method of determining that these detectors have stopped moving, except at the full-in and full-out positions, their use is only to determine that full traverse movement is possible. Therefore, SRMs and IRMs are not useful at defining the extent of (axial) of all damage. They only traverse from below the active fuel to 15" above active fuel centerline.

C. **Incorrect but plausible:** LPRMs detectors are not moveable, and therefore are of limited use in determining the extent of damage.

D. **Incorrect but plausible:** SRMs and IRMs axial position can be determined as a distance from the detector full-in or full-out position. Since there is no definite method of determining that these detectors have stopped moving, except at the full-in and full-out positions, their use is only to determine that full traverse movement is possible. Therefore, SRMs and IRMs are not useful at defining the extent of (axial) of all damage. They only traverse from below the active fuel to 15" above active fuel centerline.

References: NOH01MCD000-00 Student Ref: NONE

Learning Objective: NMRESPE003

Question Source: Bank

Question History: HC Bank #84

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.6/45.4

Comments:

QUESTION 75

HC.OP-AB.IC-0001 Stuck Control Rod subsequent actions, sets a limit on drive water differential pressure when attempting to free a stuck control rod.

Which ONE of the following is the reason for this limit?

A. Preventing mechanical seal failure.

B. Preventing excessive reactivity addition rates.

C. Preventing the hydraulic locking of drive system valves.

D. Preventing HCU directional control valve seat deformation.

K&A Rating: 2.4.11 (4.0/4.2)

K&A Statement: Knowledge of abnormal condition procedures.

Justification:

A. **Incorrect but plausible:** This is not caused by elevated drive water differential pressures.
B. **Correct**: The limitation for drive water differential pressure is based on concern for Control Rod speed and not on the mechanical limitations of the components. Control rod speed affects the reactivity addition rate.
C. **Incorrect but plausible:** This is not caused by elevated drive water differential pressures.
D. **Incorrect but plausible:** This is not caused by elevated drive water differential pressures.

References: HC.OP-AB.IC-0001 Student Ref: NONE

Learning Objective: ABIC01E004

Question Source: Bank

Question History: HC Bank #33

Cognitive Level: Memory/Fundamental Knowledge: X
Comprehensive/Analysis:

10CFR55: CFR 41.10/41.5/43.5/45.13

Comments: