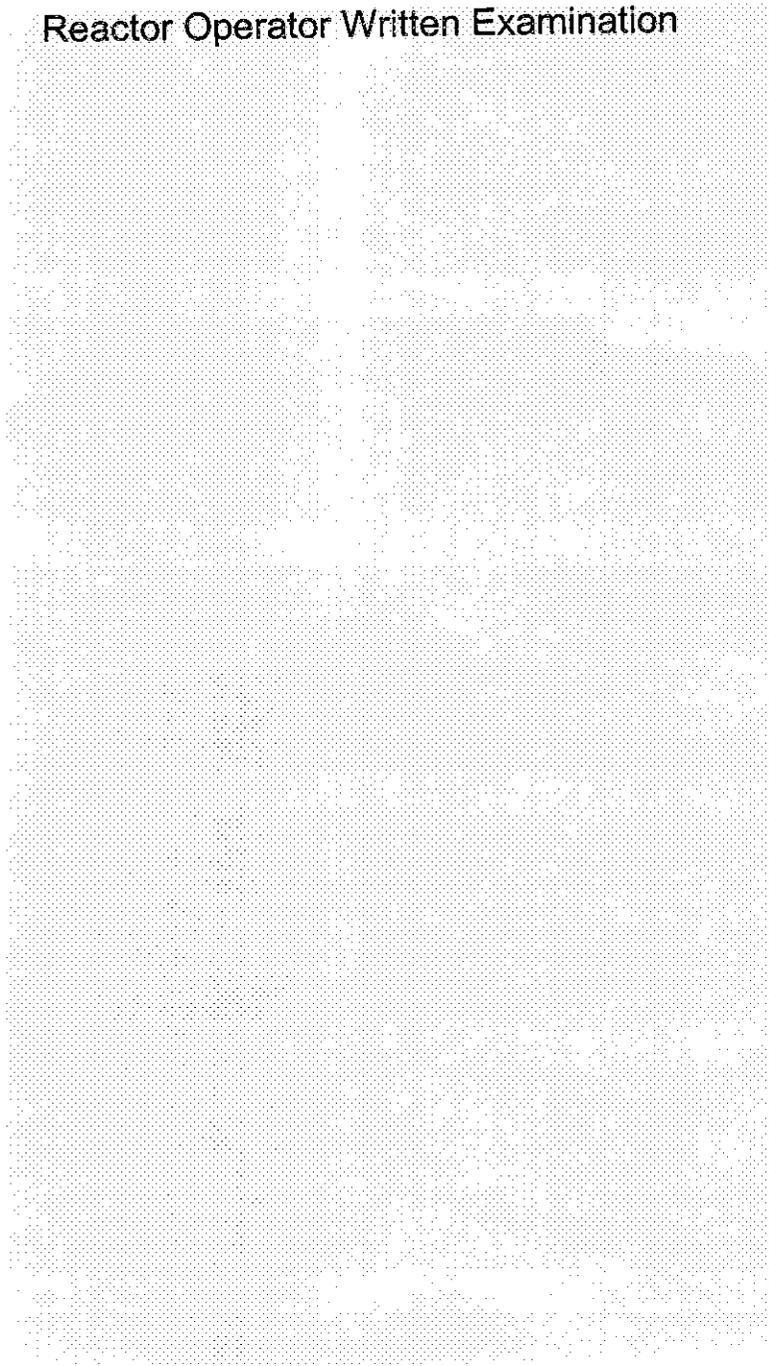


Final Submittal

WATTS BAR JULY 2004 EXAM 50-390/2004-301 JULY 23, & JULY 26-30, 2004

1. Reactor Operator Written Examination



U.S. Nuclear Regulatory Commission Site-Specific RO Written Examination	
Applicant Information	
Name: _____	
Date: 7/23/2004	Facility/Unit: WATTS BAR - 1
License Level: RO / SRO-Region: <input checked="" type="radio"/> II / <input type="radio"/> III / <input type="radio"/> IV	Reactor Type: <input checked="" type="radio"/> W / <input type="radio"/> CE / <input type="radio"/> BW / <input type="radio"/> GE
Start Time: _____	Finish Time: _____
Instructions	
Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires To pass the examination you must achieve a final grade of at least 80.00 percent. Examination papers will be collected six hours after the examination starts.	
Applicant Certification	
All work done on this examination is my own. I have neither given nor received aid.	
_____ Applicant's Signature	
Results	
Examination Value	_____ 75 _____ Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

1. 008 AK3.03 001

Given the following plant conditions:

- Unit 1 was initially at 100% power.
- A small break LOCA has occurred due to a failed open PZR PORV.
- The associated PORV block valve will NOT close.
- The operating crew transitions to E-1, Loss of Reactor or Secondary Coolant.
- RCS pressure has lowered to 1450 psig and the crew trips all Reactor Coolant Pumps (RCPs) in accordance with step 1.

Which ONE of the following indicates the reason the RCPs were tripped by the crew?

- A. To minimize RCS cooldown rate.
- B. To minimize RCS inventory loss.
- C. To prevent RCP damage due to overspeed.
- D. To reduce RCS heat input.

The correct answer is B.

- A. Incorrect - Student may select this distractor since securing RCPs would reduce RCS forced flow cooldown (RCS is still coupled to S/Gs). However a RCS cooldown would lessen the severity of core uncover which is the objective of the step to secure the RCPs.
- B. *Correct* - RCPs are tripped to prevent excessive depletion of RCS water inventory through a small break which might lead to core uncover if RCPs were tripped later in the accident.
- C. Incorrect - Under the stated condition it is not possible to overspeed the RCPs. Motors would be connected to a 60 hz stable power source in this situation. Student may incorrectly believe that RCPs may overspeed due to steam formation.
- D. Incorrect - RCPs are tripped to prevent excessive depletion of RCS water inventory. Some plant transients require RCPs to be stopped to reduce heat input but not in this case. Examinee may select this distractor for this reason.

REFERENCES:

Lesson plan 3-OT-EOP0100, p. 14
INPO Bank Point Beach 9/29/2003

10CFR55 41.5, 10, 45.6, 13

Knowledge of the reasons for the following responses as they apply to the
Pressurizer Vapor Space Accident: Actions contained in EOP for PZR vapor
space accident/ LOCA

RO - 1 SRO - 1

2. 009 EK1.01 001

Which ONE of the following describes reflux flow following a small break LOCA?

- A. Liquid heated by the core is subsequently cooled inside the steam generator tubes and returned to the core via natural circulation flow along the bottom of each cold leg pipe.
- B. Liquid heated by the core is subsequently cooled inside the steam generator tubes and returned to the core via counterflow along the bottom of each partially filled hot leg pipe.
- C. Steam produced inside the core is condensed in the steam generator tubes and returned to the core via natural circulation flow along the bottom of each cold leg pipe.
- D. Steam produced inside the core is condensed in the steam generator tubes and returned to the core via gravity counterflow along the bottom of each partially filled hot leg pipe.

The correct answer is D.

- A. Incorrect - Reflux flow occurs after core boiling starts. Steam has formed over top of core. Student may select due to liquid flow and reflux flow. Cold leg pipe is also incorrect.
- B. Incorrect - Reflux flow occurs after core boiling starts. Steam has formed over top of core. Student may select due to liquid flow and reflux flow. Hot leg pipe would be correct transport pipe.
- C. Incorrect - Steam produced in the core is transported via the hot leg pipe where it is cooled and travels back along the same hot leg pipe to the core. Natural circulation has stopped at this point. Student may see this as natural circulation, however flow will not return in the cold leg pipe.
- D. *Correct* - Reflow flow is the transport of steam to the S/Gs where it is condensed and travels back to the core along the hot leg pipe.

REFERENCES:

Lesson plan 3-OT-MCD0002, p. 11
Lesson plan 3-OT-TAA013, p. 16
INPO Bank Braidwood 7/17/2002

10CFR55 41.8, 10, 45.3

Knowledge of the operational implications of the following concepts as they apply to the small break LOCA: Natural circulation and cooling, including reflux.

RO - 2 SRO - 2

Changed stem of question due to feedback from Ron Aiello.

3. 011 EK2.02 001

Unit 1 is initially at 60% power:

- 1A-A Containment Spray pump is out of service.
- 1A-A Safety Injection pump is out of service.
- RWST was at its minimum level for operability when the event occurred.

A Large break LOCA occurs. The operating crew takes action in accordance with E-1, Loss of Reactor or Secondary Coolant.

The following conditions currently exist:

- Containment pressure is 3.2 psig, DROPPING slowly.
- RCS pressure is 100 psig, STABLE.
- Pressurizer level is offscale LOW.
- All operable pumps are delivering DESIGNED flowrate.

Which ONE of the following lists the approximate time before to transition to ES-1.3, "Transfer to Containment Sump" is required? (Use reference provided)

- A. 15 minutes
- B. 20 minutes
- C. 25 minutes
- D. 30 minutes

The correct answer is B.

- A. Incorrect - If ALL pumps are used at designed flow (15450 gpm) the RWST would reach 34% (recirc swapover setpoint) in 14.2 minutes.
- B. *Correct* - With design flowrate used on AVAILABLE pumps (10725 gpm) the RWST will reach 34% (recirc swapover setpoint) in 20.5 minutes.
- C. Incorrect - Using ALL pumps at design flow (15150 gpm) will completely empty the RWST in 24.5 minutes.
- D. Incorrect - Using available pumps at design flow (10725 gpm) will reduce RWST level to 8%, (level at which all pumps taking a suction on RWST must be secured) in 29 minutes.

REFERENCES:

TI-4 part II appendix 29 - Must be provided to the examinees.

Lesson plan 3-OT-SYS063A

Lesson plan 3-OT-SYS072A

INPO Bank Beaver Valley 12/01/2002

10CFR55 41.7, 45.7

Knowledge of the interrelations between the and the following Large Break

LOCA: Pumps (*note: K/A wording is exactly as given in NUREG-1122 Rev. 2*)

RO - 3 SRO - 3

4. 017 AA1.03 001

Given the following plant conditions:

- The Unit is operating at 100%.
- Loop 2 RCP #1 SEAL LEAKOFF FLOW HI alarm is LIT.
- Loop 2 RCP #2 SEAL STANDPIPE LEVEL HI/LO alarm is NOT LIT.
- Loop 2 RCP #1 seal leakoff flow recorder indicates offscale HIGH.
- Charging flow has risen 40 gpm to maintain pressurizer level.

Which ONE of the following Loop 2 RCP seal failures has occurred?

- A. The #1 seal has failed and the RCS pressure drop is across the #2 seal.
- B. The #1 and #2 seals have failed and the RCS pressure drop is across the #3 seal.
- C. The #2 seal has failed and is allowing water from the standpipe to flow out the #1 seal leakoff line.
- D. The #2 and #3 seals have failed and the RCS pressure drop is across the #1 seal.

The correct answer is A.

- A. *Correct* - # 1 seal failure results in high leakoff flowrate as indicated by alarm and on recorder. Full system pressure will be placed upon the #2 seal.
- B. *Incorrect* -operator may misdiagnose indications.
- C. *Incorrect* - operator may misdiagnose indications.
- D. *Incorrect* - operator may misdiagnose indications.

If operator had misconception of seal flow and leakoff paths he would not be able to differentiate between different types of seal failures.

REFERENCE:

AOI-24, "RCP Seal Abnormalities During Pump Operation" Rev. 27.
Lesson plan 3-OT-AOI2400
Lesson plan 3-OT-SYS068B

10 CFR 41.5, 41.10 / 45.6, 45.13

Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions: Reactor trip alarms, switches, and indicators.

RO - 4 SRO - 4

5. 022 G2.4.35 001

Given the following plant conditions:

- Unit is at 87% power.
- 1A-A CCS pump is tagged out of service.
- 1A-A Charging Pump is in service.
- C-S CCS pump is aligned to its normal source.
- A loss of 6.9kV Shutdown Board 1B-B occurred.
- The crew initiated a reactor trip in accordance with the proper procedure.

Which ONE of the following actions is required within 10 minutes in order to maintain charging and seal injection?

- A. Manually align ERCW flow to CCP 1A-A in the pump room.
- B. Start Thermal Barrier Booster Pump 1A-A from the main control room.
- C. Transfer C-S CCS pump to its alternate power supply using the local transfer switch.
- D. Align 2B-B CCS pump to replace 1B-B CCS pump from the main control room.

The correct answer is A.

- A. *Correct* - if ERCW is manually aligned to supply cooling flow to CCP 1A-A within 10 minutes the pump should continue to run and supply seal flow and charging.
- B. *Incorrect*- start of TBBP will not ensure protection of RCP seals since no CCS pumps are available to supply their suction. Examinee may think if the "A" train pump is started cooling will be provided to the thermal barriers.
- C. *Incorrect* - transfer of the C-S CCS pump power supply will not restore flow to "A" train CCS. Examinee may confuse which pumps are aligned to provide CCS to "A" train ESF equipment.
- D. *Incorrect* - 2B-B CCS pump can not be aligned to replace the 1B-B CCS pump but may be aligned to replace the C-S pump.

REFERENCES:

Lesson plan 3-OT-AOI1500; AOI-15

10CFR55 43.5 / 45.13

Loss of Reactor Coolant Makeup: Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.

RO - 5 SRO - 5

6. 025 G2.1.33 001

Given the following conditions:

- Unit is in MODE 3.
- RCS temperature is 360°F and pressure is 400 psig.
- While performing a control board walk-down, the Operator at the Controls discovered 1-FCV-74-33, RHR HX "A" Outlet Crosstie CLOSED.

Which ONE of the following actions should be taken?

- A. No action required since RHR injection alignment is not required when RCS temperature less than 375°F.
- B. No action required since 1-FCV-74-33 is normally CLOSED to maintain train separation.
- C. Declare BOTH trains of ECCS inoperable and enter LCO 3.0.3.
- D. Declare "A" train of ECCS inoperable and enter LCO 3.5.2.

The correct answer is C.

