

# **Final Submittal**

(Blue Paper)

**CRYSTAL RIVER OCTOBER 2005 EXAM**

**05000302/2005301**

**SEPTEMBER 12 - 16, 2005**  
**SEPTEMBER 19, 2005 (WRITTEN)**

**Reactor Operator Written Examination**

**U.S. Nuclear Regulatory Commission  
Site-Specific  
RO Written Examination**

**Applicant Information**

Name:

Date: September 19, 2005

Facility/Unit: Crystal River Nuclear Plant

Region: II

Reactor Type: BW

Start Time:

Finish Time:

**Instructions**

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. 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 \_\_\_\_\_ Points

Applicant's Score \_\_\_\_\_ Points

Applicant's Grade \_\_\_\_\_ Percent

1. 001K1.05 001/2/2/RO #56/C/A 4.5/4.4/MOD/R/CR03501/4-014-005

The following plant conditions exist:

- NI-5 indicates 73% reactor power.
- NI-6 indicates 74% reactor power.
- NI-7 indicates 76% reactor power.
- NI-8 indicates 74% reactor power.
- NI-5/6 selected for control.

Which ONE of the following describes the expected plant response if NI-6 failed high?

- A. ✓ The neutron power signal from RPS to ICS would be 76% power; SASS would transfer and select NI-7/8 for control; CRD system would initially insert control rods.
- B. The neutron power signal from RPS to ICS would be 73% power; SASS would not transfer; CRD system would initially withdraw control rods.
- C. The neutron power signal from RPS to ICS would be 76% power; SASS would transfer and select NI-7/8 for control; CRD system would maintain rod position.
- D. The neutron power signal from RPS to ICS would be 73% power; SASS would not transfer; CRD system would maintain rod position.

Reasons:

- A. Correct. SASS would transfer to NI-7/8 and send the highest signal (76%) to ICS. This would generate a >1% error and rods would insert.
- B. The power signal would be the highest of NI-7/8 (76%).
- C. Rods would insert.
- D. The power signal would be the highest of NI-7/8 (76%) because SASS will transfer. Rods will initially insert.

OPS 4-09 Obj. 3; OPS 4-10 Obj. 5; OPS 4-09 Section 1-4.0.A.5; OPS 4-10 Section 1-4.0.C.5, OPS 4-14 Section 1-4.0.F.5

History: NRCM98

RO - Modified

Reference(s) provided: None

2. 002K1.09 001/2/2/RO #57/MEM 4.1/4.1/NEW/R/CR03501/

A plant cooldown is in progress. The RPS has been placed in S/D Bypass and Control Rod Group 1 has just been withdrawn. Prior to any further actions a PZR insurge occurs. PZR temperature is now 600° F. Assuming no further operator actions which ONE of the following will occur due to the change in RCS pressure?

- A. ✓ HPI actuation.
- B. RBIC and HPI actuation.
- C. Low RCS pressure reactor trip.
- D. Variable RCS Press/Temp reactor trip.

Reasons:

- A. Correct. RCS pressure will decrease to about 1565#. This is below the 1625# HPI actuation setpoint.
- B. Stem conditions do not indicate conditions that would increase RB pressure.
- C. While this pressure is low enough to cause a low pressure reactor trip this function is bypassed when the RPS is taken to S/D Bypass.
- D. This function is bypassed when the RPS is taken to S/D Bypass.

OPS 4-12, Obj. 4; OPS 4-12 Section 1.3.0.C.3.a.1; OP-209 Step 4.1.6; OP-507 Step 4.14.3

RO - New

Reference(s) provided: None

3. 003K2.01 001/2/1/RO #28/C/A 3.1/3.1/NEW/R/CR03501/

The following plant conditions exist:

- All Unit buses are powered from the Startup transformer.
- DPDP-1C, Switch 12, has failed in the open position (feeder to DPDP-3B, Turbine Building)
- Two minutes later the reactor experiences a spurious trip from 100% power.

All RCPs need to be secured. Which ONE of the following methods will accomplish this?

- A. Trip all RCPs with their individual control switches on the MCB.
- B. Trip "A" and "C" RCPs with their individual control switches on the MCB. De-energize the "B" 6900 volt bus from the MCB by opening breaker 3104, SU transformer feeder breaker to the "B" 6900 volt bus.
- C. Trip "A" and "B" RCPs with their individual control switches on the MCB. Trip "C" and "D" RCPs locally at their breakers.
- D. ✓ Trip "A" and "C" RCPs with their individual control switches on the MCB. Trip "B" and "D" RCPs locally at their breakers.

Reasons:

- A. With DPDP-3B de-energized DC control power to "B" Train turbine building equipment is lost. RCPs "B" and "D" must be tripped locally.
- B. Control power to breaker 3104 is lost.
- C. Control power for the "B" RCP breaker is lost.
- D. Correct. "A" and "C" RCPs are powered from the "A" 6900V bus. Control power is available to these breakers. "B" and "D" RCP breakers have lost control power and must be opened locally.

Crystal River Nuclear Plant 2005-001  
RO Initial Exam

OPS 4-64, Obj. 7; OPS 4-64 Section 1-8.0.B.2; OP-705 Enclosure 2; OPS 4-60  
Section 1-4.0.K.2

RO - New

Reference(s) provided: None

4. 004A2.26 001/2/1/RO #29/C/A 2.8/3.0/MOD/R/CR03501/

The following plant conditions exist:

- MUT venting is in progress.
- "MAKEUP TANK PRESS HIGH/LOW" alarm has just annunciated.
- MUT level is 80 inches.

Which ONE of the following describes the concern with this alarm and the amount that the pressure could be increased from its current value to return the MUT to the "Preferred Region" without receiving further MUT alarms?

- A. Insufficient MUP NPSH; 14 psig above low pressure *alarm* setpoint
- B. ✓ Inadequate oxygen control; 14 psig above low pressure *alarm* setpoint
- C. Insufficient MUP NPSH; 16 psig above low pressure *alarm* setpoint
- D. Inadequate oxygen control; 16 psig above low pressure *alarm* setpoint

Reasons:

- A. MUT low pressure is not a concern for MUP operation.
- B. Correct. To ensure adequate hydrogen concentration in the RCS (dissolved oxygen control) the MUT must be operated in the "Preferred Region". The operator should know that the low pressure annunciator alarm setpoint is 3 psig. Raising pressure by 14 psig will return the MUT to the "Preferred Region" and not cause any further alarms.
- C. MUT low pressure is not a concern for MUP operation. At 19 psig the computer high pressure alarm will be actuated.
- D. At 19 psig the computer high pressure alarm will be actuated.

OPS 4-52, Obj. 3; OP-103B Curve 8C; OPS 4-52 Sections 1-4.0.P.3 & 1-4.0.P.4; AR 403 EP 1063

RO - Modified

Reference(s) provided: OP-103B, Curve 8



5. 005A1.03 001/2/1/RO #30/C/A 2.5/2.6/NEW/R/CR03501/

"A" Decay Heat Removal train is in service. Instrument air pressure is 85 psig and rapidly decreasing.

DCV-17                      A DH Cooler Bypass Control Valve

DCV-177                    A DH Cooler Outlet Control Valve

IAW AP-470, Loss of Instrument Air, manually throttling DCV-17 \_\_\_\_ (1) \_\_\_\_ and DCV-177 \_\_\_\_ (2) \_\_\_\_ to limit RCS \_\_\_\_ (3) \_\_\_\_ will be required.

(1)

(2)

(3)

- |      |        |        |          |
|------|--------|--------|----------|
| A.   | closed | open   | heatup   |
| B.   | open   | closed | heatup   |
| C.   | closed | open   | cooldown |
| D. ✓ | open   | closed | cooldown |

Reasons:

- A. DCV-17 must be throttled open and DCV-177 must be throttled closed to limit RCS cooldown.
- B. The concern is RCS cooldown, not heatup.
- C. DCV-17 must be throttled open and DCV-177 must be throttled closed.
- D. Correct. Opening the bypass valve and closing down on the outlet valve will lower the cooling water flow through the heat exchanger and limit cooldown of the RCS.

OPS 5-84, Obj. 7; AP-470 Step 3.4; OPS 5-84 Section 1-4.0.D

RO - New

Reference(s) provided: None

6. 005AK3.01 001/1/2/RO #19/C/A 4.0/4.3/NEW/R/CR03501/5-010-001

The following plant conditions exist:

- The plant was operating at 60% power.
- The reactor tripped due to a feedwater problem.
- The crew is performing the Immediate Actions of EOP-2, Vital System Status Verification.
- A check of the Rod Bottom indications lights show that two rods in Group 6 have failed to insert into the core.

Which ONE of the following describes the actions to be taken and the reason for the action?

- A. Immediately commence an RCS boration to ensure that shutdown margin is adequate.
- B. ✓ Continue with actions in the EOP; commence a boration when directed by the procedure to ensure shutdown margin is adequate.
- C. Immediately commence an RCS boration to counteract the positive reactivity addition due to lower RCS temperature.
- D. Continue with actions in the EOP; Xenon peaking will ensure that shutdown margin is always adequate for the first 24 hours.