- A. Incorrect - SIPs and CCPs are required to be aligned prior to exceeding 375°F. Examinee may confuse requirements for aligning RHR for ECCS injection with requirements for SIPs and CCPs for cold overpressure protection.
- B. Incorrect - Examinee may mistakenly assume train separation is required for RHR injection flow as it is for most other ESF components. In addition, these valves are manually closed during alignment of hot leg recirc in order to maintain train separation.
- C. *Correct* - both trains are declared inoperable since in the event one RHR pump failed during a LOCA flow to all RCS cold legs could not be ensure if this crosstie valve is closed. Requires entry into LCO 3.0.3.
- D. Incorrect - since the valve is associated with "A" train RHR the examinee may think only "A" train RHR is inoperable.

Reference:

WBN Bank - SYS074.10.007
Lesson plan 3-OT-SYS074A

10 CFR 55 43.2, 3, 45.3

Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.

RO - 6 SRO - 6

7. 026 AA1.06 001

Given the following plant conditions:

- A tube leak has developed in the Non-Regenerative heat exchanger.
- Charging and Letdown have been isolated.
- The operating crew is placing excess letdown in service in accordance with AOI-15 "Loss of Component Cooling Water (CCS)".

Which ONE of the following describes how letdown outlet flow is adjusted to control Excess Letdown temperature?

- A. Automatically adjusted using a temperature controller to maintain CCS outlet temperature less than 200°F.
- B. Automatically adjusted using a temperature controller to maintain LETDOWN outlet temperature less than 200°F.
- C. Manually adjusted to ensure maximum letdown flow while maintaining CCS outlet temperature less than 200°F.
- D. Manually adjusted to ensure maximum letdown flow while maintaining LETDOWN outlet temperature less than 200°F.

The correct answer is D.

- A. Incorrect - letdown flow is not automatically adjusted even though a foxboro controller is used it has no auto capability. Outlet temperature maintained is letdown temperature.
- B. Incorrect - letdown flow is not automatically adjusted even though a foxboro controller is used it has no auto capability.
- C. Incorrect - Letdown flow is manually adjusted. CCS outlet temperature is not the parameter maintained less than 200°F. Students may think CCS outlet temperature is maintained parameter.
- D. *Correct* - Letdown flow is manually adjusted and letdown outlet temperature is the parameter maintained less than 200°F.

REFERENCES:

Lesson plan 3-OT-SYS062A
AOI-15 Loss of Component Cooling Water

10CFR55 41.7, 45.5, 6

Ability to operate and / or monitor the following as they apply to the Loss of
Component cooling Water:Control of flow rates to components cooled by the
CCWS

RO - 7 SRO - 7

8. 027 AK2.03 001

Given the following plant conditions:

- Plant is at 100% power.
- Following a step load change pressurizer pressure drops to 2205 psig.
- Automatic pressure control cycles all pressurizer backup heaters ON.
- As pressure rises to 2215 psig, Master Pressure Controller, PIC-68-340A, is inadvertently placed in MANUAL.

As Pressurizer pressure RISES, which ONE of the following describes the system response if the operator takes NO action?

- A. Spray valves open to control pressure.
- B. Only PORV PCV-68-334 opens to control pressure.
- C. Only PORV PCV-68-340 opens to control pressure.
- D. PORV PCV-68-334 and PCV-68-340 both open to control pressure.

The correct answer is B.

- A. Incorrect - Spray valves are being controlled in manual and will not respond to high pressure signal. Student may select wanting spray valves to control pressure.
- B. *Correct* - PORV 68-334 is not controlled by master controller. PORV will open at setpoint to control pressure.
- C. Incorrect - PORV 68-340 is controlled by master controller in manual and will not open to control pressure. Student may confuse PORVs.
- D. Incorrect - Both PORVs will not open. Student may select thinking both respond.

REFERENCES:

Lesson plan 3-OT-SYS068C p.21-22
AOI-18 p. 13 Discussion

10CFR55 41.7, 45.7

Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Controllers and positioners

RO - 8 SRO - 8

9. 029 EK2.06 001

Given the following plant conditions:

- RCS leakage has risen above Charging pump capacity.
- The OAC initiates a reactor trip from the control room.
- While verifying Step 1 of E-0 "Reactor Trip or Safety Injection", the red indicating lights for both Reactor Trip Breakers (52/RTA and 52/RTB) are illuminated and the green indicating lights are extinguished.

Which ONE of the following describes the current status of the components associated with each Reactor Trip Breaker (RTB)? (assume the RTBs are NOT mechanically bound)

- A. The Undervoltage Coil is energized, the Shunt coil is energized.
- B. The Undervoltage Coil is de-energized, the Shunt coil is energized.
- C. The Undervoltage Coil is energized, the Shunt coil is de-energized.
- D. The Undervoltage Coil is de-energized, the Shunt coil is de-energized.

The correct answer is C.

- A. Incorrect - Student may confuse distractor.
- B. Incorrect - Student may confuse distractor
- C. *Correct* - Reactor trip signal was not passed to the breakers, Therefore the coils remain in thier normal state. UV-energized and Shunt de-energized.
- D. Incorrect - Student may confuse distractor.

When a Reactor Trip signal is passed to the RTBs the UV coil will de-energize and the Shunt coil will energize. This question tests the students ability to recognize that a trip signal has not been sent to the RTBs (ATWS) and the correct status of each coil. (normal and trip states)

REFERENCES:

Lesson plan 3-OT-SYS099A p. 19
Braidwood exam 7/17/2002

10CFR55 41.7, 45.7

Knowledge of the interrelations between the and the following an ATWS: Breaker, relays, and disconnects.

RO - 9 SRO - 9

10. 038 EK3.01 001

Given the following plant conditions:

- A Steam Generator tube Rupture has occurred.
- The operating crew is performing actions contained in E-3 "Steam Generator Tube Rupture".

Which ONE of the following describes the primary reason for reducing RCS pressure to match ruptured S/G pressure in E-3 ?

- A. To restore RCS inventory and reduce break flow prior to stopping ECCS pumps.
- B. To eliminate the concern for S/G overfill and damage to secondary steam piping.
- C. To minimize the probability of a Pressurized Thermal Shock event when RCS cooldown is commenced.
- D. To ensure that there will be no release of radioactivity through the S/G Atmospheric Dump valves for the duration of the SGTR.

The correct answer is A.

- A. *Correct* - The object of the depressurization is to reduce the pressure differential across the S/G tubes to stop primary to secondary leakage and restore RCS inventory as demonstrated by PZR level prior to securing ECCS flow.
- B. *Incorrect* - May not be able to stop overfill and the concern for secondary piping.
- C. *Incorrect* - PTS is only a concern if S/G pressure is low. (also faulted)
- D. *Incorrect* - May not be able to stop release if SGTR is large enough.

REFERENCES:

Lesson plan 3-OT-EOP0300 p. 28 -29
E-3 "Steam Generator Tube Rupture"
Background document E-3 p. 94

Indian Point Exam 3/10/2003

10CFR55 41.5, 10, 45.6, 13

Knowledge of the reasons for the following responses as they apply to the
SGTR: Equalizing pressure on primary and secondary sides of ruptured S/G.

RO - 10 SRO - 10

11. 054 AA1.02 001

Given the following plant conditions:

- Unit 1 is currently in Mode 3
- Tavg = 557°F
- S/G pressures 1100 psig.
- S/G level is being maintained on program with By-pass Feed Reg valves in AUTO.
- A trip of the Standby Main Feed pump has occurred due to an overcurrent condition.

Which ONE of the following describes the correct operator action in accordance with AOI-16 "Loss of Normal Feedwater" ?

- A. Verify auto initiation of all AFW pumps.
- B. Manually start one MDAFW pump only.
- C. Manually start the TDAFW pump only.
- D. Manually start all AFW pumps.

The correct answer is D.

- A. Incorrect - Trip of Standby Feed pump does to auto start AFW. Student may mistake this for Auto start signal.
- B. Incorrect - One MDAFW pump would be enough feed to prevent loss of heat sink but only feeds 2 of 4 S/Gs. Student may want to start only one pump.
- C. Incorrect - Two MDAFW pumps will feed all S/Gs. Student may be reluctant to start TDAFW pump with only RCPs providing heat for steam production.
- D. *Correct* - AOI-16 requires start of all AFW pumps. Manual actions match the plant response to an auto initiation which would start all AFW pumps.

REFERENCES:

Lesson plan 3-OT-AOI1600

AOI-16 "Loss of Normal Feedwater"

10CFR55 41.7, 45.5, 6

Ability to operate and / or monitor the following as they apply to the Loss of Main feedwater: Manual startup of electric and steam-driven AFW pumps.

RO - 11 SRO - 11

Incorporated comments from Ron Aiello.

12. 055 EK1.02 001

Given the following plant conditions:

- A loss of all AC power occurred while the unit was at 100% power.
- ECA-0.0, "Loss of Shutdown Power", was implemented.
- The crew is performing step 20, "Depressurize intact S/Gs to 300 psig".
- All S/G levels drop to ~ 10% narrow range.
- Operating crew terminates the S/G depressurization.

Which ONE of the following describes the operational implication if all S/G levels are allowed to drop below 10% NR level?

- A. Natural circulation may NOT be effective in removing heat from the RCS.
- B. Sufficient steam supply may NOT remain available for TDAFWP operation.
- C. S/G tubes may NOT remain covered in order to insulate liquid and vapor space to prevent sudden depressurization.
- D. Primary to secondary leakrates would be excessive in the event a SGTR occurred during the depressurization.

The correct answer is A.

- A. *Correct* - S/G narrow range level must be maintained above 10% to provide adequate heat transfer to ensure natural circulation.
- B. *Incorrect* - although steam pressure and S/G levels may drop, TDAFWP operation should not be a concern at this point. Operator may incorrectly prioritize this issue.
- C. *Incorrect* - the potential for uncovering the tubes is a potential, however the concern is NOT for potential sudden depressurization. Operator may relate this distractor to similar bases in E-3 for SGTR which is not correct for this situation.
- D. *Incorrect* - an individual who does not understand the mechanics of transients may believe that maintaining tubes covered would help mitigate S/G tube leakage.

REFERENCE:

WBN exam bank ECA0000.04 004

Lesson Plan 3-OT-ECA0000

10 CFR 55 41.8 / 41.10 / 45.3

Knowledge of the operational implications of the following concepts as they apply to the Station Blackout: Natural circulation cooling.

RO-12 SRO -12

13. 056 AA2.18 001

Given the following conditions:

- Reactor tripped from 100% power due to a loss of offsite power.
- T-HOT as observed on the control room recorder initially drops, then rises over the next several minutes.

Which ONE of the following correctly describes the observed conditions?

- A. This is normal because a ΔT is needed to establish the thermal driving head for Natural Circulation.
- B. This is normal because of the long time delay for AFW to provide water for decay heat removal.
- C. This is abnormal because the Steam Dump System should maintain ΔT approximately zero and T-Hot at 557°F.
- D. This is abnormal and indicates Natural Circulation is NOT being established.

The correct answer is A

- A. Correct - T-hot will lower following a trip then rise to establish ΔT for natural circulation.
- B. Incorrect - AFW will have no effect on T-hot until natural circulation is established.
- C. Incorrect - Steam dumps will also be in-effective until natural circulation is established and will have no initial effect on T-hot.
- D. Incorrect - Students may wish to see T-hot stable or lowering when natural circulation is established. Natural circulation has not yet been established, therefore T-hot lowering would not be observed.

REFERENCES:

ES-0.2 WOG Background Document
ES-0.2

10CFR55.43.5/45.13

Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Reactor coolant temperature, pressure, and PZR level recorders.

RO-13 SRO-13

14. 057 AK3.01 001

Given the following plant conditions:

- Plant is at 100% power.
- All systems operating normally.
- A loss of 120V AC Vital Instrument Power Board 1-I occurs.
- The operating crew implements AOI-25.01, "Loss of 120V AC Vital Instrument Power Board 1-I and 2-I".
- The OAC is directed to ensure control rods in MANUAL.

Which ONE of the following describes the reason control rods are placed in MANUAL?

- A. ✓ Loss of the Tref signal causes control rods to step IN if in AUTO.
- B. Failure of channel I NIS power range instrument causes rods to step IN if in AUTO.
- C. CCP suction shifts from the VCT to the RWST resulting in a boration that causes control rods to move OUT if in AUTO.
- D. MFW reg valve controllers fail causing MFW transients that cool the RCS and cause control rods to move OUT if in AUTO.

The correct answer is A.

- A. *Correct* - AOI-25.03 has operator place rods in MANUAL to prevent outward motion
- B. *Incorrect* - loss of this power supply affects channel I PRM and causes it to fail however, the failure is low and would not affect the auctioneered high signal from NIS power range monitors to the control rod drive system.
- C. *Incorrect* - this action does occur and would result in boration with resultant rod motion in outward direction however this effect is not immediate thus not the primary reason for placing rods in MANUAL
- D. *Incorrect* - MFW reg and MFWP controllers fail however, the reg valves fail closed and would result in heat up of RCS that would result in rods moving in to compensate.

REFERENCES:

AOI-25.03

10CFR55.41.5, 10, 45.6, 45.13

Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital ac electrical instrument bus.

RO-14 SRO-14

15. 062 AA2.03 001

Which ONE of the following correctly describes the required actions of AOI-13, "Loss of ERCW", for a 1-A ERCW supply header rupture in the yard?

- A. Align 1A-A and 2A-A D/G ERCW supplies to the B Train supply headers.
- B. Align 1A-A and 1B-B D/G ERCW supplies to the B Train supply headers.
- C. Align 1B-B and 2B-B D/G ERCW supplies to the B Train supply headers.
- D. Align 2A-A and 2B-B D/G ERCW supplies to the B Train supply headers.

The correct answer is A.

- A. *Correct* - 1A-A and 2A-A are aligned to B train supply.
- B. *Incorrect* - Student may confuse which EDGs are supplied from 1-A header.
- C. *Incorrect* - Student may confuse which EDGs are supplied from 1-A header.
- D. *Incorrect* - Student may confuse which EDGs are supplied from 1-A header.

REFERENCES:

3-OT-AOI1300 p.16

AOI-13 Section 3.4 step 9

10CFR 55.43.5/45,13

Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The valve lineups necessary to restart the SWS while bypassing the portion of the system causing the abnormal condition.

RO - 15 SRO - 15

16. E04 EA2.2 001

Given the following plant conditions:

- A small break LOCA has occurred outside containment.
- The crew transitioned to ECA-1.2, "LOCA Outside Containment" from E-0, "Reactor Trip or Safety Injection".
- RCS pressure is 1750 psig and DROPPING.