Reasons:

- A. An immediate boration is not required.
- B. Correct. Immediate actions are completed and followup procedure steps will direct when to commence a boration.
- C. An immediate boration is not required and this reason is incorrect.
- D. This is the correct reason but Xenon peaking will not ensure that shutdown margin is always adequate for the first 24 hours.

OPS 5-96, Obj. 4

RO - New

Reference(s) provided: None

7. 006A1.13 001/2/1/RO #31/C/A 3.5/3.7/NEW/R/CR03501/

The following plant conditions exist:

- "CF TANK A LEVEL LOW" alarm has just annunciated.
- CFT-1A boron concentration is 3000 ppmb.

Which ONE of the following additions would meet TS requirements and clear all CFT level alarms?

- A. 450 gal @ 12,000 ppmb
- B. ✓ 500 gal @ 0 ppmb
- C. 550 gal @ 12,000 ppmb
- D. 600 gal @ 0 ppmb

Reasons:

OP-103F	CFT Low Level alarm	12.14 ft	7338.23 gallons
OP-103F	CFT High Level alarm	13.27 ft	7912.70 gallons
CFT TS level			> 7255 gal and < 8005 gal
CFT TS boron			> 2,270 ppmb and < 3,500 ppmb

$$C1V1 + C2V2 = C3V3$$

- A. 7338.23 gal + 450 gal = 7788.23 gal. **this is within level limits**  
(3,000 ppmb)(7338.23 gal) + (12,000 ppmb)(450 gal) = (C3) 7788.23 gal  
22,014,690 ppmb(gal) + 5,400,000 ppmb(gal) = (C3) 7788.23 gal  
27,414,690 ppmb(gal)/7788.23 gal = (C3)  
(C3) = 3520 ppmb **this is above ppmb limits**
- B. **Correct**  
7338.23 gal + 500 gal = 7838.23 gal. **this is within level limits**  
(3,000 ppmb)(7338.23 gal) + (0 ppmb)(500 gal) = (C3) 7838.23 gal  
22,014,690 ppmb(gal) + 0 = (C3) 7838.23 gal  
22,014,690 ppmb(gal)/7838.23 gal = (C3)  
(C3) = 2808 ppmb **this is within ppmb limits**
- C. 7338.23 gal + 550 gal = 7888.23 gal. **this is within level limits**  
(3,000 ppmb)(7338.23 gal) + (12,000 ppmb)(550 gal) = (C3) 7888.23 gal  
22,014,690 ppmb(gal) + 6,600,000 ppmb(gal) = (C3) 7888.23 gal  
28,614,690 ppmb(gal)/7888.23 gal = (C3)  
(C3) = 3627 ppmb **this is above ppmb limits**
- D. 7338.23 gal + 600 gal = 7938.23 gal.  
**this is within TS level limits, but above the high level alarm setpoint**  
(3,000 ppmb)(7338.23 gal) + (0 ppmb)(600 gal) = (C3) 7938.23 gal  
22,014,690 ppmb(gal) + 0 = (C3) 7938.23 gal  
22,014,690 ppmb(gal)/7938.23 gal = (C3)  
(C3) = 2773 ppmb **this is within ppmb limits**

OPS 4-53, Obj. 6 & 10; OP-103F, Figure 14; TS 3.5.1

RO - New

Reference(s) provided: OP-103F, Figure 14

8. 007A3.01 001/2/1/RO #32/MEM 2.7/2.9/BANK/R/CR03501/4-059-005

The plant is in Mode 5 with a drain of the Reactor Coolant System (RCS) in progress. While reviewing control board indications part way through your shift you notice that the level in the Reactor Coolant Drain Tank (RCDT) has increased since the beginning of the shift.

Which ONE of the following describes a possible source for this fluid?

- A. ✓ A Core Flood Tank was drained to the RCDT.
- B. Leakoff from the Makeup Pumps was directed to the RCDT.
- C. Leakoff from the Decay Heat Pumps was directed to the RCDT.
- D. The OTSG "J" legs were pumped to the RCDT.

Reasons:

- A. Correct. The CFT is drained to the RCDT when the RCS is drained.
- B. Only leakoff from the RCPs can be directed to the RCDT.
- C. Only leakoff from the RCPs can be directed to the RCDT.
- D. The "J" legs are pumped to an RCBT, not the RCDT.

OPS 4-59, Obj. 2 & 3; OPS 4-59 Section 1-3.0.A.1.c

RO - Slightly modified - count as Bank

Reference(s) provided: None

9. 008AA2.19 001/1/1/RO #2/C/A 3.4/3.6/NEW/R/CR03501/

A plant trip has occurred from 100% power due to the loss of the "B" MFWP. Fifteen minutes later the following indications are observed:

- PZR level is 100 inches and stable.
- Makeup flow is normal and stable.
- Tave is 545° F and stable.
- RCS pressure is 1900 psig and slowly decreasing.
- RCDT level and pressure are stable.

Which ONE of the following describes the cause of these indications and the operator response required, if any?

- A. The PORV is leaking by. The PORV block valve should be closed.
- B. ✓ The Spray valve is leaking by. The Spray block valve should be closed.
- C. An overcooling event has occurred. EOP-5, Excessive Heat Transfer, should be entered.
- D. These indications are normal plant values following a reactor trip. No additional operator actions are required.

Reasons:

- A. If the PORV was leaking by RCDT level and/or pressure should be rising.
- B. Correct. While RCS pressure and temperature will decrease following a reactor trip the plant will have recovered to normal operating values within 15 minutes.
- C. Even though Tave is a little low the rest of the plant parameters don't support an overcooling event.
- D. 15 minutes after a reactor trip RCS pressure will be close to its normal setpoint of 2155 psig.

OPS 3-20, Obj. 4; OPS 3-20 Section 2-2.0.C

RO - New

Reference(s) provided: None



10. 008G2.4.4 001/2/1/RO #34/MEM 4.0/4.3/NEW/R/CR03501/

The following plant conditions exist:

- Plant is at normal full power operation.
- Both ES buses are currently powered from the OPT.

Which ONE of the following conditions would require entry into AP-330, Loss of Nuclear Services Cooling?

- A. Annunciator window C-1-8, "SW Surge Tank Level Low", has illuminated.
- B. Both ES 4160V buses have lost power and both EDGs have failed to start.
- C. ✓ Two CRD stator temperature computer points have alarmed and are slowly increasing.
- D. Outlet water temperature computer points from the running RB Main Fan Assemblies have alarmed and are slowly increasing.

Reasons:

Entry conditions for AP-330 are:

Temps of SW cooled components are high and rising,  
SW flow is lost and can NOT be restored,  
SW RW flow is lost and can NOT be restored,  
Surge tank level < 7 feet.

- A. This alarm annunciates at 8.5 feet. Entry into AP-330 is not required until the surge tank level is < 7 feet.
- B. SWP-1C and RWP-1 should still be available. Both DH/RW pumps are lost but only the loss of all SW/RW pumps meets the entry conditions.
- C. Correct. With component temperatures high and rising entry into AP-330 is required.
- D. During normal full power operation the RB fans are cooled by CI, not SW.

OPS 5-61, Obj. 2; AP-330

RO - New

Reference(s) provided: None

11. 008K4.02 001/2/1/RO #33/C/A 2.9/2.7/BANK/R/CR03501/4-077-002

The following plant conditions exist:

- SCV-146 (automatic fill valve to SCT-1) opened due to a valid low level in SCT-1.
- When SCT-1 level was restored SCV-146 failed to receive a close signal.
- SCV-146 is manually isolated by the operator 5 minutes after the malfunction.

Which ONE of the following problems will occur if no other operator actions are taken in the next two hours?

- A. The temperature of SC cooled components will begin to increase.
- B. ✓ SC System chemistry parameters will be taken out of specified ranges.
- C. SCT-1 level will continue to increase and exceed its maximum specified level.
- D. SCV-145 (SC pumps pressure regulating valve) will be unable to maintain SC System pressure at 60 psig.

Reasons:

- A. Isolation of DW to SCT-1 will have no effect on the cooling capability of the SC System.
- B. Correct. SCP-2, chemical injection pump, will auto-start when SCV-146 opens and will not automatically shutdown until SCV-146 closes. This will cause chemicals to be continually injected into the SC System until operator action shuts down the pump or the chemicals are depleted.
- C. If SCV-146 is properly isolated SCT-1 level should not increase.
- D. Isolation of DW to SCT-1 will have no effect on the ability of SCV-145 to control SC System pressure.

OPS 4-77, Obj. 4 & 7; OPS 4-77 Section 1-4.0.F.2 and 1-4.0.H.2; AR-402 EP 0333

RO - Bank

Reference(s) provided: None

12. 009EA1.11 001/1/1/RO #3/C/A 4.1/4.1/MOD/R/CR03501/3-025-004

The following plant conditions exist:

- A Small Break LOCA has occurred.
- Lowest RCS pressure during this event was 1385 psig.
- Current RCS pressure is 1435 psig.
- Incore thermocouples indicate 500° F.

Which ONE of the following is the minimum required setpoint for OTSG level IAW Rule 3?

- A. ✓ > 20" EFIC Lo Range.
- B. > 65% EFIC Hi Range.
- C. > 70% EFIC Hi Range.
- D. > 90% EFIC Hi Range.