Which ONE of the following lists the required procedure transition from ECA-1.2, "LOCA Outside Containment" ?

- A. E-1, "Loss of Reactor or Secondary Coolant".
- B. ES-1.2, "Post LOCA Cooldown and Depressurization".
- C. ES-1.3, "Transfer to Containment Sump".
- D. ECA-1.1, "Loss of RHR Sump Recirculation".

The correct answer is D.

- A. Incorrect - this would be the correct procedure transition when a break is isolated.
- B. Incorrect - examinee may think inventory reduction may be more limited in a LOCA outside containment and transition to ES-1.2 would be appropriate.
- C. Incorrect - as long as the break is unisolated RWST inventory will drop. Examinee may believe that this transition is appropriate to take actions to conserve inventory.
- D. *Correct* - transition to ECA-1.1 is appropriate since the leak remained unisolated inadequate inventory would exist in the sump.

REFERENCE:

Lesson Plan 3-OT-ECA0101

10 CFR 55 41.7 / 45.5 / 45.6

Ability to determine and interpret the following as they apply to the (LOCA Outside Containment): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

RO-16 SRO-16

17. E05 EK1.1 001

Given the following plant conditions:

- The Operating crew is responding to a Loss of AFW in accordance with FR-H.1 "Loss of Secondary Heat Sink".
- The control room crew notes the following:
 - Containment conditions are normal.
 - RCS pressure is 2275 psig
 - SG wide range levels are:

#1	#2	#3	#4
34%	35%	34%	38%
- No AFW pumps can be restored at this time.
- Bleed and Feed is anticipated.

Given these plant conditions, which ONE of the following identifies the operational implication (basis) of stopping the RCPs in accordance with step 9 of FR-H.1 "Loss of Secondary Heat Sink"?

- A. Prevents core uncover and minimize an inadequate core cooling condition.
- B. Establishes natural circulation to enhance the bleed and feed capability of safety injection.
- C. Improves the effectiveness of the remaining water inventory while continuing effort to establish a feed train.
- D. Protects the RCPs from the low pressure caused by the subsequent depressurization of the RCS.

The correct answer is C.

- A. Incorrect - This is the basis for Bleed and Feed. Bleed and Feed conditions have not been satisfied in this question. Student may select this if it is believed that a transfer to Bleed and Feed is required.
- B. Incorrect - Natural circulation will not enhance the Bleed and Feed capability of SI.
- C. *Correct* - RCPs are stopped to prolong the time for establishment of a secondary feed train. The heat input from the RCPs is removed.
- D. Incorrect - RCPs were not initially threatened by low RCS pressure in this event. When the PORV is opened RCS pressure will drop. Student may select this option to protect the RCPs from cavitation.

REFERENCES:

Lesson plan 3-OT-FRH0001 p.14

10CFR55.41.8/41.10/45.3

Knowledge of the operational implications of the following concepts as they apply to the (Loss of Secondary Heat sink) Components, capacity, and function of emergency systems.

RO -17 SRO -17

18. E11 G2.4.21 001

Given the following plant conditions:

- A large break LOCA has occurred.
- 1-FCV-63-72 and 1-FCV-63-73, RHR sump suction valves, failed to open following automatic initiation of sump swapover and could NOT be manually opened.
- RHR and Containment Spray are aligned to the RWST
- The operating crew implemented ECA-1.1, "Loss of RHR Sump Recirculation".
- The STA observes Containment pressure at 6 psig and transition to FR-Z.1 is performed.

Which ONE of the following identifies the procedure that should be used to operate the containment spray pumps and why?

- A. FR-Z.1; maintains full containment spray.
- B. FR-Z.1; because the orange path for FR-Z.1 takes precedence over ECA-1.1.
- C. ECA-1.1; provides for reduced containment spray.
- D. ECA-1.1; because the ECA must be completed prior to implementing an FRI.

The correct answer is C.

- A. Incorrect - FR-Z.1 allows full operation of containment spray. Orange path does exist and FR-Z.1 will be implemented, however ECA-1.1 states that containment spray should NOT be operated in accordance with FR-Z.1.
- B. Incorrect - orange path does exist and FR-Z.1 will be implemented, however ECA-1.1 states that containment spray should NOT be operated in accordance with FR-Z.1.
- C. *Correct* - ECA-1.1 controls containment spray operation until it is aligned to the cntmt sump or RWST makeup is sufficient. Reduces Containment spray to conserve the RWST inventory.
- D. Incorrect - examinee may confuse ECA-1.1 with ES-1.3, "Transfer To Containment Sump" which is a higher priority than the FRIs, however ECA-1.1 states that containment spray should NOT be operated in accordance with FR-Z.1.

REFERENCE:

INPO Bank - Diablo Canyon 10/01/2002

Lesson Plan 3-OT-ECA0101

ECA-1.1, "Loss of RHR Sump Recirculation"

10 CFR 55 43.5 / 45.12

Knowledge of the parameters and logic used to assess the status of safety functions including; 1. Reactivity control; 2. Core cooling and heat removal; 3. Reactor coolant system integrity; 4. Containment conditions; 5. Radioactivity release control.

RO-18 SRO-18

19. 005 AK1.03 001

Given the following plant conditions:

- Unit is currently at 80% RTP.
- Control bank D rods are at 180 steps.
- The crew identifies one control rod in D bank at 155 steps.
- The misaligned rod has been declared inoperable.

Which ONE of the following describes a concern associated with the inoperable rod if left uncorrected?

- A. Xenon buildup will have the greatest affect on core power distribution in the first hour.
- B. Xenon burnout will have the greatest affect on core power distribution in the first hour.
- C. Xenon buildup will have the greatest affect on core power distribution after the first hour.
- D. Xenon burnout will have the greatest affect on core power distribution after the first hour.

The correct answer is C.

- A. Incorrect - Xenon will build in during the first hour but will have only a limited affect on core power distribution.
- B. Incorrect - Burnout at the affected location should not be occurring.
- C. *Correct* - if left uncorrected Xenon will continue to build until peak value is reached in ~6 - 8 hrs and core power distribution will be affected the most.
- D. Incorrect - Xenon will not burn out in the area of the inoperable rod.

REFERENCES:

Lesson plan 3-OT-TAA008; AOI-2; 3-OT-AOI0200

10CFR55 41.8, 10, 45.3

Knowledge of the operational implications of the following concepts as they apply to Inoperable / Stuck control Rod: Xenon transient.

RO - 19 SRO - 19

20. 024 AK2.01 001

The following alternate flowpaths for Immediate Boration are provided in AOI-34, "Immediate Boration", for use if the normal flowpath through the Boric Acid Blender is NOT injecting boric acid:

1. Align CCP suction from the RWST
2. Manual boration using 1-ISV-62-929
3. Emergency borate valve 1-FCV-62-138

Which ONE of the following is the priority sequence in which these alternate flowpaths are directed to be attempted by AOI-34 until adequate boration flow is established?

- A. 3, 2, 1
- B. 2, 1, 3
- C. 2, 3, 1
- D. 1, 2, 3

The correct answer is A.

- A. *Correct* - This is the order of priority given in AOI-34.
- B. *Incorrect* - Student may confuse order.
- C. *Incorrect* - Student may confuse order.
- D. *Incorrect* - Student may confuse order.

REFERENCES:

Lesson Plan 3-OT-AOI3400 p. 8-9

10 CFR55.41.7/45.7

Knowledge of the interrelations between the Emergency Boration and the following: Valves.

RO - 20 SRO - 20

21. 037 AK3.06 001

Given the following plant conditions:

- The operating crew is responding to a tube leak in accordance with AOI-33, "Steam Generator Tube Leak".
- Chemistry reports at 0815 that S/G #1 tube leakage is .07 gpm.
- At 0845 S/G tube leakage is reported to be .08 gpm.
- At 0915 S/G tube leakage is reported to be .09 gpm.

Which ONE of the following describes the action and basis for this event? (use the references provided)

- A. Shutdown to $\leq 50\%$ power within one hour and be in MODE 3 within the next 2 hours to minimize the possibility of exceeding the 10 CFR100 limits at the site boundary.
- B. Shutdown to $\leq 50\%$ power within one hour and be in MODE 3 within the next 2 hours to prevent the crack propagation into a tube rupture.
- C. Shutdown to MODE 3 within the next 24 hours to minimize the possibility of exceeding the 10 CFR100 limits at the site boundary.
- D. Shutdown to MODE 3 within the next 24 hours to prevent the crack propagation into a tube rupture.

The correct answer is D.

- A. Incorrect - The rise in leak rate is less than 30 gpd/hr so this action does not apply. Basis statement also incorrect.
- B. Incorrect - the rise in leak rate is less than 30 gpd/hr so this action does not apply. Basis statement correct.
- C. Incorrect - Action statement correct, basis statement incorrect.
- D. *Correct* - Action statement and basis match AOI-33 actions.

REFERENCES:

Lesson plan 3-OT-AOI3300

10CFR55 41.5, 10, 45.6, 13

Knowledge of the reasons for the following responses as they apply to Steam Generator Tube Leak: Normal operating precautions to preclude or minimize SGTR.

RO - 21 SRO - 21

22. 051 AA2.02 001

Given the following plant conditions:

- Turbine load is 600 MW.
- Condenser backpressure is 4.0" Hga.

Which ONE of the following is the MAXIMUM condenser backpressure allowed by procedure if turbine load is to be raised greater than 600 MW?

- A. 3.5 in. Hga
- B. 4.5 in. Hga
- C. 5.5 in. Hga
- D. 6.2 in. Hga

The correct answer is C.

- A. Incorrect - this setpoint is the maximum allowed by AOI-11 for turbine load $\geq 365\text{MW}$ (~30%).
- B. Incorrect - this value is halfway between the setpoints for 30 and 50% turbine load.
- C. *Correct* - this value is the maximum allowed for operation $\geq 600\text{MW}$ (~50%) turbine load in accordance with AOI-11.
- D. Incorrect - this setpoint is the maximum allowed by AOI-11 for turbine load $\geq 1050\text{MW}$ (~90%).

REFERENCE:

WBN Bank AOI1100.02 003

AOI-11, Loss of Condenser Vacuum

Lesson Plan 3-OT-AOI1100

10CFR 55 43.5 / 45.13

Ability to determine and interpret the following as they apply to the Loss of Condenser vacuum: Conditions requiring reactor and/or turbine trip.

RO-22 SRO-22

23. 061 G2.4.11 001

Given the following conditions:

- Unit 1 at 100% RTP.
- Several Auxiliary Building Area Radiation Monitors rise to the alarm setpoint.

Which ONE of the following actions should be taken?

- A. Ensure the Aux Bldg Gen Exhaust Fan running.
- B. Use the PA to evacuate the Auxiliary Building.
- C. Activate the plant emergency alarm and initiate plant assembly.
- D. Initiate a Containment Vent Isolation (CVI).

The correct answer is B

- A. Incorrect - AOI-31 will have the operator check this fan stopped. Student may want to have this fan running to provide ventilation of particulate activity.
- B. *Correct* - AOI-31 step 1 of section 3.2 has the operator evacuate the affected area.
- C. Incorrect - AOI-31 will have the crew refer to EIPs but does not force an emergency alarm or plant assembly.
- D. Incorrect - CVI is initiated in section 3.3, this section initiates an ABI.

Reference:

AOI-31 Section 3.2

10CFR55 41.10/43.5/45.13

Knowledge of abnormal condition procedures.

RO- 23 SRO-23

24. E01 EA1.1 001

Given the following conditions:

- Reactor Trip and Safety Injection have occurred.
- The Unit Supervisor has implemented ES-0.0, "Rediagnosis".
- During performance of ES-0.0, the following indications are observed:
 - RCS temperature 500°F and slowly DROPPING.
 - All S/G pressures 450 psig and slowly DROPPING.
 - All S/G levels are < 5% NR and DROPPING.
 - AFW providing 200 gpm to each S/G.
 - MSIV's are OPEN.
 - NAUO's have been dispatched to locally close MSIV's.
 - Pzr level is offscale LOW.
 - Pzr pressure is 900 psig and DROPPING.

Which ONE of the following procedures will ES-0.0 direct the crew to implement?

- A. FR-H.1, "Loss of Secondary Heat Sink".
- B. E-1, "Loss of Reactor or Secondary Coolant".
- C. E-2, "Faulted Steam Generator Isolation".
- D. ECA-2.1, "Uncontrolled Depressurization of All Steam Generators".

The correct answer is C.

- A. Incorrect - examinee may select this procedure based upon S/G levels < 10% NR.
- B. Incorrect - examinee may select this procedure based upon loss of Pzr level and dropping RCS pressure. RCS pressure, Pzr level, and RCS temp drop is due to depressurization of all S/G. The procedure transition to E-1 is sequenced after the transition to ECA-2.1.
- C. Incorrect - examinee may select this procedure based upon dropping S/G parameters. Should relate the closed MSIVs to depressurization of all S/Gs.
- D. *Correct* - with the stated parameters and MSIVs closed depressurization of S/Gs is indicated and indicates a transition to ECA-2.1.

REFERENCES:

Lesson Plan 3-OT-EOP000
ES-0.0, "Rediagnosis

10CFR55 41.7 / 45.5 / 45.6

Ability to operate and / or monitor the following as they apply to the (Reactor Trip or Safety Injection/Rediagnosis: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes and automatic and manual features.

RO-24 SRO-24

25. E02 EK1.1 001

Given the following plant conditions:

- Watts Bar has had a Reactor trip and Safety Injection.
- The crew has transitioned to ES-1.1, "SI Termination" and is currently performing step 4, which states, "if two charging pumps are running then stop one charging pump and place in A-Auto".

Which ONE of the following describes the basis per ES-1.1, "SI Termination" for securing one of two running charging pumps?

- A. To prevent pressurizer overfill which may force an undesirable transition to FR-1.1, "High Pressurizer Level".
- B. To allow parallel alignment and restart of the stand-by pump after a normal charging flowpath is established in step 6.
- C. To determine if one charging pump is sufficient to make-up for RCS shrink or break flow.
- D. To determine if pressurizer level is under the control of the operator and if it is NOT then a transition to ES-1.2, "Post LOCA Cooldown and Depressurization", is made.

The correct answer is C.

- A. Incorrect - With two charging pumps running and SI termination criteria met there may be some concern of a PZR overfill however this is not the reason for stopping the pump.
- B. Incorrect - Step aligns the remaining running charging pump to normal charging path. The stand-by pump will not be restarted.
- C. *Correct* - One charging pump is secured to ensure that RCS is under the control of the operator and that in fact SI Termination criteria have been met. One charging pump should be capable of maintaining RCS conditions stable.
- D. Incorrect - If PZR level cannot be maintained then a transition to E-1 would be made.

REFERENCES:

Lesson plan 3-OT-EOP0100
EOI ES-1.1 SI Termination
WOG background document for ES1.1

10CFR55 41.8, 10, 45.3

Knowledge of the operational implications of the following concepts as they apply to the (SI Termination): Components, capacity and function of emergency systems.

RO - 25 SRO - 25

26. E08 G2.4.2 001

Given the following temperature and pressure history:

<u>Time</u>	<u>Cold Leg Temps</u>	<u>RCS pressure</u>
0000	363°F	1100 psig
0030	338°F	955 psig
0100	265°F	790 psig
0130	235°F	710 psig

Using the attached critical safety function status tree (FR-P), which ONE of the following identifies the functional restoration procedure, if any, that the STA should have recommended at time 0100? (Consider only the information provided)

- A. FR-P.1 (Red Path)
- B. FR-P.1 (Orange Path)
- C. ✓ FR-P.2 (Yellow Path)
- D. Status tree satisfied (Green Path)

The correct answer is C.

- A. Incorrect - cooldown <100°F in last hour and cold leg temp > 240°F.
- B. Incorrect - Cold leg temps > 240°F.
- C. *Correct* - Cooldown < 100°F, RCS temp > 350°F, pressure > cold over pressure limit but < 240°F.
- D. Incorrect - pressure > cold overpressure limit.

REFERENCES:

Lesson Plan 3-OT-FRP0001
FR-0 "Status Trees"

10CFR55.41.7, 45.7, 8

Knowledge of system setpoints, interlocks and automatic actions associated with EOP entry conditions. Note: the issue of setpoints and automatic safety features is not specifically covered in the system sections.

RO-26 SRO-26

27. E15 EK3.3 001

Given the following conditions:

- The unit has tripped from 100% power.
- Phase B Containment Isolation has been initiated.
- FR-Z.2, "Containment Flooding", has been entered.

Which ONE of the following identifies the reason it is important to identify and isolate the source of flooding that has caused level to exceed 83%.

- A. The high level will lower the effectiveness of the ice condenser to remove heat.
- B. Plant components necessary for recovery could be damaged or rendered inoperable.
- C. Will lead to an overpressure condition that could challenge containment integrity.
- D. Will cause excessive backpressure on recirculation sump isolation valves and hinder or prevent sump swapover actions.

The correct answer is B.

- A. Incorrect - containment level should not approach a point where it would block flow through the ice condenser. An Examinee that is not familiar with physical design of the ice condenser and containment may select this distracter.
- B. *Correct* - components and instrumentation needed for orderly and safe plant shutdown are above design flood level. Flooding above that level could impact those components.
- C. Incorrect - since level will reduce total volume in containment pressure some increased pressure may be expected. Examinee may think pressure rise would be excessive due to the volume reduction.
- D. Incorrect - head pressure caused by the excessive flooding may be greater than expected however, not enough to interfere with operation of these valves.

REFERENCES:

Lesson Plan 3-OT-FRZ0001 p. 12

FR-Z.2

WOG background document p.2 FR-Z.2

10CFR55.41.5/41.10/45.6/45.13

Knowledge of the reasons for the following responses as they apply to the (Containment Flooding): Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.

RO-27 SRO-27

28. 003 K3.03 001

Given the following plant conditions:

- Unit was operating at 40% power when the #4 Reactor Coolant Pump (RCP) lower bearing temperature began to steadily RISE.
- Power was reduced to 8% and the #4 RCP stopped.

Which ONE of the following statements identifies the operator response necessary when the RCP was stopped?

Feedwater flow to #4 steam generator (SG) will be controlled by the:

- A. MFW reg valve and will be less than the flow to the other 3 SGs.
- B. MFW reg valve and will be greater than the flow to the other 3 SGs.
- C. MFW bypass reg valve and will be less than the flow to the other 3 SGs.
- D. MFW bypass reg valve and will be greater than the flow to the other 3 SGs.

The correct answer is C.

- A. Incorrect - MFW flow should be controlled by the bypass regs at this power, however flow would be reduced as steam flow decreased.
- B. Incorrect - MFW flow should be controlled by the bypass regs at this power, and flow must be reduced as steam flow decreased.
- C. *Correct* - MFW flow would be controlled by the bypass regs at this power and the flow must be reduced as steam flow decreased.
- D. Incorrect - MFW flow would be controlled by the bypass regs, however flow must be reduced as steam flow decreased.

REFERENCES:

Lesson Plan 3-OT-AOI0500 p.6
AOI-5

10CFR55.41.7/45.6

Knowledge of the effect that a loss or malfunction of the RCPs will have on the following: Feedwater and emergency feedwater.

RO-28 SRO-28

29. 004 K6.07 001

1-TCV-70-192, Letdown HX Temp control Valve, fails due to a broken air line.

Assuming NO actions taken by the operating crew, which ONE of the following describes the effect of this failure on the plant?

- A. Letdown temperature goes UP; the RISE in letdown temperature causes the letdown demineralizers to remove more boron, resulting in a minor dilution.
- B. ✓ Letdown temperature goes DOWN; the LOWERING of letdown temperature causes the letdown demineralizers to remove more boron, resulting in a minor dilution.
- C. Letdown temperature goes UP; the RISE in letdown temperature causes the letdown demineralizers to release boron, resulting in a minor boration.
- D. Letdown temperature goes DOWN; the LOWERING of letdown temperature causes the letdown demineralizers to release more boron, resulting in a minor boration.

The correct answer is B.

- A. Incorrect - Letdown temperature goes down.
- B. *Correct* - Mixed bed demineralizers will remove more boron when the inlet temperature is lowered causing a minor dilution.
- C. Incorrect - Letdown temperature goes down.
- D. Incorrect - Dilution will occur.

REFERENCES:

Lesson plan 3-OT-SYS062A p. 61
Lesson plan 3-OT-SYS70A p.28
INPO exam bank Indian Point 3/10/2003

10CFR55 41.7, 45.7

Knowledge of the effect of a loss or malfunction on the following CVCS components: Heat exchangers and condensers.

RO - 29 SRO - 29

30. 005 K6.03 001

The operating crew is responding to a "Loss of CCS to RHR System" in accordance with AOI-14, "Loss of Shutdown Cooling". Step one (1) requires the operators to stop the affected RHR pump.

Which ONE of the following identifies why the operating crew is directed to stop the affected RHR pump?

- A. To prevent severe steam hammer in CCS.
- B. To prevent the heat-up of the entire RHR loop.
- C. To prevent cavitation of the affected RHR pump.
- D. To prevent seal failure of the affected RHR pump.

The correct answer is A.

- A. *Correct* - If RHR flow were continued, the HX would heat-up with the RHR loop. Steam could then form on the CCS side of the HX and a steam hammer event when CCS re-started.
- B. *Incorrect* - Student may confuse this distractor and not want the entire RHR loop to heat-up with the core.
- C. *Incorrect* - Student may believe increased heat at the suction will lead to cavitation and select this distractor.
- D. *Incorrect* - RHR seal packages are sensitive to heat and student may select to prevent pump failure.

REFERENCES:

Lesson Plan 3-OT-AOI1400 p.22

10CFR55.41.7/45.7

Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: RHR heat exchanger.

RO-30 SRO-30

31. 006 K5.09 001

Given the following plant conditions:

- A Reactor Trip and Safety Injection have occurred.
- Appropriate actions in accordance with E-0, "Reactor Trip or Safety Injection", E-1, "Loss of Reactor or Secondary Coolant", and ES-1.3, "Transfer To Containment Sump" have been completed.
- RCS pressure is stable at 50 psig.
- ECCS is operating in cold leg recirculation mode.

Which ONE of the following statements describes the primary method of long term decay heat removal?

- A. Heat transfer from Reflux boiling in the S/Gs.
- B. Heat transfer between the RCS and the S/Gs due to natural circulation flow.
- C. Heat transfer between the RCS and the S/Gs due to forced circulation flow.
- D. Heat transfer from the injection of water from the containment sump and the removal of steam/water out of the break.

The correct answer is D.

- A. Incorrect - S/G are heat source in large break LOCA event.
- B. Incorrect - S/G are heat source in large break LOCA event.
- C. Incorrect - S/G are heat source in large break LOCA event.
- D. *Correct* - Injection flow and break flow are cooling the core.

REFERENCES:

Lesson plan 3-OT-TAA013 p. 8
UFSAR section 15.4-2

10CFR55.41.5/45.7

Knowledge of the operational implications of the following concepts as they apply to ECCS: Thermodynamics of water and steam, including subcooled margin, superheat, and saturation.

RO-31 SRO-31

32. 007 K5.02 001

Operators are in the process drawing a pressurizer bubble following vacuum refill of the RCS in accordance with GO-10, "Reactor Coolant System Drain and Fill Operations. GO-10 has a CAUTION, warning the operator to ensure that PRT (Pressurizer Relief Tank) conditions are returned to normal before exceeding 85 psig RCS pressure.

Which ONE of the following describes the operational implication of this CAUTION?

- A. Establishing normal conditions in the PRT will preclude damage to the PRT rupture disk.
- B. Establishing normal conditions in the PRT will preclude damage to the waste gas header since it normally operates at much less than 85 psig.
- C. Establishing normal conditions in the PRT will allow operations to monitor PZR reliefs and safeties for seat leakage before pressure exceeds 85 psig.
- D. Establishing normal conditions in the PRT will preclude vacuum collapse damage to the PRT if an RCS cooldown were initiated prior to establishing a PZR bubble.

The correct answer is A.

- A. *Correct* - The two rupture disks on the PRT are designed to relieve pressure at approximately 85 psig.
- B. *Incorrect* - the PRT is isolated from the waste gas header at 8 psig by PCV-68-301.
- C. *Incorrect* - It may or may not be possible to determine any seat leakage at this RCS pressure or temperature.
- D. *Incorrect* - Tank is designed for full vacuum.

REFERENCES:

GO-10 p.136

3-OT-SYS068C p.35

10CFR55 41.5, 45.7

Knowledge of the operational implications of the following concepts as they apply to PRTS: Method of forming a steam bubble in the PZR.

RO - 32 SRO - 32

33. 008 K1.04 001

Given the following initial conditions in the Component Cooling System :

- Unit 1 SURGE LEVEL HI/LO annunciation in alarm.
- Side A level, 1-LI-70-63A, is 87% and RISING.
- Side B level, 1-LI-70-69A, is 87% and RISING.
- U-1 Surge Tank makeup valve, 1-LCV-70-63A CLOSED.

The CRO observes the following alarms associated with CCS.

- RCP THRM BAR RET HDR TEMP HI.
- RCP THRM BAR RET HDR FLOW LO.
- RCP1 THRM BAR RET FLOW LO.

Which ONE of the following describes the automatic actions that would be indicated by these alarms?

- A. Surge tank vent closed due to high return flowrate from the RCP's thermal barrier.
- B. Surge tank vent closed due to a high return temperature from RCP's thermal barrier.
- C. RCP thermal barrier heat exchanger inlet and discharge valves closed due to high return temperature.
- D. RCP thermal barrier heat exchanger inlet and discharge valves closed due to high differential flowrate.

The correct answer is D.

- a. Incorrect - high return flow may cause alarms but will not close the surge tank vents, they close on high radiation.
- b. Incorrect - high return temperature from RCP's thermal heat exchanger would indicate a leak and generate annunciation but not close the vent.
- c. Incorrect - High temperature would not close the Thermal Barrier isolation.
- d. *Correct* - high differential flowrate would indicate a leak in the thermal barrier heat exchanger and cause its isolation valves to close.

REFERENCE:

WBN Bank SYS070A.08 007

AOI-15, "Loss of Component Cooling Water"; Lesson plan 3-OT-AOI1500

10CFR50 41.2-41.9 / 45.7-45.9

Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: RCS, in order to determine source(s) of RCS leakage into the CCWS.

RO - 33 SRO - 33

34. 008 G2.4.18 001

Given the following plant conditions;

- A LOCA has occurred.
- Crew has implemented E-0, "Reactor Trip or Safety Injection".
- Containment pressure is 6 psig.
- 6.9KV Shutdown Board 1A-A has a fault and is de-energized.
- RCS pressure is 1650 psig.
- All systems responded normally to automatic actuation signals.
- The operator was directed to stop all RCPs.

Which ONE of the following describes the BASIS for stopping the RCPs?

- A. Phase A signal causes isolation of CCS cooling to RCP oil cooler.
- B. Phase A signal causes isolation of CCS cooling to RCP thermal barrier.
- C. Phase B signal causes isolation of CCS cooling to the RCP oil cooler.
- D. Phase B signal causes isolation of CCS cooling to RCP thermal barrier.

The correct answer is C.

- a. Incorrect - examinee may confuse components affected by Phase A or Phase B. Phase A does NOT isolate CCS to RCP oil coolers.
- b. Incorrect - examinee may confuse components affected by Phase A or Phase B. Phase A does not isolate CCS to the RCP thermal barrier.
- c. *Correct* - Phase B isolates CCS cooling water to the RCP oil coolers which could result in damage to the RCPs.
- d. Incorrect - A loss of CCS to the RCP thermal barrier would not require RCP shutdown. Phase B does isolate CCS cooling to the RCP thermal barrier, however is not the basis for stopping RCPs.

REFERENCE:

E-0, "Reactor Trip or Safety Injection"; 3-OT-EOP0000.

10CFR50 41.10 / 45.13

Component Cooling Water System: Knowledge of the specific bases for EOPs.

RO - 34 SRO - 34

35. 010 K5.01 001

Which ONE of the following lists the PZR liquid space temperature at which a steam bubble will start to form in the Pressurizer with PRT pressure at 3.8 psig and one PZR PORV open?