Reasons:

- A. Correct. Adequate SCM does exist. RCPs should still be running. EFIC should be controlling at LLL, or > 20" as required by Rule 3.
- B. This is the actual EFIC setpoint if no RCPs are running.
- C. This is the required level per Rule 3 if no RCPs are running.
- D. This is the required level per Rule 3 if adequate SCM does not exist.

OPS 5-116, Obj. 1; EOP-13, Rule 3

History: NRCM98

RO - Modified

Reference(s) provided: Steam Tables

13. 010A4.02 001/2/1/RO #36/C/A 3.6/3.4/MOD/R/CR03501/4-009-006

The following plant conditions exist:

- Plant startup in progress with PZR level at 100".
- RC-1-LT1 (selected PZR level transmitter) slowly fails to 0".
- MUV-31 is selected to manual and PZR level is maintained at 100".

What affect, if any, will this failure have on PZR heater control?

- A. There will be a loss of all automatic and manual PZR heater control.
- B. SASS will transfer to the alternate level transmitter and PZR heater control will not be affected.
- C. ✓ There will be a loss of automatic PZR heater control of the SCR controlled heaters. Manual control of PZR heater bank "E" is available.
- D. There will be a loss of automatic PZR heater control of the SCR controlled heaters. Manual control of the SCR controlled heaters and PZR heater bank "E" is available.

Reasons:

- A. Manual and automatic control of PZR heater bank "E" is still available.
- B. SASS will not transfer due to the slow failure. Heater control will be affected.
- C. Correct. The selected PZR level inputs to the SCR controlled heaters. All automatic and manual control of these heaters is locked out on low level. Since LT3 is still indicating 100" heater bank "E" will function normally.
- D. Manual control of the SCR controlled heaters is not available.

OPS 4-9, Obj. 4 & 7; OPS 4-9 Section 1-4.B & Figure 4

History: NRCM98

RO - Modified

Reference(s) provided: None

14. 010K5.02 001/2/1/RO #35/C/A 2.6/3.0/BANK/R/CR03501/2-034-002

The following plant conditions exist:

- RCS pressure is 885 psig.
- RCDT pressure 5 psig.
- RCDT level 84 inches and slowly increasing.
- RCDT temperature 110° F and slowly increasing.
- Operations and Engineering have determined that the PORV is leaking by.

Which ONE of the following PORV tailpipe temperatures would be expected for these plant conditions?

- A.  $\approx 110^{\circ} \text{ F}$
- B.  $\approx 228^{\circ} \text{ F}$
- C. ✓  $\approx 310^{\circ} \text{ F}$
- D.  $\approx 532^{\circ} \text{ F}$

Reasons:

- A. This is RCDT temperature.
- B. This is Tsat for the RCDT.
- C. Correct. Using the Mollier diagram and a constant enthalpy process, a leaking valve at 885 psig (900 psia) would produce a downstream temperature of approximately 310° F if going to a 5 psig (20 psia) tank.
- D. This is Tsat for 885 psig (900 psia) if using Steam Tables.

OPS 2-34, Obj. 15; OPS 2-34 Section 1-7.0; Mollier Diagram

RO - Slightly modified - count as Bank

Reference(s) provided: Steam Tables with Mollier diagram



15. 011EA2.09 001/1/1/RO #4/C/A 4.2/4.3/BANK/R/CR03501/ROT 3-003-042

After a loss of coolant accident the following plant conditions exist:

- RCS pressure is 435 psig
- OTSG pressures are 140 psig
- Subcooling margin is 40° F

Based on these conditions which ONE of the following parameter values indicate that Natural Circulation has been established?

- A.  $T_{\text{hot}}$  is 456° F;  $T_{\text{cold}}$  is 428° F.
- B.  $T_{\text{hot}}$  is 416° F;  $T_{\text{cold}}$  is 428° F.
- C.  $T_{\text{hot}}$  is 456° F;  $T_{\text{cold}}$  is 360° F.
- D. ✓  $T_{\text{hot}}$  is 416° F;  $T_{\text{cold}}$  is 360° F.

Reasons:

$T_{\text{hot}}$  should be at saturation temperature for RCS pressure minus 40° F;  $T_{\text{cold}}$  should be at saturation temperature for OTSG pressure.

- A. This is the correct temperature for  $T_{\text{hot}}$  if the RCS was not 40° F subcooled.  $T_{\text{cold}}$  is not coupled to the OTSG.
- B.  $T_{\text{cold}}$  is not coupled to the OTSG.
- C. This is the correct temperature for  $T_{\text{hot}}$  if the RCS was not 40° F subcooled.
- D. Correct. A  $T_{\text{hot}}$  indication of 416° F is correct for RCS pressure of 450 psia and 40° F subcooled.  $T_{\text{cold}}$  indication of 360° F is saturation temperature for the existing OTSG pressure.

OPS 3-03, Obj. 3; OPS 3-03 Section 1-2.0.G

History: NRCN99

RO - Bank

Reference(s) provided: Steam Tables

16. 012K4.02 001/2/1/RO #37/C/A 3.9/4.3/BANK/R/CR03501/4-012-022

With the plant at 100% power which ONE of the following explains why a reactor trip occurs due to the loss of a reactor coolant pump?

- A. The RCS pressure increase, due to the decreasing RCS flow, is faster than the power decrease from the plant runback. This results in a reactor trip on high RCS pressure.
- B. ✓ The RCS flow decrease lowers the calculated power trip setpoint faster than the power decrease from the plant runback. This results in a flux/delta flux/flow trip.
- C. The RCS pressure increase, due to the decreasing feedwater flow, is faster than the power decrease from the plant runback. This results in a reactor trip on high RCS pressure.
- D. The RCS flow decrease, combined with the control rods running in, drives imbalance negative outside of the trip envelope. This results in a flux/delta flux/flow trip.

Reasons:

- A. RCS pressure will not increase to the high pressure trip setpoint with this failure.
- B. Correct. The function generator calculates the new high flux trip setpoint faster than plant power can be reduced by the plant runback.
- C. Feedwater flow will initially decrease faster than power but the FW Limited by Rx cross-limit will maintain FW flow high enough to limit the RCS pressure increase.
- D. While the rods running in will increase the negative imbalance it will never take imbalance outside the trip envelope on a power decrease to 75%.

OPS 4-12, Obj. 4 & 6; OPS 4-12 Section 1-5.0.F

RO - Bank

Reference(s) provided: None

17. 013A4.03 001/2/1/RO #39/C/A 4.5/4.7/MOD/R/CR03501/4-013-002

With the plant at full power a LOOP occurs. An overcooling event following the reactor trip has resulted with RCS pressure at 450 psig and RB pressure at 2.5 psig.

Which ONE of the following describes the status of DHP-1A, DHV-5 and BSV-3?

- |      |        |           |
|------|--------|-----------|
| A.   | DHP-1A | Off       |
|      | DHV-5  | Closed    |
|      | BSV-3  | Open      |
| B.   | DHP-1A | Off       |
|      | DHV-5  | Open      |
|      | BSV-3  | Closed    |
| C.   | DHP-1A | Running   |
|      | DHV-5  | Open      |
|      | BSV-3  | Throttled |
| D. ✓ | DHP-1A | Running   |
|      | DHV-5  | Open      |
|      | BSV-3  | Closed    |

Reasons:

- A. DHP-1A will be running and DHV-5 will be open. BSV-3 will not open until an RBIC actuation occurs.
- B. DHP-1A will be running.
- C. BSV-3 will remain closed until an RBIC actuation occurs. It will throttle when a building spray actuation occurs.
- D. Correct. Even with a LOOP, actuation of the 500# bistable will start DHP-1A. BSV-3 will remain closed until an RBIC actuation occurs.

OPS 4-13, Obj. 2; OPS 4-13 Section 1-5.0.F.14 and Table 6

History: NRCN99

RO - Modified

Reference(s) provided: None

18. 013K6.01 001/2/1/RO #38/C/A 2.7/3.1/NEW/R/CR03501/

RC-3A-PT3 (RCS pressure transmitter) rapidly fails to its mid-scale value of 1250 psig. Which ONE of the following describes the resulting plant response/condition?

- A. ✓ ES Channel 1 trips.
- B. RPS Channel A trips.
- C. Actual RCS pressure increases.
- D. SASS will transfer to the alternate transmitter prior to any plant upset occurring.

Reasons:

- A. Correct. With a failure mid-scale of 1250 psig then the range of this transmitter is 0 to 2500 psig. This is a wide range transmitter and only feeds an ES channel. ES Channel 1 will trip but no ES actuation will occur.
- B. RPS is fed by narrow range transmitters.
- C. Since no ES actuation occurred there will be no change in actual RCS pressure.
- D. These transmitters do not input to a SASS module.

OPS 4-09, Obj. 4 & 7; OPS 4-09 Section 1-4.0.D.1 and Figure 6

RO - New

Reference(s) provided: None

19. 014K4.06 001/2/2/RO #58/C/A 3.4/3.7/BANK/R/CR03501/4-028-006

The following information is available from the CRD PI panel and the computer for Absolute Position Indication (API) and Relative Position Indication (RPI):

Control Rod	RPI (PI Panel)	API (PI Panel)
7-1	92	93
7-2	93	92
7-3	88	85
7-4	93	93
7-5	94	94
7-6	91	92
7-7	91	92
7-8	92	92

From the above information evaluate the rod position indication with regard to Asymmetric conditions/faults and determine which ONE of the following is the correct indication?

- |      |  |     |
|------|--|-----|
| A.   | PI panel - Asymmetric Fault              | OFF |
|      | Diamond Control panel - Asymmetric Fault | OFF |
| B.   | PI panel - Asymmetric Fault              | OFF |
|      | Diamond Control panel - Asymmetric Fault | ON  |
| C.   | PI panel - Asymmetric Fault              | ON  |
|      | Diamond Control panel - Asymmetric Fault | OFF |
| D. ✓ | PI panel - Asymmetric Fault              | ON  |
|      | Diamond Control panel - Asymmetric Fault | ON  |

Reasons:

- A., B., C. Rod 7-3 is 6.625% below the group average (7.57% without the bad rod in the group average). An Asymmetric condition (6.5% = 9") does exist and both the Asymmetric Fault lights should be lit. (PI Panel and Diamond Control Panel)
- D. Correct. See above.

OPS 4-28, Obj. 3 & 4; OPS 4-28 Section 1-4.0.F.6.c

History: NRCM98

RO - Bank

Reference(s) provided: None



20. 015/017AA1.22 001/1/1/RO #5/C/A 4.0/4.2/BANK/R/CR03501/4-060-009

The plant is operating at 100% power when the following conditions are observed for the "B" Reactor Coolant Pump (RCP-1B).

- Second stage seal cavity pressure is 1055 psig.
- Third stage seal cavity pressure is 1055 psig.

Which ONE of the following describes the condition of RCP-1B's mechanical seal package?

- A. Only the first stage seal has failed.
- B. ✓ Only the second stage seal has failed.
- C. Both the first and the second stages have failed.
- D. Both the second and the third stages have failed.

Reasons:

- A. If the first stage seal had failed then the second stage seal cavity pressure would be  $\approx 2100$  psig and the third stage seal cavity pressure would be  $\approx 1100$  psig.
- B. Correct. With the second stage seal failed the second stage seal cavity pressure would be  $\approx 1055$  psig and the third stage seal cavity pressure would be  $\approx 1055$  psig.
- C. If both the first and second stages had failed then the second stage seal cavity pressure would be  $\approx 2100$  psig and the third stage seal cavity pressure would be  $\approx 2100$  psig.
- D. If both the second and third stages had failed then the second stage seal cavity pressure would be  $\approx 20$  psig and the third stage seal cavity pressure would be  $\approx 20$  psig.

OPS 4-60, Obj. 3 & 7; OPS 4-60 Section 1-4.0.J.7.c

RO - Bank

Reference(s) provided: None

21. 015K6.02 001/2/2/RO #59/C/A 2.6/2.9/BANK/R/CR03501/4-010-004

While performing a plant startup a power surge occurred in VBDP-5. The following conditions exist for NI-3:

- The detector power supply is operating normally.
- The auxiliary power supply is de-energized.

If NI-4 reads  $6.0 \times 10^{-11}$  amps which ONE of the following are the expected readings for NI-3?

Approximately:

- A. ✓  $2.9 \times 10^{-10}$  amps with a lower SUR than NI-4.
- B.  $2.9 \times 10^{-10}$  amps with a higher SUR than NI-4.
- C.  $2.9 \times 10^{-11}$  amps with a lower SUR than NI-4.
- D.  $2.9 \times 10^{-11}$  amps with a higher SUR than NI-4.

Reasons:

- A. Correct. With a failed auxiliary power supply there will be no gamma compensation. NI-3 will read higher than NI-4 with a lower SUR than NI-4.
- B. SUR will be lower than NI-4.
- C. NI-3 will read higher than NI-4.
- D. NI-3 will read higher than NI-4 with a lower SUR than NI-4.

OPS 4-10, Obj. 5; OPS 4-10 Section 1-4.0.B

RO - Bank

Reference(s) required: None

22. 017K5.03 001/2/2/RO #60/C/A 3.7/4.1/NEW/R/CR03501/

Which ONE of the following describes the indication the operator will receive on SPDS if the core is experiencing superheat conditions?

The SPDS screens will have a:

- A. positive number displayed with a yellow background.
- B. negative number displayed with a yellow background.
- C. ✓ positive number displayed with a red background.
- D. negative number displayed with a red background.

Reasons:

- A. A red background will be displayed when the core is superheated.
- B. A positive number and a red background will be displayed when the core is superheated.
- C. Correct. If the pressure/temperature point moves to the superheat region, the display will go full screen with a red background. The displayed number will be positive indicating the degrees of superheat.
- D. A positive number will be displayed.

OPS 4-21, Obj. 2, Section 1-4.0.D.7.e

RO - New

Reference(s) provided: None

23. 022A2.05 001/2/1/RO #40/C/A 3.1/3.5/NEW/R/CR03501/

During normal full power operation the following annunciator alarms are received:

- "REACTOR BLDG SW SYSTEM LEAK"
- "RB FAN A/B/C CLG WTR FLOW LOW"

Based on these alarms which ONE of the following describes the appropriate procedure to be used and actions to be taken?

- A. Enter AP-330, Loss of Nuclear Service Cooling, to swap RB fans to CI cooling. Check/fill SW surge tank.
- B. Enter AP-330, Loss of Nuclear Service Cooling, to isolate affected component(s). Check/fill CI surge tank.
- C. Use AR-303, ESC Annunciator Response, to swap RB fans to CI cooling. Check/fill SW surge tank.
- D. ✓ Use AR-303, ESC Annunciator Response, to isolate affected component(s). Check/fill CI surge tank.

Reasons:

- A. During normal full power operation the RB fans are aligned to CI. AP-330 should not be entered for a CI leak. SW surge tank level will not lower.
- B. During normal full power operation the RB fans are aligned to CI. AP-330 should not be entered for a CI leak.
- C. During normal full power operation the RB fans are aligned to CI. SW surge tank level will not lower.
- D. Correct. AR-303 guidance will isolate affected components. Since the RB fans are normally on CI the CI surge tank will need to be refilled.

OPS 4-63, Obj. 2-7 & 8; AR-303, EPs 1844 & 1841

RO - New

Reference(s) provided: None

24. 022AG2.4.45 001/1/1/RO #6/C/A 3.3/3.6/NEW/R/CR03501/

During normal full power operation the following annunciator alarms are received:

- "RC PUMP SEAL FLOWS LOW" immediately followed by
- "MAKEUP PP B GEAR OIL PRESS LOW"

Which ONE of the following describes a condition that will cause these alarms?

- A. MUP-1B breaker trip.
- B. ✓ MUP-1B sheared shaft.
- C. MUP-1B shaft driven gear oil pump failure.
- D. Increased friction within the 'speed increaser' gears on MUP-1B.

Reasons:

- A. A tripped pump will cause the RCP seal flow alarm but since the breaker is now open the gear oil pressure low alarm will not annunciate.
- B. Correct. A sheared shaft will cause decreased flow to the RCP seals and cause this alarm. Since the MUP breaker will still be closed then, after gear oil pressure decreases to < 7psig, the gear oil pressure low alarm will come in.
- C. A loss of the shaft driven gear oil pump will cause the gear oil pressure low alarm but should not affect RCP seal flow.
- D. If the friction gets great enough the MUP will eventually trip. This will cause the RCP seal flow alarm, but not the gear oil pressure low alarm.

OPS 4-52, Obj. 3, 7 & 8; AR-302 EP 1058

RO - New

Reference(s) provided: None

25. 025AA1.09 001/1/1/RO #7/MEM 3.2/3.1/BANK/R/CR03501/5-099-003

The following plant conditions exist:

- The plant is in Mode 5.
- RCS level 129.5 ft.
- DHP-1A in service.
- "DH PUMP A FLOW LOW" alarm is in and out of alarm.
- DHP-1A flow fluctuating.
- DHP-1A motor amps fluctuating.
- DHP-1B available and in standby.

Which ONE of the following describes the required operator actions IAW OP-404, Decay Heat Removal System?

- A. Place DHP-1B in service and then stop DHP-1A.
- B. ✓ Stop DHP-1A and fill RCS to greater than 130.6 ft.
- C. Stop DHP-1A and place the Makeup System in service.
- D. Raise RCS level to greater than 130.6 ft and ensure DHP-1A conditions stabilize.

Reasons:

- A. Limit and Precautions from OP-404, Decay Heat Removal System, requires that DH pumps be tripped when there is any evidence of cavitation.
- B. Correct. Per OP-404 and AP-404 the DHP would be stopped due to cavitation and the RCS refilled to greater than 130.6 ft.
- C. Makeup System would only be placed in service if there were no available Decay Heat trains.
- D. Limit and Precaution from OP-404, Decay Heat Removal System, requires that DH pumps be tripped immediately when there is any evidence of cavitation.

OPS 4-54, Obj. 5 & 8; AP-404 Step 3.8; OP-404 Step 3.2.2

RO - Bank

Reference(s) provided: None

26. 026A3.01 001/2/1/RO #42/C/A 4.3/4.5/MOD/R/CR03501/4-062-002

The following plant conditions exist:

- HPI, LPI, RBIC and BS have actuated.
- HPI, LPI and RBIC were bypassed following actuation.
- BSV-4 automatic control has failed and manual flow control has been established.
- Remote/Local switch was left in the Remote position.
- During trouble shooting activities associated with BSV-4, BSP-1B experienced a spurious trip.