- A. 151°F
- B. 168°F
- C. 224°F
- D. 272°F

The correct answer is C.

- A. Incorrect - This is the temperature for saturation at 3.8 psia. Student may not convert 3.8 psig to psia.
- B. Incorrect - Incorrect reading of the steam table.
- C. *Correct* - From table 1 of steam tables this is the Temperature at which steam will begin to form at 6 psia.
- D. Incorrect - Incorrect reading of the steam table.

REFERENCES:

Lesson plan 3-OT-GFET003
GO-10 RCS Drain and Fill

10CFR55 41.5, 45.7

Knowledge of the operational implications of the following concepts as they apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables.

RO - 35 SRO - 35

36. 012 K4.09 001

Which ONE of the following describes the method used to ensure separation of control and protection functions of Eagle-21 Reactor Protection System?

- A. ✓ Signals sent to the control circuits from Eagle-21 are sent through isolation devices.
- B. Control and Protection circuits in Eagle-21 receive signals from independent transmitters.
- C. Signals sent to the Eagle 21 from control circuits are sent through isolation devices.
- D. Eagle-21 receives input signals from the control circuits output after it has been verified accurate by the loop processor subsystem.

The correct answer is A.

- A. *Correct* - Signal send to control functions are sent from Eagle-21 through an isolation device.
- B. *Incorrect* - The same transmitter is used.
- C. *Incorrect* - Signals are used in control circuits after Eagle-21 protection.
- D. *Incorrect* - Eagle-21 gets the signal direct from the transmitter.

REFERENCES:

Lesson plan 3-OT-SYS099b p.9

10CFR55 41.7 / 45.7

Knowledge of the RPS design feature(s) and/or interlock(s) which provide for the following: Separation of control and protection circuits.

RO - 36 SRO - 36

37. 013 K3.02 001

Given the following plant conditions:

- Unit 1 is at 100% RTP
- All control systems are in AUTO maintaining normal plant parameters.
- An inadvertent Train 'A' SI signal has actuated.

Based upon the conditions stated, which ONE of the following is the expected effect on the Reactor Coolant System and resultant SSPS actuation? (Assume NO operator action is taken)

- A. HIGH pressurizer level will cause Reactor Trip Breaker 'A' to open.
- B. LOW pressurizer pressure will cause Train 'B' SI equipment to AUTO start.
- C. HIGH pressurizer pressure will cause Reactor Trip Breaker 'B' to open.
- D. HIGH containment pressure will cause Train 'B' SI equipment to AUTO start.

The correct answer is D.

- A. Incorrect - Reactor trip breaker 'A' will be opened by the Train 'A' SI. After Rx trip PZR pressure will go high and generate a trip signal.
- B. Incorrect - Pressure normally drops following a Rx trip and SI however charging injection will cause pressure to go high. There will not be a signal to the Train 'B' SI.
- C. Incorrect - A high PZR pressure signal will be generated but will not cause the reactor trip breaker to open since the SI has already opened the breaker.
- D. *Correct* - Train 'A' SI will trip the reactor, Charging injection will fill the PZR, PORVs and Safeties will fill and rupture the PRT, and SI will auto actuate on high containment pressure.

REFERENCES:

Lesson plan 3-OT-SYS063A

10CFR55 41.7, 45.6

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

RO - 37 SRO - 37

38. 022 A2.03 001

Containment temperature is 120°F and RISING.

Which ONE of the following is the correct order for implementation of additional methods to cool lower containment per the annunciator response instruction (ARI) 104-B LWR CNTMT TEMP HI?

1. Containment air return fans.
2. Containment Spray.
3. CRDM cooling fans.

A. 1,3,2

B. 2,1,3

C. 3,1,2

D. 3,2,1

The correct answer is C.

- A. Incorrect - List containment air return fans first. This would reduce the ice contained in the containment and would be less desired than the start of CRDM fans in the supplemental cooling mode.
- B. Incorrect - Selects containment spray first. Exposes containment to water environment and is less desired than CRDM supplemental cooling.
- C. *Correct* - CRDM supplemental cooling is the preferred method, followed by air return fans, then containment spray.
- D. Incorrect - Containment air return fans are preferred over containment spray.

REFERENCES:

Lesson plan 3-OT-SYS030C
ARI 104-A, 104-B

10CFR55 41.5/43.5/45.3/45.13

Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Fan motor thermal overload /high-speed operation.

RO - 38 SRO - 38

39. 025 K6.01 001

Which ONE of the following describes the problem with excessive frost build-up in the ice condenser system.

- A. Frost build-up may accelerate the process of sublimation which will raise post accident sump level.
- B. Frost build-up may restrict ice condenser door operation and result in a degradation of the ice condenser effectiveness.
- C. Frost may raise the pH of the water in the containment sump above the Tech Spec limit during a LOCA event.
- D. Frost may dilute the boron concentration of the water in the containment sump below the Tech Spec limit during a LOCA event.

The correct answer is B.

- A. Incorrect - sublimation could possibly lower Contmt sump level.
- B. *Correct* - frost build up on ice condenser doors could impede their proper operation.
- C. Incorrect - any frost formed would be made up of steam from primary or secondary leaks and should be at a pH of ~7.0 and would only tend to lower pH in the sump since ice is maintained at a pH of 9.0 - 9.5.
- D. Incorrect - there is no Tech Spec limit on the Contmt Sump boron concentration during a LOCA. Examinee may confuse this with the fact that there is a Tech Spec limit on the ice.

REFERENCES:

Lesson plan 3-OT-SYS061A
INPO Bank DC Cook 7/07/97

10CFR55 41.7/45.7

Knowledge of the effect of a loss or malfunction of the following will have on the ice condenser system: Upper and lower door of the ice condenser.

RO - 39 SRO - 39

40. 025 G2.1.7 001

Given the following plant conditions:

- Plant is at 100% power.
- Annunciator window 144-A, ICE COND INLET DOOR OPEN is LIT.

Which ONE of the following describes how the operator determines the status of ice condenser inlet doors?

- A. Dispatch an NAUO to the Ice Condenser to locally check door status.
- B. Dispatch an NAUO to check the Ice Condenser Door Status panel located in the incore instrument room.
- C. Check the Ice Condenser Door Status using an ICS terminal in the main control room.
- D. Check the Condenser Door Status panel located on 1-M-10 in the main control room.

The correct answer is D.

- A. Incorrect - during shutdown, individual conducting activities in the ice condenser may not close doors completely resulting in alarm. Lower doors are not accessible at power as are the intermediate and top deck doors.
- B. Incorrect - the status panel located in the incore instrument room is for monitoring ice condenser air handling unit backdraft damper status.
- C. Incorrect - ice condenser inlet doors are not monitored by ICS as are most other plant components.
- D. *Correct* - ice condenser inlet door status is indicated on this panel in the main control room

REFERENCE:

ARI-138-144

10 CFR 55 43.5 / 45.12 / 45.13

Changed K/A from 025 G2.1.9 to 025 G2.1.7 per Ron Aiello.

Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.

RO - 40 SRO - 40

41. 026 K3.02 001

Given the following plant conditions:

- 1200 - The operating crew is responding to a LOCA.
- 1225 - ES-1.3 "Transfer to Containment Sump" is in progress.
- 1235 - RWST level has reached 8% and spray pumps are placed in PULL-TO-LOCK.
- 1240 - Attempts to establish containment spray recirculation flow have been unsuccessful.
- The crew suspects containment spray recirc sump blockage.
- 1241 - Step 27 of ES-1.3 directs transition to ECA 1.1 "Loss of RHR Sump Recirculation", however containment pressure is 11 psig and FR-Z.1, "High Containment Pressure", is implemented.
- 1250 - The crew reaches Step 10 of FR-Z.1 "High containment Pressure", to determine if RHR spray should be placed in service.

Which ONE of the following statements is correct concerning RHR spray?

RHR spray may NOT be started:

- A. Until containment pressure reaches 13.5 psig.
- B. Until the crew verifies both CCPs and SIPs running.
- C. Because the RHR pump is aligned to the containment sump.
- D. Because RHR injection flow is still needed for emergency core cooling.

The correct answer is D.

- A. Incorrect - The pressure requirement is 9.5 psig or greater. Student may confuse 13.5 psig for the pressure required in the status tree for a RED path in containment.
- B. Incorrect - Procedure requires only one CCP and one SIP to be running, and one hour elapsed.
- C. Incorrect - RHR pump suction MUST be aligned to the containment sump to allow RHR spray.
- D. *Correct* - RHR spray flow is not permitted in the first hour following the accident because RHR injection is needed for core cooling.

REFERENCES:

Lesson Plan 3-OT-FRZ0001

FR-Z.1

10CFR55.41.7/45.6

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

Recirculation spray system.

RO-41 SRO-41

42. 039 K4.06 001

Which ONE of the following describes how the Main Steam System design provides protection against blowdown of ALL S/Gs in the event one S/G is faulted inside containment?

- A. ALL MSIVs receive a close signal when actuated by Phase B Containment Isolation.
- B. ✓ ALL MSIVs receive a close signal when actuated by High-High Containment pressure.
- C. Only affected S/G MSIV will receive a close signal when actuated by Phase B Containment Isolation.
- D. Only affected S/G MSIV will receive a close signal when actuated by High-High Containment pressure.

The correct answer is B.

- A. Incorrect - closure of all MSIVs provide protection for the stated conditions however Phase B signal does not close MSIVs. Examinees may confuse the actuation signals since Phase B is actuated by High High containment pressure.
- B. *Correct* - closure of all MSIVs provide protection for the stated conditions and are closed by High High Containment pressure signal.
- C. Incorrect - High-High Containment Pressure signal closes all four MSIVs.
- D. Incorrect - High-High Containment Pressure signal closes all four MSIVs.

REFERENCES:

Lesson Plan 3-OT-SYS002A p.15&20
FSAR 10.3-3
Main Steam system description p. 27

10CFR55.41.7

Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following: Prevent reverse steam flow on steam line break.

RO-42 SRO-42

43. 056 A2.04 001

Given the following plant conditions:

- Unit 1 was operating at 90% power.
- The suction pipe of the 'A' Hotwell pump ruptured.
- The unit tripped and all systems responded as designed with the exception that the crew was unable to start any AFW pumps.
- The crew has performed the immediate actions of E-0, "Reactor trip or Safety Injection".
- Crew has just transitioned to ES-0.1, "Reactor Trip Response".
- S/G narrow range levels are 13% and dropping.

Which ONE of the following identifies how the crew will transition from ES-0.1, "Reactor Trip Response" to FR-H.1 "Loss of Secondary Heat Sink" ?

- A. Immediately from the foldout page.
- B. At step 3 if AFW can not be established.
- C. From the foldout page when all S/G narrow range levels are less than 10% only.
- D. When all S/G narrow range levels are less than 10%, and the STA completes the next update of FR-0, "Status Trees".

The correct answer is C.

- A. Incorrect - FR-H.1 entry requires NR level less than 10% with no feed flow. Levels at 13% do not meet entry requirements.
- B. Incorrect - Step 3 requires the operators to verify less than 10% level before a transition to FR-H.1
- C. *Correct* - When NR levels go below 10% the operators should transition to FR-H.1
- D. Incorrect - The crew should not wait on the STA to complete status tree monitoring but should transition off the foldout page.

REFERENCES:

ES-0.1 Foldout page.

TI-12.0) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps.

RO-43 SRO-43

44. 059 A3.02 001

The unit was operating at 80% power with all systems operating normally when PRM-142 fails LOW.

Which ONE of the following lists how S/G NR levels will change?

- A. S/G 1 drops ~18%.
- B. S/G 2 drops ~22%.
- C. S/G 3 drops ~18%.
- D. S/G 4 drops ~22%.

The correct answer is C.

- a. Incorrect - S/G 1 is not affected by failure of N-142, however the amount of change corresponds to the correct value.
- b. Incorrect - S/G 2 is affected by failure of N-142, however this is an incorrect value for the change in level. Value is based upon 100% power.
- c. *Correct* - S/G 3 is affected by failure of N-142 and level is reduced to the zero power setpoint of 38%.
- d. Incorrect S/G 4 is not affected by failure of N-142. Value is based upon 100% power.

REFERENCES:

3-OT-SYS003A; SOI-2 & 3.01, "Condensate and Feedwater System".

10 CFR 55 41.7 / 45.5

Ability to monitor automatic operation of the MFW, including: Programmed level of the S/G.

RO-44 SRO-44

45. 061 K2.02 001

Given the following conditions:

- The unit has just tripped.
- AFW Pumps are maintaining SG levels.
- 6.9 KV Shutdown Board 1A-A trips on bus differential relay operation.

Which ONE of the following describes how AFW will be supplied to the steam generators?

- A. SG 1 & 3 supplied by TD AFW pump, SG 2 & 4 supplied by A-A AFW pump.
- B. SG 3 & 4 supplied by TD AFW pump, SG 1 & 2 supplied by B-B AFW pump.
- C. SG 1 through 4 supplied by TD AFW pump, SG 1 & 2 supplied by A-A AFW pump.
- D. SG 1 through 4 supplied by TD AFW pump, SG 3 & 4 supplied by B-B AFW pump.

The correct answer is D.

- A. Incorrect - TD AFW pump supplies all 4 S/Gs, S/Gs 2&4 are supplied by different MD AFW pumps. A-A MD AFW pump has no power.
- B. Incorrect - TD AFW pump supplies all 4 S/Gs, S/Gs 2&4 are supplied by different MD AFW pumps. A-A MD AFW pump has no power.
- C. Incorrect - S/Gs 1&2 are supplied by the A-A MD AFW pump that is without power due to lockout of 6.9 KV Shutdown board 1A-A.
- D. *Correct* - TD AFW pump supplies all S/Gs and B-B supplies S/Gs 3&4.

REFERENCES:

3-OT-SYS003

10CFR55.41.7

Knowledge of the bus power supplies to the following:
AFW electric driven pumps.

RO-45 SRO-45

46. 062 K2.01 001

Which ONE of the following describes how the loads on the 120 VAC instrument panel 1-II NORMALLY receive power?