Assuming BSP-1B and BSV-4 automatic control circuitry has been repaired, which ONE of the following methods would be successful in returning BSV-4 to Remote/Auto control?

- A. Depressing the auto pushbutton will return BSV-4 to auto with flow controlled at 1500 gpm.
- B. Depressing the auto pushbutton will return BSV-4 to auto with flow controlled at 1200 gpm.
- C. ✓ The auto pushbutton must be depressed and RBIC must be re-actuated in order to restore the Remote/Auto setpoint.
- D. The auto pushbutton must be depressed and HPI must be re-actuated in order to restore the Remote/Auto setpoint.

Reasons:

- A. Since BSP-1B tripped after RBIC was bypassed the automatic (1500 gpm) signal was lost. RBIC must be re-actuated to restore this signal.
- B. The Remote/Auto setpoint is 1500 gpm. The Local/Auto setpoint is 1200 gpm.
- C. Correct. Since BSP-1B tripped after RBIC was bypassed the automatic (1500 gpm) signal was lost. RBIC must be re-actuated to reinstate the Remote/Auto setpoint.
- D. This method will not restore the Remote/Auto setpoint. The HPI actuation has no input to the BSV-4 controller, only the BSP start circuit.



OPS 4-62, Obj. 4; OPS 4-62 Sections 1-4.0.C

RO - Modified

Reference(s) provided: None

27. 026AA2.01 001/1/1/RO #8/C/A 2.9/3.5/BANK/R/CR03501/5-061-003

The plant is at full power with the following plant conditions:

- The nuclear services surge tank level is slowly decreasing.
- SWV-277 (SW Surge Tank fill valve) is full open.
- The RO has estimated the SW leak rate to be in excess of 80 gpm.
- The reactor building and auxiliary building sump levels are not increasing.
- All nuclear services heat exchangers have been rotated into operation with no change in conditions.
- RCS makeup, letdown and MUT level are steady.
- There are no reactor building SW system leak annunciators in alarm.

Where ONE of the following describes the location of the SW leak?

- A. The reactor coolant drain tank.
- B. ✓ The spent fuel cooling system.
- C. The primary sample cooler.
- D. The in-service reactor coolant pump seal return cooler.

Reasons:

- A. No leak annunciators in alarm will rule this tank out. SW Tank level lowering with the fill valve open indicates a leak greater than the 50 gpm differential required to cause the leak annunciators to be in alarm. The ROs leak rate estimate confirms the leak rate is greater than 50 gpm.
- B. Correct. This system is the only location for this leak with these conditions.
- C. SW would not leak out of this cooler; RCS will leak into the SW System.
- D. MUT level or the auxiliary building sump level would increase.

OPS 5-61, Obj. 5; OPS 5-61 Section 1-4.0.I; AP-330 Steps 3.5 & 3.25

History: NRCN99

RO - Bank

Reference(s) provided: None

28. 026G2.1.32 001/2/1/RO #41/MEM 3.4/3.8/BANK/R/CR03501/4-062-003

Which ONE of following describes the basis for the Limit and Precaution for minimum RB pressure during the performance of SP-340B, BSP-1A and Valve Surveillance?

- A. This establishes the conditions necessary for RB spray flow control valve (BSV-3/4) stroke time determination for operability.
- B. This ensures adequate NPSH for the RB spray pumps (BSP-1A/1B) if an accidental discharge of the RB spray system were to occur.
- C. ✓ This prevents exceeding the negative design pressure of the RB if an accidental discharge of the RB spray system were to occur.
- D. This ensures the minimum 40 psig pressure drop across the spray nozzles if an accidental discharge of the RB spray system were to occur.

Reasons:

- A. The building pressure will not affect the stroke time for this surveillance.
- B. NPSH is supplied from the BWST during this surveillance.
- C. Correct. This is the stated reason as found in SP-340B, L & P 3.5.4.
- D. This is the design number for  $\Delta P$  but has nothing to do with this surveillance.

OPS 4-62, Obj. 5; SP-340B, Step 3.5.4

RO - Bank

Reference(s) provided: None

29. 028AK2.02 001/1/2/RO #20/C/A 2.6/2.7/NEW/R/CR03501/

The following plant conditions exist:

- Plant is at 100% power.
- The temperature transmitter used by the selected PZR level transmitter slowly fails high.

Which ONE of the following describes what effect, if any, this malfunction will have on MUV-31 (PZR level control valve) operation? Assume no operator actions are performed.

MUV-31 will throttle in the:

- A. closed direction resulting in a low pressure reactor trip.
- B. open direction resulting in a high pressure reactor trip.
- C. ✓ closed direction resulting in level being maintained at a new lower level.
- D. open direction resulting in level being maintained at a new higher level.

Reasons:

- A. Indicated level will be high so MUV-31 will close in an attempt to restore level to setpoint. A new, lower level, approximately 207", will be maintained.
- B. If temperature compensation fails high then indicated level will go high. This will cause MUV-31 to close, not open.
- C. Correct. When the temperature transmitter fails high MUV-31 signal indicates about 232". The valve will close until this signal reaches about 220" and then MUV-31 will throttle open to maintain this new, lower level. Approximately 207" actual level.
- D. MUV-31 will throttle in the closed direction.

OPS 2-25, Obj. 66; OPS 2-25 Section 1-6.0.B.4.c).3)

RO - New

Reference(s) provided: None

30. 029EK2.06 001/1/1/RO #9/MEM 2.9/3.1/NEW/R/CR03501/

With the plant at full power an RCS pressure excursion is in progress. Three RPS channels have failed to actuate. As RCS pressure increases which of the following describes how DSS (Diverse Scram System) will shut down the reactor?

DSS will open contacts in:

- A. parallel with the "E" and "F" electronic trip contacts.
- B. ✓ series with the "E" and "F" electronic trip contacts.
- C. parallel with the DC hold bus to de-energize "A" and "CC" phases.
- D. series with the DC hold bus to de-energize "A" and "CC" phases.

Reasons:

- A. DSS opens contacts in series with "E" and "F" electronic trip contacts.
- B. Correct. When both channels of DSS trip (2450 psig) contacts in series with the "E" and "F" electronic trip contacts will open. This will kill gating power to the regulating rods and they will insert into the core.
- C. & D. The DC hold bus does energize "A" and "CC" phases but this power is not interrupted from a DSS actuation.

OPS 4-12, Chapter 2, Obj. 2; OPS 4-12 Section 2-2.0.C; OPS 4-28 Figure 22

RO - New

Reference(s) provided: None

31. 038EA2.08 001/1/1/RO #10/C/A 3.8/4.4/NEW/R/CR03501/

The following plant conditions exist:

- Reactor has tripped.
- One TV and two GVs failed to close.
- EOP-2, Vital System Status Verification, immediate actions have been completed.
- The crew has transitioned to EOP-6, Steam Generator Tube Rupture, due to a 50 gpm tube leak on the "A" OTSG.
- "A" OTSG level is 100 inches and increasing slowly.
- RCS temperature is 490° F.
- BWST level is 44 feet.
- Initial Dose Equivalent Iodine-131 -- 2.53 E-3 uCi/g.
- Peak Dose Equivalent Iodine-131 -- 6.27 E-3 uCi/g .

Which ONE of the following describes the RCS cooldown method that should be ~~used until~~ DHR is established?  
*in effect when*

Use the:

- A. "B" OTSG only and steam to the condenser.
- B. "A" and "B" OTSGs and steam to the condenser.
- C. ✓ "B" OTSG only and steam to atmosphere.
- D. "A" and "B" OTSGs and steam to atmosphere.

Reasons:

- A. The "A" OTSG cannot be steamed to the condenser because the MSIVs are closed.
- B. Neither OTSG can be steamed to the condenser because the MSIVs are closed.
- C. Correct. The "A" OTSG meets the TRACC criteria for Initial Dose Equivalent Iodine. With the failure of the TVs and GVs to close the operator would have closed the MSIVs and isolated the OTSGs from the condenser.
- D. The "A" OTSG meets the TRACC criteria and will be isolated.



OPS 5-101, Obj. 5; OPS 5-101 Step 3.33; EOP-6 Step 3.33

RO - New

Reference(s) provided: EOP-6

32. 039K4.05 001/2/1/RO #43/C/A 3.7/3.7/NEW/R/CR03501/

A plant heatup is in progress. Which ONE of the following conditions will cause the MSIVs and the EFW valves on the "A" OTSG to close?

- A. "A" & "B" OTSGs are at 650 psig.  
A steam leak develops and "A" OTSG pressure decreases to 525 psig.  
"B" OTSG remains at 650 psig.
- B. ✓ "A" & "B" OTSGs are at 750 psig.  
A FW problem occurs causing the "A" OTSG pressure to decrease to 575 psig and the "B" OTSG pressure to decrease to 625 psig.
- C. "A" OTSG is at 750 psig.  
"B" OTSG is at 700 psig.  
A steam leak develops and "A" OTSG pressure decreases to 525 psig.  
"B" OTSG pressure remains at 700 psig.
- D. "A" OTSG is at 750 psig.  
"B" OTSG is at 800 psig.  
A FW problem occurs causing the "A" OTSG pressure to decrease to 475 psig and the "B" OTSG pressure to decrease to 575 psig.

Reasons:

- A. EFIC is still bypassed in this condition and will not actuate at the 600 psig setpoint. BOTH OTSGs must get above 732 psig to release the bypass.
- B. Correct. Once BOTH OTSGs are greater than 732 psig EFIC automatically comes out of bypass. When the "A" OTSG gets below 600 psig the MSIVs will close. Since "B" OTSG is still above 600 psig the FOGG circuit will close the EFW valves to the "A" OTSG.
- C. EFIC is still bypassed at this point. BOTH OTSGs must get above 732 psig to release the bypass.
- D. Once BOTH OTSGs are greater than 732 psig EFIC automatically comes out of bypass. Since both OTSGs are now under 600 psig the MSIVs on both OTSGs will close. However, since both OTSGs are less than 600 psig, but the delta P between them is less than 125 psig, FOGG will not close either set of EFW valves.

OPS 4-31, Obj. 2; OPS 4-31 Sections 1-4.0.G & 1-4.0.J

RO - New

Reference(s) provided: None

33. 039K5.08 001/2/1/RO #44/MEM 3.6/3.6/MOD/R/CR03501/1-047-001

Which ONE of the following describes the most restrictive analyzed conditions to ensure adequate SDM is maintained?

- A. BOL; 579° F; Ejected rod
- B. EOL; 532° F; Ejected rod
- C. BOL; 579° F; Main Steam Line Break
- D. ✓ EOL; 532° F; Main Steam Line Break

Reasons:

As the core ages MTC becomes increasingly more negative. A steam line break results in a cooldown of the RCS and MTC adds positive reactivity as this occurs. Because MTC has a larger negative value as the core ages, the effect of the steam line break gets greater also.

OPS 1-47, Obj. 15; OPS 1-47, Section 1-4.0.C.3; OPS 1-51, Section 1-6.0.B.3; OPS 3-08, Section 3-1.0.D.1.b; TS 3.1.1 Basis

RO - Modified

Reference(s) provided: None

34. 041A1.02 001/2/2/RO #61/C/A 3.1/3.2/BANK/R/CR03501/4-014-004

During a plant start-up the following conditions exist:

- Turbine header pressure is 870 psig and increasing slowly.
- Turbine is in operator auto with one generator output breaker closed.
- The ULD demand signal is less than 12%.
- All turbine bypass valves are closed.

If turbine header pressure continues to increase which ONE of the following values will be the earliest pressure that the turbine bypass valves should begin to open? (assume header pressure at setpoint for normal operation)

- A. 885 psig
- B. ✓ 895 psig
- C. 935 psig
- D. 1010 psig

Reasons:

- A. With the turbine and reactor not tripped and all TBVs closed with less than a 10# header pressure error the bias applied is 50#. The bias is released if a 10# header pressure error exists. At this pressure the bias is still applied.
- B. Correct. When pressure reaches 10# above setpoint the bias is released. The TBVs open to lower pressure back to setpoint.
- C. This is the correct pressure if the bias did not release.
- D. This is the correct pressure if the reactor tripped.

OPS 4-14, Obj. 3; OPS 4-14 Sections 1-4.0, 1-15 Table 3

History: NRCM98

RO - Bank

Reference(s) provided: None

35. 045K4.13 001/2/2/RO #62/MEM 2.6/2.8/MOD/R/CR03501/ROT 4-022-031

Placing the OPC key switch, located on the EHC lower operator panel, to the "Overspeed Test" position:

- A. ✓ bypasses the 103% overspeed protection signal to allow testing of the mechanical overspeed trip device.
- B. injects a 103% overspeed signal to test the mechanical overspeed trip device.
- C. bypasses the 103% overspeed protection signal to allow testing of the electronic overspeed trip device.
- D. injects a 103% overspeed signal to test the electronic overspeed trip device.

Reasons:

- A. Correct. In the "Overspeed Test" position the 103% signal is defeated to allow the mechanical overspeed trip device to be tested at 110% of rated speed.
- B. The 103% speed signal is only inserted when the key switch is placed in the "Test" position.
- C. The mechanical overspeed trip device is tested.
- D. The 103% speed signal is only inserted when the key switch is placed in the "Test" position.

OPS 4-22, Obj. 3 & 4; OPS 4-22 Section 1-5.0.B.4.k

RO - Modified

Reference(s) provided: None

36. 051AA2.02 001/1/2/RO #21/C/A 3.9/4.1/NEW/R/CR03501/

The following plant conditions exist:

- The plant is at 25% power.
- Both condenser air removal pumps are operating.
- The "TURB VACUUM PRETRIP" alarm has just annunciated.
- Low pressure turbine exhaust temperature has increased to 255° F.

Based on these conditions which ONE of the following action(s) is required to be taken?

- A. Increase turbine hood spray flow to lower turbine exhaust temperature.
- B. ✓ Trip the main turbine immediately and enter AP-660, Turbine Trip.
- C. Notify available operators to visually inspect turbine building for vacuum leaks.
- D. Trip the reactor immediately and enter EOP-2, Vital Systems Status Verification.

Reasons:

- A. Hood spray is a fixed value. Flow cannot be increased.
- B. Correct. The pretrip alarm comes in at 25 in-Hg. Since this is below the vacuum limit for 25% power, and reactor power is less than 45%, then the immediate action is to trip the turbine.
- C. This is the correct action to take if vacuum had not already reached the pretrip alarm value.
- D. If vacuum cannot be maintained the reactor may be tripped later, but is not a requirement at this time.

OPS 4-93, Obj. 5, 8 & 9; OPS 4-93 Section 1-8.A; OP-607 Step 3.2.4; AR-603 EP 1630

RO - New

Reference(s) provided: None

37. 054AG2.4.49 001/1/1/RO #12/C/A 4.0/4.0/NEW/R/CR03501/

With the plant at 15% power all main feedwater is lost. With proper operator response which ONE of the following describes the expected power level and turbine header pressure values 20 minutes later?

- A. Reactor power is 15%.  
Turbine header pressure is 885 psig.
- B. ✓ Reactor power is 4%.  
Turbine header pressure is 885 psig.
- C. Reactor power is 4%.  
Turbine header pressure is 935 psig.
- D. Reactor is tripped.  
Turbine header pressure is 1010 psig.

Reasons:

- A. Per AI-505, Enclosure 1, Step 3.6, the turbine must be tripped and power reduced below 5% as quickly as possible.
- B. Correct. Power level is less than 5% and header pressure is correct for a tripped turbine.
- C. Since the turbine is tripped there will be no bias applied to header pressure setpoint. Pressure should be 885 psig.
- D. The reactor should not be tripped.

OPS 5-14, Obj. 11; AI-505, Enclosure 1, Step 3.6

RO - New

Reference(s) provided: None



38. 055EA1.07 001/1/1/RO #13/C/A 4.3/4.5/BANK/R/CR03501/5-030-001

A station blackout has occurred and appropriate procedures have been entered.  
The following plant conditions now exist:

- Neither diesel is running.
- No ES 4160V Bus fault exists.
- The Off-site Power Transformer has been repaired.
- DIESEL GEN A BREAKER CLOSED annunciator alarm (Q-02-03) is NOT lit.

IAW AP-770 the BOP closes the Off-site transformer breaker, 3211. However, when the breaker control handle was released five seconds later, annunciator Q-02-01, 4KV ES BUS A DEAD, was still in alarm. Which ONE of the following conditions is responsible for this alarm not clearing?

- A. The "A" ES 4160V Bus AY knife switch is open.
- B. The 4160V ESA UV RESET pushbutton was not depressed.
- C. ✓ The "A" ES 4160V bus undervoltage relays did not reset.
- D. The 480V ES undervoltage lockout has not been reset.

Reasons:

- A. The diesel generator breaker did not attempt to close and there is no reason to open the AY knife switch.
- B. The 4160V ESA UV RESET pushbutton is depressed following 3211 closure. Step 3.14 of AP-770.
- C. Correct. The control handle for the breaker has to be held until the undervoltage relays reset.
- D. There is no interlock between the 480V ES undervoltage lockout and the 4160V ES bus.

OPS 5-30, Obj. 7; AP-770, Step 3.16

RO - Bank

Reference(s) provided: None

39. 055K3.01 001/2/2/RO #63/C/A 2.5/2.7/BANK/R/CR03501/4-093-004

The plant is operating at 25% RTP when the control board operator notices a slow degradation of condenser vacuum. Ten minutes later the following conditions exist:

- OP-607, Condenser Vacuum Systems, Section 4.5, Loss of Vacuum, has been entered.
- Condenser vacuum is 4" Hg absolute.
- Condenser  $\Delta T$  is 3° F.
- "A" Air Removal Pump, ARP-1A, has tripped.
- "B" Air Removal Pump, ARP-1B, has failed to auto-start and cannot be manually started.

Which ONE of the following describes required operator action(s), if any, and the status of condenser vacuum?