- A. 125 VDC from vital battery board II; rectified to 120 VAC.
- B. 125 VDC from vital battery board II; inverted to 120 VAC.
- C. 480 VAC from Shutdown Board; inverted to 125 VDC and rectified to 120 VAC.
- D. 480 VAC from Shutdown Board; rectified to 125VDC and inverted to 120 VAC.

The correct answer is D.

- A. Incorrect - Battery board II is the back-up power supply but it is not rectified.
- B. Incorrect - Battery board II is the back-up power supply .
- C. Incorrect - 480 VAC from Shutdown board is rectified first, then inverted.
- D. *Correct* - 480 VAC from Shutdown board is rectified, then inverted and supplied to VAC loads.

REFERENCES:

Lesson plan 3-OT-SYS235 p.13

10CFR55 41.7

Knowledge of bus power supplies to the following: Major system loads.

RO - 46 SRO - 46

47. 062 G2.1.2 001

Given the following plant conditions:

- Reactor trip occurs.
- BOTH 6.9 KV Shutdown Boards are de-energized.

Which ONE of the following describes the responsibility of the CRO with respect to emergency starting of the Diesel Generators?

- A. ✓ Emergency start the Diesel Generators without SRO direction prior to entering emergency procedures.
- B. Emergency start the Diesel Generators with SRO direction prior to entering emergency procedures.
- C. Emergency start the Diesel Generators when directed by the SRO while reading E-0, "Reactor Trip or Safety Injection".
- D. Emergency start the Diesel Generators when directed by the SRO while reading ECA-0.0, "Loss of Shutdown Power".

The correct answer is A.

- a. *Correct* - RNO for immediate action step 3 directs operator to start the diesel generators and should be performed without direction.
- b. *Incorrect* - CRO does not have to be directed by the SRO to start the Diesel Generators since they are started as the RNO for an immediate action.
- c. *Incorrect* - Diesel Generators should be started in accordance with E-0 step 3 RNO and not wait only until directed by the SRO.
- d. *Incorrect* - the examinee may confuse the order of substeps contained in E-0 step 3. Transition to ECA-0.0 should only be made after actions taken to restore power to the Shutdown Boards have been performed.

REFERENCES:

E-0, "Reactor Trip or Safety Injection"; 3-OT-EOP0000

10CFR55 41.10 / 45.13

AC Electrical Distribution - Knowledge of operator responsibilities during all modes of plant operation.

RO - 47 SRO - 47

48. 013 A4.01 001

Given the following plant conditions:

- The Unit was in Mode 1, at 100% load.
- A Reactor Trip and Safety Injection were generated on Hi-Hi Contmt Pressure.
- The OAC reported Phase B failed to actuate, and manually initiated both trains.

Which ONE of the following actions would NOT occur automatically ?

- A. Containment Vent Isolation signal
- B.✓ Main Steam Isolation Valve Closure.
- C. Containment Spray Pump start signal.
- D. Essential Control Air to Containment Isolation

The correct answer is B.

- A. Incorrect - automatic phase B actuation does NOT cause CVI actuation however, manual phase B signal does.
- B. *Correct* - High-High containment pressure signal automatically closes MSIVs NOT phase B. Phase B receives the same High-High containment pressure actuation signal as MSIVs.
- C. Incorrect - Manual phase B actuates the containment spray system. Auto phase B does not actuate containment spray.
- D. Incorrect - Phase B signal closes essential air isol valve to containment.

REFERENCES:

1-47W611-32-2; 1-47W611-88-1; SOI-88.01; Lesson Plan 3-OT-SYS088A

10CFR55 41.7 / 45.7

013 - ESFAS

Ability to manually operate and/or monitor in the control room: ESFAS-initiated components which fails to actuate.

RO - 48 SRO - 48

49. 063 A4.01 001

Given the following plant conditions:

- Reactor was operating at 50% power.
- A loss of 125V DC Vital Battery Board I occurred.
- AOI-21.01, "Loss of 125V DC Vital Battery Bd I" has been implemented.
- All Emergency Diesel Generators are running.
- Operators have been dispatched to perform Appendix B, "Transfer of 125V DC Busses".
- Contrary to step 1, the BO-RESET switch was NOT depressed and held when the DC control bus was RE-ENERGIZED.

Which ONE of the following identifies the effect the mistake in step 1 of AOI-21.01 will have?

- A. A trip of running components on the 6.9KV Shutdown Board 1A-A would occur.
- B. Load shedding and sequencing would not occur if a loss of offsite power were to occur after the control bus was re-energized.
- C. Unwanted starts of components on the 6.9KV Shutdown Board 1A-A would occur.
- D. The 1A-A Emergency Diesel Generator would trip and immediately restart if a loss of offsite power were to occur after the control bus was re-energized.

The correct answer is C.

- A. Incorrect - BO relays trip components. Student may believe holding the relay will prevent trips.
- B. Incorrect - May believe the relay for BO have not been toggled to normal thus preventing UVX and UVE relays from actuating.
- C. *Correct* - Note in appendix B states that holding the BO-RESET switch prevents unwanted start of Train A equipment.
- D. Incorrect - EDG started due to loss of dc power to the start relays. Would not trip due loss of offsite power. Since the EDG would normally start after a loss of offsite power the examinee may select this distracter.

Reference:

AOI 21.01 and 02 Section 2.2.B
3-OT-SYS021

10CFR55.41.7/45.5 to45.8

Ability to manually operate and/or monitor in the control room:
Major breakers and control power fuses.

RO-49 SRO-49

50. 064 A1.04 001

Which ONE of the following lists the normal condition of the Emergency Diesel Generator crankcase and how it is protected against potential combustion of oil vapors?

- A. Maintained at a slightly positive pressure; High crankcase pressure trip.
- B. Maintained at a slightly negative pressure; High crankcase pressure trip.
- C. Maintained at a slightly positive pressure; High crankcase temperature trip.
- D. Maintained at a slightly negative pressure; High crankcase temperature trip.

The correct answer is B.

- A. Incorrect - crankcase is normally maintained at a slightly negative pressure and protected against vapor combustion by the high crankcase pressure trip. Examinee may believe a positive pressure is maintain to exclude the vapors.
- B. *Correct* - crankcase is normally maintained at a slightly negative pressure and protected against vapor combustion by the high crankcase pressure trip.
- C. Incorrect - crankcase is normally maintained at a slightly negative pressure and protected against vapor combustion by the high crankcase pressure trip. Examinee may believe high temperatures associated with vapor combustion would actuate a high temperature device.
- D. Incorrect - crankcase is normally maintained at a slightly negative pressure and protected against vapor combustion by the high crankcase pressure trip. Examinee may believe high temperatures associated with vapor combustion would actuate a high temperature device.

REFERENCES:

Lesson Plan 3-OT-SYS082A; System 82 System Description

10CFR55.41.5 / 45.5

Ability to predict and/or monitor changes in paramenters (to prevent exceeding design limits) associated with operating the ED/G system controls including:
Crankcase temperature and pressure.

RO-50 SRO-50

51. 073 A2.01 001

Given the following conditions:

- Radwaste AUO is in the process of making a liquid radwaste release from the monitor tank.
- 1-RM-90-122, WDS Liquid Effluent, radiation monitor has just been placed in service.
- The release flowrate has been adjusted and 1-ISV-77-660, Cooling Tower Blowdown Release Header Isol, OPENED.
- Annunciators 181-A WDS RELEASE LINE LIQ RAD HI and 181-C WDS RELEASE LINE INSTR MALF have just alarmed.

If the alarms are the result of a power supply failure which ONE of the following actions would the operator perform?

- A. VERIFY 0-RE-90-9 (ARM) is NOT in alarm, if clear, release is permitted to continue.
- B. ENSURE automatic isolation of 0-RCV-77-43, Waste Condensate Discharge Radiation Isolation Valve, to terminate the release.
- C. CHECK 1-RM-90-122 alarms on the local radwaste panel, 0-L-2, if NO additional alarms have been received the release is permitted to continue.
- D. MONITOR 1-RM-90-122 alarms in the Main Control Room and manually isolate cooling tower blowdown diffuser valves, 1-FCV-27-100 and 101.

The correct answer is B.

- A. Incorrect - ARI 181-A step 2 has the operator check 0-RE-90-9 but the release should have auto terminated.
- B. *Correct* - ARI 181-A&C step 1 ensures that the release has auto terminated by the closing of 0-RCV-77-43.
- C. Incorrect - Used as a distractor to entice student to back-up MCR alarms. If not due to radiation student may continue release.
- D. Incorrect - Student may also send the release to a safer location if no radiation alarms in MCR.

Reference:

3-OT-SYS090A p.64

ARI 181-A

ARI 181-C

10CFR55.41.5/43.5/45.3/45.13

Ability to (a) predict the impacts of the following malfunctions or operations on the PRM system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operation: Erratic or failed power supply.

RO-51 SRO-51

52. 076 A1.02 001

Given the following plant conditions:

- Plant was operating at 100% power when an earthquake occurred.
- The Intake Pumping Station (IPS) suffered substantial damage.
- All ERCW headers lost flow either due to damage to the pumps or strainers.
- The operating crew implemented AOI-13, "Loss of Essential Raw Cooling Water".
- The OAC is directed to start 1B-B CCP and stop 1A-A CCP.

Which ONE of the following describes the BASIS in accordance with procedure for starting the 1B-B CCP?

- A. ✓ Low heat load on "B" train CCS allows for extended pump operation.
- B. HPFP will be aligned to provide cooling to 1B-B CCP using Attachment "E" of AOI-13.
- C. CCP operation is alternated between 1A-A and 1B-B pumps in order to extend the run time.
- D. 1A-A CCP must be shut down in order to align HPFP cooling using Attachment "E" of AOI-13.

The correct answer is A.

- A. *Correct* - since the heat load on "B" train CCS is minimal, more cooling is available to the 1B-B CCP therefore it would be able to run for a more extended time than the 1A-A CCP.
- B. *Incorrect* - AOI-13 will align HPFP to the 1A-A CCP for temporary cooling but not to the 1B-B CCP.
- C. *Incorrect* - some plants would alternate between the two CCPs to extend the run time but WBN aligns temporary cooling to the 1A-A CCP.
- D. *Incorrect* - 1B-B CCP is not only started to allow alignment of HPFP. It is started since it's run time would be extended since "B" train CCS has very small heat load besides the 1B-B CCP.

REFERENCES:

Lesson Plan 3-OT-AOI1300; AOI-13

10CFR55.41.5 / 45.5

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SWS system controls including:
Reactor and Turbine building closed cooling water temperatures.

RO-52 SRO-52

53. 078 A3.01 001

Which ONE of the following is the correct pressure for the Service Air System to automatically isolate from the Control Air System?

A. 83 psig.

B. 80 psig.

C. 79.5 psig.

D. 70 psig.

The correct answer is B.

A. Incorrect - This is the setpoint for the low air pressure alarm.

B. *Correct* - PCV-33-4 shuts at 80 psig.

C. Incorrect - This is the automatic setpoint at which essential air will isolate from the non-essential and aux air.

D. Incorrect - this is the setpoint at which the containment isolation valve close on a loss of IAS.

Reference:

3-OT-SYS032A

10CFR55.41.7/45.5

Ability to monitor automatic operation of the IAS, including: Air pressure

RO-53 SRO-53

54. 103 K1.05 001

Which ONE of the following describes how the operation and design of the personnel access hatch ensures containment integrity is maintained for accident response during containment entry at power?

The inside door opens inward:

- A. The outside door opens outward and each door has a double gasket seal.
- B. The outside door opens outward and each door has a single gasket seal.
- C. The outside door opens inward and each door has a double gasket seal.
- D. The outside door opens inward and each door has a single gasket seal.

The correct answer is C.

- A. Incorrect - outside door opens inward.
- B. Incorrect - Both doors open inward toward containment so that a rise in containment pressure will force the door closed. Each door has a double gasket seal.
- C. Correct - Both open in toward containment. Each door has a double gasket seal.
- D. Incorrect - Both open in toward containment. Each door has a double gasket seal.

REFERENCES:

3-OT-SYS088A p. 21-22

10CFR55.41.2 to 41.9/45.7 to 45.8

Knowledge of the physical connections and/or cause-effect relationship between the containment system and the following systems: Personnel access hatch.

RO-54 SRO-54

55. 103 A4.06 001

Given the following plant conditions:

- The unit is shutdown for refueling.
- Fuel handling personnel are in the process of moving irradiated fuel assemblies from the core to the spent fuel pit.
- A Main Control Room operator observes that annunciator 158-A, UPR CNTMT AIRLOCK INNER/OUTER, is LIT.
- NAUO reports that both doors for the upper containment personnel airlock are open to allow laborers to move materials through the airlock with one individual assigned to close airlock doors as needed.
- All other plant systems normally required operable during this MODE are operable.

Which ONE of the following describes the required actions?

- A. Suspend movement of irradiated fuel assemblies; Close one air lock door.
- B. Suspend movement of irradiated fuel assemblies; Allow both doors to remain open.
- C. Ensure ABGTS is operable; Close one air lock door.
- D. Ensure ABGTS is operable; Allow both doors to remain open.

The correct answer is D.

- A. Incorrect - both personnel airlock doors are allowed to be open during movement of irradiated fuel assemblies and suspension of fuel handling is not required as long as ABGTS is operable.
- B. Incorrect - both personnel airlock doors are allowed to be open during movement of irradiated fuel assemblies and suspension of fuel handling is not required as long as ABGTS is operable.
- C. Incorrect - ABGTS must be operable in order to allow simultaneous opening of both airlock doors, however it is not necessary to close one door if ABGTS is operable.
- D. *Correct* - both personnel airlock doors are allowed to be open during movement of irradiated fuel assemblies as long as ABGTS is maintained operable.

REFERENCES:

Lesson Plan 3-OT-SYS088A; Tech Spec 3.9.4

10CFR55.41.7 / 45.5 to 45.8

Ability to manually operate and/or monitor in the control room: Operation of the personnel airlock door.

RO-55 SRO-55

56. 001 K2.01 001

Which ONE of the following is the NORMAL supply to the Control Rod Drive MG Set 1A?

- A. 480v Unit Bd 1A.
- B. 480v Shutdown Bd 1A1-A.
- C. 480v Aux Bldg Common Bd.
- D. 480v Turbine Bldg Common Bd.

The correct answer is A.