- A. The main turbine should be manually tripped; procedural limits have been exceeded. Condenser vacuum will continue to degrade following the turbine trip.
- B. The main turbine should be manually tripped; procedural limits have been exceeded. Condenser vacuum will stabilize following the turbine trip.
- C. ✓ Condenser vacuum is within procedural limits; condenser vacuum will continue to degrade.
- D. Condenser vacuum is within procedural limits; condenser vacuum will stabilize prior to reaching the turbine trip setpoint.

Reasons:

- A. For this power level a turbine trip is not required unless condenser vacuum exceeds 4.5" Hg absolute.
- B. For this power level a turbine trip is not required unless condenser vacuum exceeds 4.5" Hg absolute. Vacuum will continue to degrade after a turbine trip.
- C. Correct. Vacuum is within limits for this power level and will continue to degrade as non-condensable gases build up in the condenser.
- D. Vacuum will continue to degrade under these conditions.

OP-607 Step 3.2.4

History: NRCN99

RO - Bank

Reference(s) provided: None

40. 056AA1.06 001/1/1/RO #14/C/A 3.6/3.6/BANK/R/CR03501/4-013-009

The following plant conditions exist:

- MUP-1A is tagged out.
- EDG-1A is tagged out.
- A Loss of Offsite Power has occurred.
- The resulting reactor trip causes an RCS leak with RCS pressure decreasing to 1575 psig.
- RB pressure has increased to 4.3 psig.

<b>"A" Train</b>		<b>"B" Train</b>	
<b><i>Component</i></b>	<b><i>ES Status Lights</i></b>	<b><i>Component</i></b>	<b><i>ES Status Lights</i></b>
MUP-1A	OUT	MUP-1B	OUT
MUP-1B	GREEN	MUP-1C	GREEN
MUV-23	AMBER	MUV-25	GREEN
MUV-24	AMBER	MUV-26	GREEN
MUV-73	AMBER	MUV-58	GREEN
MUV-53	AMBER	MUV-257	GREEN
AHF-1A High	GREEN	AHF-1B High	GREEN
AHF-1A Low	AMBER	AHF-1B Low	GREEN
DHV-5	AMBER	DHV-6	GREEN
DHP-1A	AMBER	DHP-1B	AMBER
MUV-586	GREEN	MUV-586	GREEN
MUV-587	GREEN	MUV-587	GREEN

Based on the above conditions which ONE of the following describes the status of ES components?

- A. ✓ All components have actuated/responded as expected.
- B. All "A" Train components have actuated/responded as expected with the exception of MUV-586 & 587.
- C. All "B" Train components have actuated/responded as expected with the exception of DHP-1B.
- D. All "A" Train components have actuated/responded as expected with the exception of MUP-1B.

Reasons:

- A. Correct. For these conditions all components have responded properly, see B., C., and D. for reasons for other component variations.
- B. MUV-586 & 587 are DC powered valves and have responded correctly.
- C. DHP-1B responded correctly and should not have started from the RBIC cascade due to the LOOP.
- D. MUP-1B breaker has closed (green light comes off of breaker position) however the pump is not running due to the loss of power.

OPS 4-12, Obj. 2; OPS 4-13 Tables 1 & 2

RO - Bank

Reference(s) provided: None

41. 057G2.1.28 001/1/1/RO #15/MEM 3.2/3.3/NEW/R/CR03501/

The "Inverter A Available" light (located on the 'Standby Power Status' section of the MCB) has extinguished. Which ONE of the following describes the purpose of the "Inverter Available" light?

- A. AC power *to* VBIT-1A is less than 72 volts.
- B. ✓ AC power *from* VBIT-1A is less than 72 volts.
- C. VBIT-1A has swapped to its backup AC power supply.
- D. VBIT-1A has swapped to its backup DC power supply.

Reasons:

- A. If AC input power degrades DC will automatically supply the inverter.
- B. Correct. This light will extinguish if the output of the inverter decreases to < 72 volts.
- C. This light only looks at inverter output voltage. Backup power for the inverter is DC.
- D. This light only looks at inverter output voltage.

OPS 4-91, Obj. 6; OPS 4-91 Section 1-5.0.A

RO - New

Reference(s) provided: None

42. 058AK3.01 001/1/1/RO #16/C/A 3.4/3.7/NEW/R/CR03501/

125 VDC for the "A" Emergency Diesel Generator has been lost. Which ONE of the following describes the effect this failure has on the "A" EDG and the reason for this effect?

The "A" EDG will:

- A. remain shutdown due to power being lost to the air start solenoid valves.
- B. remain shutdown due to the start relays being energized-to-actuate relays.
- C. ✓ start due to power being lost to the air start solenoid valves.
- D. start due to the start relays being de-energized-to-actuate relays.

Reasons:

- A. The EDG will start.
- B. The EDG will start.
- C. Correct. The EDG will start because the air start solenoid valves lose power and port air to the engine. The valves will remain open and exhaust all air from the air reservoirs.
- D. The start relays require DC power to operate.

OPS 4-06, Obj. 4 & 7; OPS 4-06 Section 1-4.0.D.4, 1-4.0.L.5 & Section 1-8.0;  
AR-302 EP 1195

RO - New

Reference(s) provided: None

43. 059AK1.01 001/1/2/RO #22/MEM 2.7/3.1/BANK/R/CR03501/2-030-001

The following conditions exist:

- 100% reactor power.
- Approximately 1000 gallons of Reactor Coolant has been drained to an empty RCBT.
- Two hours later a valve alignment error results in an accidental liquid radwaste release of the contents of the RCBT to the environment.

Which ONE of the following statements describes a potential radiation hazard associated with this release and the intensity of that radiation hazard?

- A. Nitrogen-16 will be a hazard and will produce a high energy gamma.
- B. Nitrogen-16 will be a hazard and will produce a low energy Beta.
- C. Tritium will be a hazard and will produce a high energy gamma.
- D. ✓ Tritium will be a hazard and will produce a low energy Beta.

Reasons:

- A. & B. Nitrogen-16 has a very short half life and would be a minimal contributor to radiation hazards within a few minutes of storage in the RCBT.
- C. Tritium produces a very low energy Beta.
- D. Correct. The tritium beta has an energy of about 20 Kev.

OPS 2-30, Obj. 74; OPS 2-30 Section 2-13.0.I

RO - Slightly modified - count as Bank

Reference(s) provided: None



44. 059K3.02 001/2/1/RO #45/C/A 3.6/3.7/MOD/R/CR03501/4-012-013

The following plant conditions exist:

- A power increase is in progress with reactor power at 55%.
- VBDP-9 is out of service.
- "A" train Main Feedwater (MFW) flow momentarily decreases to 9 E5 lbm/hr then immediately recovers back to 2.8 E6 lbm/hr.
- "A" and "B" FW Loop Demands are at 47%.

If AMSAC Channel "B" were to actuate one minute later which ONE of the following describes the resulting plant response?

- A. Only "A" EFIC Train will actuate.
- B. ✓ Only "B" EFIC Train will actuate.
- C. Both trains of EFIC will actuate; the turbine and reactor will trip.
- D. Both trains of EFIC will actuate; the turbine will trip and the reactor will runback to about 18% power.

Reasons:

- A. Only "B" EFIC Train will actuate.
- B. Correct. "A" MFW flow would have to decrease to <17% of scale on both the SU and main FW flow ranges. With FW loop demands at 47% the MBVs are not open and flow is still seen by the SU flow transmitters. The values given will only decrease main FW flow below 17%. The loss of VBDP-9 de-energizes "C" Channel of EFIC. This channel is now sending a 1/2 trip signal to the other 3 EFIC cabinets. AMSAC Channel "B" inputs to "D" Channel. With this combination, C and D Channels tripped, only the "B" Train of EFIC will receive a full trip signal. The "A" EFIC Train will remain in a 1/2 trip condition.
- C. Only "B" Train will actuate and the turbine/reactor will not trip.
- D. Only "B" Train will actuate and the turbine/reactor will not trip.

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OPS 4-12, Obj. 4; OPS 4-31 Obj. 2, 4 & 6, OPS 4-12 Section 2-3.0.B; OPS 4-31  
Sections 1-2.0.A, B & C

RO - Modified

Reference(s) provided: None

45. 061AK2.01 001/1/2/RO #23/C/A 2.5/2.6/BANK/R/CR03501/4-025-012

The following plant conditions exist:

- The reactor has been tripped for 30 minutes
- Tave is constant at 552° F.
- Pressurizer level is decreasing.
- MUV-31 is full open.
- Makeup tank level is decreasing.
- Reactor Building (RB) pressure is 0.5 psig and steady.
- The "A" OTSG is at low level limits.
- The "B" OTSG is at 40 inches and increasing.

Which ONE of the following radiation monitors would be in alarm or increasing towards an alarm setpoint?

- A. RM-A6, Reactor Building Ventilation Duct Monitor.
- B. ✓ RM-A12, Condenser Vacuum Pump Off Gas Monitor.
- C. RM-G26, "B" Main Steam Line Monitor.
- D. RM-G29, Containment D Ring Monitor.

Reasons:

- A. These parameters indicate an OTSG tube leak is in progress. Unless there is also a steam leak in containment this monitor will not increase.
- B. Correct. RM-A12 will detect any activity, not just short-lived N-16 gammas.
- C. While this monitor is very accurate when the reactor is on line producing N-16 gammas within a few minutes after the reactor is shut down this monitor will trend back to its base value.
- D. These parameters indicate an OTSG tube leak is in progress. Unless there is also a steam leak in containment this monitor will not increase.