- A. *Correct* - M/G sets are powered from respective 480v Unit Boards.
- B. *Incorrect* - Not powered from Shutdown board. Students may confuse power supply.
- C. *Incorrect* - Not powered from Aux Common Board. Students may confuse power supply.
- D. *Incorrect* - Not powered from Turbine Common Board. Students may confuse power supply.

REFERENCES:

3-OT-SYS085B p. 7, 10

10CFR55.41.7

Knowledge of bus power supplies to the following: One-line diagram of power supply to M/G sets.

RO-56 SRO-56

57. 002 A1.09 001

Which ONE of the following conditions or events will REDUCE the margin between Delta T and the OPΔT trip setpoint?

- A. Pressurizer spray valve sticks open for 15 seconds (assume no reactor trip).
- B. A reactor boration is initiated at 50% power.
- C. Feedwater flow to a steam generator is raised.
- D. A power ascension from 75% to 100% power.

The correct answer is D.

- A. Incorrect - RCS pressure is not input to the setpoint calculation for OPDT.
- B. Incorrect - Boration will lower Tave. Lower Tave does not affect the OPDT setpoint but lower power will reduce actual DT.
- C. Incorrect - Additional feed flow will lower Tave and initially suppress power.
- D. *Correct* - Power ascension raises actual DT closer to setpoint. Setpoint not affected until Tave exceeds 588.2°F.

REFERENCES:

3-OT-TAA0001 p. 3-6

10CFR55.41.5 / 45.7

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

RO - 57 SRO - 57

58. 014 A4.01 001

Which ONE of the following describes the setting of the Bank Overlap Unit thumbwheel switches and the Rod Bank Select switch position in which the Bank Overlap Unit is enabled?

- A. ✓ Switches set to maintain 100 steps overlap; Rod Bank Select switch in MANUAL or AUTOMATIC.
- B. Switches set to maintain 100 steps overlap; Rod Bank Select switch in MANUAL or BANK SELECT.
- C. Switches set to maintain 128 steps overlap; Rod Bank Select switch in MANUAL or AUTOMATIC.
- D. Switches set to maintain 128 steps overlap; Rod Bank Select switch in MANUAL or BANK SELECT.

The correct answer is A.

- A. *Correct* - 100 step overlap is the correct setting for the Bank Overlap Unit thumbwheel switches and the unit is enabled when the control rod mode selector switch is in MANUAL or AUTOMATIC.
- B. *Incorrect* - 100 step overlap is the correct setting for the Bank Overlap Unit thumbwheel switches but the Bank Overlap Unit is NOT enabled in the Bank Select position. The examinee may confuse the function of the different switch positions on the rod control mode select switch.
- C. *Incorrect* - 128 step overlap is NOT the correct setting for the Bank Overlap Unit thumbwheel switches but the unit is enabled when the control rod mode selector switch is in MANUAL or AUTOMATIC.
- D. *Incorrect* - 128 step overlap is the correct setting for the Bank Overlap Unit thumbwheel switches and the Bank Overlap Unit is NOT enabled in the Bank Select position. The examinee may confuse the function of the different switch positions on the rod control mode select switch.

REFERENCES:

WBN Bank - SYS085A.08.002
3-OT-SYS085A

10CFR55.41.7 / 45.5 to 45.8

Ability to manually operate and/or monitor in the control room: Rod selection control.

RO-58 SRO-58

59. 016 K5.01 001

While the plant is operating at 100% power a short circuit occurs internally on the Master Pressurizer Pressure Controller, 1-PIC-68-340A.

Which ONE of the following describes the effect of this fault on the Reactor Protection system?

- A. The controller short circuit will feed back into the protection circuit causing the associated channel to trip.
- B. The controller short circuit will NOT feed back into the protection circuit due to the use of isolation amplifiers.
- C. The controller short circuit will feed back into the protection circuit preventing the associated channel from tripping
- D. The controller short circuit will NOT feed back into the protection circuit since separate sensors (pressure transmitters) are used for control and protection.

The correct answer is B.

- A. Incorrect - short circuit will not feed back into the protection circuit since it the protection and control circuits are separated by isolation amplifiers.
- B. *Correct* - short circuit will not feed back into the protection circuit since it the protection and control circuits are separated by isolation amplifier.
- C. Incorrect - short circuit will not feed back into the protection circuit since it the protection and control circuits are separated by isolation amplifier. the examinee may misunderstand how channel failures impact the ability to trip associated bistables.
- D. Incorrect - short circuit will not feed back into the protection circuit since it the protection and control circuits are separated by isolation amplifier not because of the use of redundant sensors. The examinee may confuse the use of redundant instrumentation with the separation of controls and protection.

REFERENCES:

Lesson Plan - 3-OT-SYS068C

INPO Bank - Kewaunee 1 9/06/2002

10CFR55.41.5 / 45.7

Knowledge of the operational implications of the following concepts as they apply to the NNIS: Separation of control and protection circuits.

RO-59 SRO-59

60. 028 K3.01 001

Given the following plant conditions:

- A large break LOCA occurs from 100% power.
- "B" Hydrogen Recombiner is tagged out.
- "A" Hydrogen Recombiner has been placed in service.
- Subsequently the "A" Hydrogen Recombiner trips on overcurrent.

Which ONE of the following indicates how the concentration of hydrogen will be controlled inside containment?

- A. A continuous vent path is provided that allows hydrogen to vent to the annulus and then be removed by EGTS.
- B. Containment Purge Supply and Exhaust fans are placed in service to dilute the hydrogen concentration in containment.
- C. ✓ Air Return Fans create a mixing effect and the hydrogen igniters will burn hydrogen to maintain it below an explosive concentration.
- D. Emergency Gas Treatment System will remove hydrogen which collects in the containment dome and discharge to the shield building vent.

The correct answer is C.

- A. Incorrect - containment purge cleanup units do not recirculate to containment remove hydrogen gas.
- B. Incorrect - A continuous vent is available from the containment to the annulus during normal operation but this path is isolated on a containment vent isolation signal. Examinee may not understand this isolation since this continuous vent is a recent design change to the plant.
- C. *Correct* - Air return fans do create a mixing effect to prevent pockets of hydrogen from forming, and the igniters would cause hydrogen to burn and reduce hydrogen concentration.
- D. Incorrect - EGTS takes suction from the top of the annulus dome instead of the containment dome. Examinee may mistake the two.

REFERENCES:

47W611-30-1, Lesson plan 3-OT-SYS083A p. 21, 24.

WBN exam bank

10CFR55. 41.7 / 45.6

Knowledge of the effect that a loss or malfunction of th HRPS will have on the following: Hydrogen concentration in containment.

RO - 60 SRO - 60

61. 029 A3.01 001

Given the following plant conditions:

- Plant is shutdown for refueling.
- "A" train Containment Purge system is in service.

Which ONE of the following will cause a trip of the Containment Purge fans?

- A. High flux detected by Source Range detector, NI-132.
- B. High radiation detected by Spent Fuel Pit area radiation monitor, 1-RM-90-102.
- C. ✓ Containment Vent Isolation from high radiation detected by containment purge exhaust radiation monitor, 1-RM-90-130.
- D. Phase A Containment Isolation from high radiation detected by upper containment radiation monitor radiation monitor, 1-RM-90-112.

The correct answer is C.

- A. Incorrect - the SRMs actuate containment evacuation alarm and high flux at shutdown alarm but do not trip the purge fans.
- B. Incorrect- 1-RM-90-102, Spent Fuel Pit area monitor actuates much of the same equipment as an ABI but does not trip the containment purge fans. An ABI signal would trip the purge fans.
- C. *Correct* - Containment Vent Isolation will provide a trip signal to the Containment Purge fans via 1-RM-90-130, containment purge exhaust radiation monitor.
- D. Incorrect - 1-RM-90-112 does not initiate a containment vent isolation signal, however the examinee may select this since the RM-90-112 monitor samples upper containment atmosphere.

REFERENCES:

3-OT-SYS030C

10CFR55. 41.7 / 45.5

Ability to monitor automatic operation of the Containment Purge System including: CPS isolation.

RO - 61 SRO - 61

62. 035 K4.05 001

Which ONE of the following is the basis for 'S/G Water Level Low-Low Reactor Trip'?

To ensure there is adequate reserve inventory to:

- A. Continue RCP operation until generator breaker is opened.
- B. Cool turbine blading in the event turbine fails to trip.
- C. Allow AFW pump start before S/G tubes are uncovered.
- D. Continue MFW pump operation until AFW pumps start.

The correct answer is C.

- A. Incorrect - Generator breaker opening is delayed for 30 seconds to allow RCP coastdown, but steam flow is isolated to the turbine at this time.
- B. Incorrect - Students may wish to provide steam flow to keep turbine blades cooled if a trip does not occur.
- C. *Correct* - Basis states that AFW needs time to start to prevent S/G tube uncover.
- D. Incorrect - MFPs are tripped on main feedwater isolation which occurs after reactor trip at 564°F.

REFERENCES:

3-OT-SYS-003D p.13

10CFR55.41.7

Knowledge of S/Gs design feature(s) and/or interlock(s) which provide for the following:
Amount of reserve water in S/G.

RO-62 SRO-62

63. 068 K1.07 001

Given the following plant conditions:

- Plant is at 100% power.
- RCDT level is RISING.

Which ONE of the following describes the cause of this level RISE?

- A. Reactor head inner "O" ring seal failure.
- B. Reactor Building Pocket Sump discharge.
- C. RHR suction relief valve leaking through.
- D. #1 seal bypass for the RCPs leaking through.

The correct answer is A.

- A. *Correct* - leakage from the reactor head "O" ring is routed to the RCDT and would result in RISING level.
- B. *Incorrect* - Reactor Building Pocket Sump pump discharge is not routed to the RCDT. Examinee may think waste water collected in the containment is likely tritiated and should be routed from the RCDT to the Tritiated Drain Collector Tank.
- C. *Incorrect* - RHR suction relief valve is not routed to the RCDT. Examinee may think it is routed to the RCDT to be processed since it is primary coolant.
- D. *Incorrect* - RCP #1 seal bypass valve does not route water to the RCDT. Examinee may think it is routed to the RCDT to be processed since it is primary coolant.

REFERENCES:

INPO bank - Prairie Island 1 (6/16/1997)
Lesson Plan 3-OT-SYS077A; Print 47W813

10CFR55.41.2 to 41.9 / 45.7 to 45.8

Knowledge of the physical connections and/or cause effect relationships between the Liquid Radwaste system and the following systems:

Sources of liquid wastes for LRS.

RO-63 SRO-63

64. 079 A2.01 001

Given the following plant conditions:

- A non-isolable rupture occurs in the piping just downstream of the control air dryers that exceeds the capacity of the control and station service air compressors.
- Reactor trip occurs due to low S/G levels.
- An NAUO reports the following status of essential air isolation valves:
 - Train "A", 1-FCV-32-82, Control to Aux Air Hdr Isolation FAILED to close.
 - Train "B", 1-FCV-32-85, Control to Aux Air Hdr Isolation CLOSED.

Which ONE of the following describes the appropriate procedure application and how a heat sink is established to maintain the plant in Mode 3?

<u>Procedure</u>	<u>FW supply</u>	<u>Heat Sink</u>
A. AOI-10, "Loss of Control Air"	AFW	S/G PORVs
B. AOI-10, "Loss of Control Air"	MFW	Steam Dumps
C. AOI-16, "Loss of Normal Feedwater"	MFW	Steam Dumps
D. AOI-16, "Loss of Normal Feedwater"	AFW	S/G PORVs

The correct answer is A.

- A. *Correct* - AOI-10 will address the loss of air and directs the crew to maintain mode 3 using AFW and S/G PORVs. Examinee should recognize the failed isolation valve and know that one train auxiliary instrument air is still available to train B components for maintaining the plant.
- B. *Incorrect* - AOI-10 will address the loss of air and directs the crew to maintain mode 3. Examinee must recognize when one auxiliary air isolation valve failed open and one failed closed that one train is adequate to control the plant. Examinee may think that with one valve open and one closed, the normal air system is still available and may use normal feedwater and steam dumps.
- C. *Incorrect* - AOI-16 normally addresses a loss of normal feedwater which the examinee may recognize given the reactor trip from low S/G levels. However the low S/G level is actually due to the loss of non-essential air.
- D. *Incorrect* - AOI-16 normally addresses a loss of normal feedwater which the examinee may recognize given the reactor trip from low S/G levels. Examinee may think that with one valve open and one closed, the normal air system is still available and may use normal feedwater and steam dumps.

REFERENCES:

Lesson Plan 3-OT-AOI1000; AOI-10

10CFR55.41.5/43.5/45.3/45.13

Ability to (a) predict the impacts of the following malfunctions or operations on the SAS; and (b) based on those predictions, use procedures to correct, control, control, or mitigate the consequences of those malfunctions or operations:
Cross-connection with IAS.

RO-64 SRO-64

65. 086 K6.04 001

Detection Zone 130 in the Unit 2 Ventilation and Purge Air Room, Aux Bldg, el.737, is out of service.

Which ONE of the following is the required action? (use the reference provided)

- A. No actions required since this is a Unit 2 area.
- B. Enter OR-14.1.1 since the detection has failed.
- C. ✓ Enter OR-14.3.1.a.3 since the detection is on the Aux Bldg, el 737.
- D. Enter OR-14.3.1.a.1 since detection is affected and this inhibits the associated suppression.

The correct answer is C.

- A. Incorrect - Students may decide that this equipment is Unit 2 related and not affected by fire protection plan.
- B. Incorrect - Detectors are all Function B. 14.1 applies to Function A detectors.
- C. Correct - Since this detector is elevation 737 of Aux Bldg OR-14.3.1.a.3 must be applied.
- D. Incorrect - This action is less restrictive and is not specific to elevation 737. Student may select this distractor if they fail to completely scan the document.

REFERENCES:

Lesson Plan 3-OT-TSOR14 p.6&7

10CFR55.41.7/45.7

Knowledge of the effect that a loss or malfunction of the following will have on the Fire Protection System: Fire, smoke, and heat detectors.

RO-65 SRO-65

66. G 2.1.2 001

Under which ONE of the following conditions is the Operator at the Controls (OAC) allowed to leave the normal OAC surveillance area, without obtaining a relief, during plant operations?

- A. To respond to an expected annunciator alarm on a back panel in MODE 6.
- B. To verify receipt of an annunciator alarm on a back panel during an emergency.
- C. To enter the Shift Manager clerk's office to obtain a controlled key during an emergency.
- D. To configure plant equipment on a back panel to comply with an immediate Tech Spec LCO action.

The correct answer is B.

- A. Incorrect - OAC is not allowed to leave the OAC surveillance area under normal circumstances, even if the alarm is expected. Examinee may confuse the acceptable exception during defueled conditions with refueling (MODE 6).
- B. *Correct* - OAC is allowed to leave under emergency conditions to verify receipt of an alarm.
- C. Incorrect - OAC is not allowed to leave the control room without proper relief. Examinee may believe it is acceptable as long as it is just outside the control room and still within the control building.
- D. Incorrect - OAC is not allowed to leave the control room without proper relief. Examinee may believe this acceptable since it refers to an immediate Tech Spec LCO action.

REFERENCES:

INPO Bank - Seabrook 1 5/30/2003
3-OT-SPP1000

10CFR55 41.10 / 45.13

Knowledge of operator responsibilities during all modes of plant operation.

RO - 66 SRO - 66

67. G 2.1.25 001

Given the following plant conditions:

- The Unit is in Mode 5, following a Refueling outage.
- The RCS is in Mid Loop operation, at 110° F.
- 1A-A RHR pump is in service at 2000 gpm.
- Preparations are in progress to begin RCS Vacuum Refill.

Which ONE of the following describes the expected time to raise RCS vacuum from 12 in Hg. to the maximum allowable value? (use references provided)

- A. 85 minutes.
- B. 90 minutes.
- C. 125 minutes.
- D. 130 minutes.

The correct answer is B.

- A. Incorrect - this answer is used to provide consistent distractor and allows for minor interpretation differences.
- B. *Correct* - answer is correct considering beginning vacuum at 12" Hg and raising vacuum to the maximum allowable value determined by using the RHR flowrate of 2,000 gpm.
- C. Incorrect - this answer is possible if the examinee does not account for beginning at 12" Hg.
- D. Incorrect - this answer is used to provide consistent distractor and allows for minor interpretation differences.

REFERENCE:

WBN Bank - GO1000.01 .008

GO-10, "Reactor Coolant System Drain and Fill Operations".

10 CFR 55 41.10 / 43.5 / 45.12

Ability to obtain and interpret station reference materials such as graphs, monographs, and table, which contain performance data.

RO-67 SRO-67

68. G 2.1.27 001

Which ONE of the following is the design basis for the reactor trip above the P-8 permissive?

- A. Provides anticipatory protective action for the subsequent low-low S/G water level trip.
- B. Prevents Tavg fluctuations from causing inadvertent reactivity additions due to unwanted rod motion.
- C. Provides protection against dropping DNBR below its limit due to reduced heat removal rate.
- D. Prevents uneven fuel burning which can lead to localized power peaks exceeding kw/ft limits.

The correct answer is C.

- A. Incorrect - S/G level is expected to drop due to shrink caused by the loss of heat input, however is not the reason for tripping the reactor upon loss of RCS flow.
- B. Incorrect - Tavg fluctuations would occur that may cause rod motion. However, this is not the basis for the trip.
- C. *Correct* - loss of RCS flow will reduce DNBR. The rapid reactor trip generated by low flow will prevent DNBR from dropping below its limit.
- D. Incorrect - potentially uneven fuel burning can occur due to temperature distribution changes across the core, however is not the reason for tripping the reactor upon loss of RCS flow.

REFERENCES:

INPO Bank - Seabrook 1 5/30/2003
3-OT-SYS099A

10CFR55 41.7

Knowledge of system purpose and/or function.

RO - 68 SRO - 68

69. G 2.2.22 001

Given the following plant conditions:

- The RO performed the Surveillance Instruction, 1-SI-68-32, "RCS Inventory Balance" and found the total RCS leakage rate to be 11.2 gpm.
- Chemistry reports S/G tube leakage to be as follows:
 - .10 gpm - S/G #1
 - .31 gpm - S/G #2
 - no leakage exists in remaining S/Gs.
- Further investigation finds the following :
 - RCDT level rising at 4.7 gpm.
 - PRT level rising at 5.1 gpm.

Of the listed leakage types:

- 1 - Identified
- 2 - Unidentified
- 3 - S/G tube (individual S/G)
- 4 - Total S/G tube

Which One of the following identifies the Tech Spec limits for operational leakage that have been exceeded?

- A. 1, 3
- B. 1, 4
- C. 2, 3
- D. 3, 4

The correct answer is A.

- A. *Correct* - Identified leakage > 10 gpm and # 2 S/G > 150 gpd.
- B. *Incorrect* - 4, total < 600 gpd. Student may select thinking limit is 500 gpd.
- C. *Incorrect* - 2, Unidentified leakage < 1 gpm and 4, total < 600 gpd.
- D. *Incorrect* - 4, total < 600 gpd. Student may select thinking limit is 500 gpd.

REFERENCES:

Lesson plan 3-OT-T/S0304 p.8
T/S 3.4.13

10CFR55.43.2/45.2

Knowledge of limiting condition for operations and safety limits.

RO - 69 SRO - 69

70. G 2.2.25 001

Which ONE of the following is NOT part of the ECCS Acceptance Criteria of 10CFR50.46?

- A. The maximum fuel pellet centerline temperature shall not exceed 2000 °F.
- B. Changes in core geometry shall be such that the core remains amenable to cooling.
- C. The total oxidation of the cladding shall nowhere exceed 0.17 times the total cladding thickness before oxidation.
- D. The total amount of hydrogen generated from the chemical reaction of the cladding with water or steam shall not exceed 0.01 times the hypothetical amount generated if all of the metal in the cladding were to react.

The correct answer is A.

- A. *Correct* - ECCS acceptance criteria states centerline temperature shall not exceed 2200 °F.
- B. *Incorrect* - This is an acceptance criteria.
- C. *Incorrect* - This is an acceptance criteria.
- D. *Incorrect* - This is an acceptance criteria.

REFERENCES:

INPO Bank Point Beach 8/29/2003
3-OT-SYS063A p. 14
Tech Spec 3.5.1 basis

10CFR55.43.2

Knowledge of basis in technical specification for limiting conditions for operations and safety limits.

RO-70 SRO-70

71. G 2.3.9 001

During operation of the Containment Purge system pressure imbalances may occur and cause inadvertent opening of Ice Condenser inlet doors.

Which ONE of the following sequences for purging lower containment will prevent pressure imbalances from causing Ice Condenser doors to open?

- A. Start upper containment purge first to stabilize pressures; start lower containment purge, then stop upper containment purge.
- B. Start lower containment purge first to stabilize pressures; start upper containment purge, then stop lower containment purge.
- C. Start upper containment purge first to stabilize pressures; stop upper containment purge, then start lower containment purge.
- D. Start lower containment purge first to stabilize pressures; stop lower containment purge, then start upper containment purge.

The correct answer is C.

- A. Incorrect - the upper will be stopped prior to starting the lower purge system. examinee may have misconception that both must remain running to maintain balanced pressures between upper and lower containment.
- B. Incorrect - the upper containment will be purged first. Examinee may have misconception that lower will be purged first.
- C. *Correct* - upper containment is purged first to stabilize pressures. It will be stopped then lower continue will be purged.
- D. Incorrect - the upper containment will be purged first. Examinee may have misconception that lower will be purged first.

REFERENCES:

SOI-30.02, Precaution and Limitation "F".

10CFR55.43.4/45.10

Knowledge of the process for performing a containment purge.

RO - 71 SRO - 71

72. G 2.3.10 001

Given the following plant conditions:

- Plant is at 100% power.
- Several Auxiliary Building radiation monitors are in alarm.
- The Radwaste NAUO reports a Waste Gas Decay Tank is ruptured and depressurizing into the Auxiliary Building.
- The operating crew implemented AOI-31, "Abnormal Release of Radioactive material".
- Crew has initiated Auxiliary Building Isolation (ABI).

Which ONE of the following lists the additional actions to be taken by the operating crew to isolate and limit the release to the environment?

- A. Check Emergency Gas Treatment fans RUNNING (EGTS); Check Aux Bldg supply and exhaust fans RUNNING.
- B. Check Emergency Gas Treatment fans running (EGTS); Check Aux Bldg supply and exhaust fans STOPPED.
- C. Check Auxiliary Building Gas Treatment fans running (ABGTS); Check Aux Bldg supply and exhaust fans RUNNING.
- D. Check Auxiliary Building Gas Treatment fans running (ABGTS); Check Aux Bldg supply and exhaust fans STOPPED.

The correct answer is D.

- A. Incorrect - ABI starts ABGTS and stops the Aux Bldg supply and exhaust fans. Examinee may confuse the actions initiated by an ABI.
- B. Incorrect - ABI starts ABGTS and stops the Aux Bldg supply and exhaust fans. Examinee may confuse the actions initiated by an ABI.
- C. Incorrect - ABI starts ABGTS and stops the Aux Bldg supply and exhaust fans. Examinee may confuse the actions initiated by an ABI.
- D. *Correct* - ABI starts ABGTS and stops the Aux Bldg supply and exhaust fans.

REFERENCES:

3-OT-AOI3100; AOI-31

10CFR55 43.4 / 45.10

Ability to perform procedures to reduce excessive levels of radiations and guard against personnel exposure.

RO - 72 SRO - 72

73. G 2.3.11 001

The Unit Supervisor has directed a Unit shutdown based on RCS activity exceeding Tech Spec limits.

In the event of a subsequent SGTR, which ONE of the following actions is designed to limit the release of radioactivity?

- A. MSIVs are closed.
- B. RCS is cooled down below 500 °F.
- C. Condensate polishers are in service at full flow.
- D. S/G atmospheric dump valve for the affected S/G is placed in OFF.

The correct answer is B.

- A. Incorrect - Closing MSIVs would contribute to Rad release through S/G PORVs if cooldown not performed in a timely manner.
- B. *Correct* - Basis states that the cooldown to < 500 °F will lower RCS temperature below the saturation pressure of the S/G reliefs.
- C. Incorrect - While the polishing system would help clean the secondary, it is not an action contained in the procedure.
- D. Incorrect - PORV setpoint are raised to 90% to limit release of radioactivity.

REFERENCES:

3-OT-T/S0304 p. 8
Tech Spec 3.4.16 basis
E-3 'S/G Tube Rupture'

Beaver Valley 12/01/2002
10CFR55.43.4/45.10

Ability to control radiation releases.

RO-73 SRO-73

74. G 2.4.12 001

Given the following plant conditions:

- The plant was initially at 100% power when a Reactor Trip occurred.
- The control room crew implemented E-0, and are performing their Immediate Operator Actions.
- During the event, one PZR PORV opened and RCS pressure dropped to 1825 psig.
- The OAC noticed the valve was open and closed it.
- Plant conditions are now as follows:
 - Charging flow on 1-FI-62-93A is 87 gpm.
 - Letdown flow on 1-FI-62-82 is 75 gpm.
 - RCS pressure is 1900 psig and rising.
 - Charging pressure is 2400 psig.
 - VCT level is 35% and stable.

Given the plant conditions above, which ONE of the following describes SI status and the required crew response?

- A. NOT initiated and IS required. The crew should manually initiate SI and continue in E-0.
- B. NOT initiated and IS NOT required. The crew should transition to ES-0.1, "REACTOR TRIP RESPONSE" to stabilize the plant.
- C. Automatically initiated but IS NOT required. The crew should continue in the emergency procedures until SI can be terminated.
- D. Automatically initiated and IS required. The crew should verify initiation of SI and continue in the emergency procedures until SI can be terminated.

The correct answer is A

- A. Correct - SI should have Auto initiated at 1870 psig. If SI signal was generated then letdown would have been isolated by Phase A. Crew is required to back-up auto signals, even if the initiating signal is no longer present. SI will be initiated and verified in E-0.
- B. Incorrect - SI is required. Students may select this due to current plant conditions.
- C. Incorrect - SI has not Auto initiated. Phase A would have isolated letdown if the SI signal generated. Student may select based on pressure rising and charging flows given. Second part of question gives option for procedural flowpath if selected.
- D. Incorrect - SI has not Auto initiated. Phase A would have isolated letdown if the SI signal generated. Student may select based on pressure rising and charging flows given. Second part of question gives option for procedural flowpath if selected.

REFERENCES:

Lesson plan 3-OT-EOP0000
E-0 'Reactor Trip or Safety Injection'

10 CFR55.41.10/45.12

Knowledge of general operating crew responsibilities during emergency operations.

RO-74 SRO-74

75. G 2.4.17 001

Match the following terms with their definition as provided in TI-12.04, "Users Guide for Abnormal and Emergency Operating Instructions".

- | | |
|------------|---|
| A. Check | 1. To manually cause a normally automatic signal to occur. |
| B. Ensure | 2. To observe that an expected characteristic or condition exists. |
| C. Actuate | 3. To observe that an expected characteristic or condition exists and, if necessary, to take actions to make the condition occur. |
| D. Verify | 4. To investigate the position or status of a specified function or variable. |
| | 5. To bring about, to take necessary actions to cause a specified set of conditions to exist. |

Which ONE of the following groups is correctly matched?

- A. A-5, B-2, C-1, D-3
- B. A-4, B-3, C-5, D-2
- C. A-4, B-3, C-1, D-2
- D. A-5, B-2, C-1, D-4

The correct answer is C

- A. Incorrect - Wrong ordered pairs (see definitions)
- B. Incorrect - Wrong ordered pairs (see definitions)
- C. *Correct* - see definitions
- D. Incorrect - Wrong ordered pairs (see definitions)

- A. Check - To investigate the position or status of a specified function or variable.
- B. Ensure - To observe that an expected characteristic or condition exists and, if necessary, to take actions to make the condition occur.
- C. Actuate - To manually cause a normally automatic signal to occur.
- D. Verify - To observe that an expected characteristic or condition exists.

REFERENCES:

TI-12.04
Lesson plan 3-OT-TI1204

10CFR55.41.10/45.13

Knowledge of EOP terms and definitions.

RO-75 SRO-75