OPS 4-25, Obj. 3; OPS 4-25 Section 1-4.0.D & 1-4.0.F.7

RO - Slightly modified - count as Bank.

Reference(s) provided: None

46. 061K5.01 001/2/1/RO #46/MEM 3.6/3.9/BANK/3.9/CR03501/5-116-003

Which ONE of the following plant conditions would require EFW/AFW flow in order to ensure sufficient primary-to-secondary heat transfer for core protection?

Certain size:

- A. large break LOCAs with two Makeup pumps available.
- B. large break LOCAs with one Makeup pump available.
- C. small break LOCAs with two Makeup pumps available.
- D. ✓ small break LOCAs with one Makeup pump available.

Reasons:

- A. & B. Large break LOCAs do not require this minimum flow per the step basis document.
- C. This minimum flow is not required for core cooling if two MUPs are available.
- D. Correct. The step basis document lists a SBLOCA with only one MUP as the reason for this step.

OPS 5-116, Obj. 2; EOP-13, Rule 3; EOP Cross-Step Document

RO - Bank

Reference(s) provided: None

47. 062AK3.03 001/1/1/RO #17/C/A 4.0/4.2/BANK/R/CR03501/5-014-005

The following plant conditions exist:

- A controlled plant shutdown is in progress due to a shaft failure of RWP-2A.
- The reactor is critical with RCS temperature at 545° F.
- PZR level is 95".
- The SPO reports that CWTS-2 is completely clogged with debris and will not start. Its flume water level is almost empty.
- CWTS-1A through 1G are operating per design.

Based on these conditions, which ONE of the following actions should be evaluated and what would be the reason for performing the action?

- A. Continue the shutdown. Redundant equipment is available to compensate for CWTS-2 fouling.
- B. Continue the shutdown and actuate EFIC due to the imminent loss of Circulating Water cooling to the condenser.
- C. Trip the reactor due to pressurizer level being under 100 inches.
- D. ✓ Trip the reactor due to the imminent loss of Nuclear Services Raw Water flow.

Reasons:

- A. This failure will render RWP-1 and RWP-2B inoperable. No redundant equipment is available to supply SW RW so the reactor should be tripped.
- B. CW cooling is not affected by this failure.
- C. During a plant startup or shutdown PZR level is allowed to be <100" without tripping the reactor.
- D. Correct. Per AP-330, the reactor should be tripped on a loss of SW RW flow.

OPS 5-61, Obj. 5; AP-330 Step 3.2

History: NRCN99

RO - Bank

Reference(s) provided: None

48. 062K1.02 001/2/1/RO #47/MEM 4.1/4.4/BANK/R/CR03501/4-006-005

SP-354A, Monthly Functional Test of the Emergency Diesel Generator, is in progress with the EDG output breaker closed and an electrical load of 2800 kW. A grid disturbance occurs and grid frequency *slightly* increases.

Which ONE of the following describes the effect this will have on the operating EDG?

- A. The EDG output breaker will automatically open due to an over power relay actuation.
- B. The EDG output breaker will automatically open due to a reverse power relay actuation.
- C. There should be minimal effect to the EDG due to the Unit/Parallel switch being selected to Parallel.
- D. ✓ There should be minimal effect to the EDG due to the Speed Droop being set at 60.

Reasons:

- A. There should be minimal effect on the EDG. Also, if anything happens, the EDG will shed load, not pick up load.
- B. There will be minimal effect on the EDG.
- C. The Unit/Parallel switch being selected to Parallel only affects voltage droop. The speed droop selection determines how the EDG responds to changes in frequency.
- D. Correct. With Speed Droop set to 60 the EDG is allowed to slow down or speed up slightly and follow grid frequency.

OPS 2-16, Obj. 42; OPS 2-16 Section 1-7.0.R; OPS 4-06 Section 1-4.0.B.2.d

History: NRCN99

RO - Bank

Reference(s) provided: None



49. 063K2.01 001/2/1/RO #48/C/A 2.9/3.1/NEW/R/CR03501/

DPDP-1B has experienced a catastrophic failure and power is lost to the DC bus it supplies. Which of the following components will lose power as a result of this failure?

- |    |        |                                     |
|----|--------|-------------------------------------|
| 1. | EFV-32 | EFP-2 block valve to the "B" OTSG   |
| 2. | EFV-33 | EFP-3 block valve to the "B" OTSG   |
| 3. | EFV-55 | EFP-2 control valve to the "B" OTSG |
| 4. | EFV-57 | EFP-3 control valve to the "B" OTSG |
- 
- A. 1 and 2
- B. ✓ 2 and 3
- C. 3 and 4
- D. 1 and 4

Reasons:

- A. Due to single failure concerns in the EFW system the block valves are powered from the opposite electrical train. EFV-32 is powered from DPDP-8C, which is powered from DPDP-1A.
- B. Correct. See A above. EFV-33 is powered from DPDP-8D and EFV-55 is powered from DPDP-5B. Both of these DPDPs are powered from DPDP-1B
- C. EFV-57 is powered from DPDP-5A, which is powered from DPDP-1A.
- D. See A above. Even though EFV-32 is in the "B" EFW train flowpath it is powered from DPDP-8C, which is powered from DPDP-1A.

OPS 4-37, Obj. 3; OPS 4-37 Sections 1-4.0.H.2 and 1-4.0.I.7

RO - New

Reference(s) provided: None

50. 064A4.06 001/2/1/RO #49/MEM 3.9/3.9/BANK/R/CR03501/4-006-002

EOP-8, LOCA Cooldown, is in progress. HPI and LPI actuated as designed and recovery efforts are in progress. The CRS directs you to shut down the EDGs. Which ONE of the following methods would be used to shut down the EDGs IAW OP-707, Operation of the ES Emergency Diesel Generators?

- A. Place the Normal/At Engine switch to At Engine and direct the primary plant operator to depress the reset pushbuttons in the EDG engine room.
- B. Bypass or reset the ES actuation and direct the primary plant operator to depress the Emergency Stop pushbutton in the EDG control room.
- C. ✓ Bypass or reset the ES actuation and depress the Stop pushbutton on the main control board.
- D. Use the speed changer to decrease EDG load to approximately 100 kW and then depress the stop pushbutton on the main control board.

Reasons:

- A. Operation of this switch will prevent the EDG from starting due to an ES actuation but will not shutdown the engine if it is already running.
- B. The Emergency Stop pushbutton will stop the EDG with an ES signal present but this would not be the normal method to secure the diesel.
- C. Correct. The HPI actuation started the EDGs. Since there was no LOOP then the engines will be running unloaded. The ES signal must be bypassed or reset to clear the start signal to the EDGs. Then the Stop pushbutton on the MCB should be depressed.
- D. The diesel is not loaded and ES must be bypassed or reset to secure the engine from the control room.

OPS 4-06, Obj. 4; OPS 4-06 Sections 1-4.0.C.1

History: NRCN99

RO - Bank

Reference(s) provided: None

51. 064G2.1.32 001/2/1/RO #50/MEM 3.4/3.8/NEW/R/CR03501/

A Limit and Precaution in SP-354A, Monthly Test of EDG-1A, requires that operation at slow speed (500 rpm) be limited to a maximum time of 5 minutes. Which ONE of the following describes the basis for this requirement and the action required if this time limit cannot be met?

- A. ✓ Limits the temperature increase of the fan drive clutch assembly; stop the engine.
- B. Limits the possibility of EDG engine trip on "High Crankcase Pressure"; stop the engine.
- C. Prevents the accumulation of lube oil in the exhaust system; increase exhaust temperature to  $> 500^{\circ}\text{F}$  prior to engine shutdown.
- D. Prevents the accumulation of unburned fuel oil in the exhaust system; increase exhaust temperature to  $> 500^{\circ}\text{F}$  prior to engine shutdown.

Reasons:

- A. Correct. This limit is based on the limitations of the fan drive clutch assembly and clutch slippage during 500 rpm operation. If engine speed cannot be raised above 500 rpm then the engine must be stopped.
- B. Time limit is based solely on fan drive clutch concerns.
- C. & D. Lube oil and fuel oil accumulation are a concern during no/low load operation but the time limit is 2 hours, not 5 minutes.

OPS 4-06, Obj. 5; SP-354A, Step 3.5.4

RO - New

Reference(s) provided: None

52. 071A3.03 001/2/2/RO #52/MEM 3.6/3.8/MOD/R/CR03501/4-025-005

A waste gas release is in progress IAW OP-412B, WGDT Release to Ventilation. Which ONE of the following describes the *first* radiation monitor that samples this release path and what actions would occur if this monitor reaches its high alarm setpoint?

- A. RM-A2; closes WDV-393, 394 & 395 (recycle isolation valves) and closes WDV-439 (common waste gas isolation valve).
- B. RM-A2; trips AHF-11A/B, closes WDV-436, 437 & 438 (tank outlet isolation valves).
- C. ✓ RM-A11; closes WDV-393, 394 & 395 (recycle isolation valves) and closes WDV-439 (common waste gas isolation valve).
- D. RM-A11; trips AHF-11A/B, closes WDV-436, 437 & 438 (tank outlet isolation valves).

Reasons:

- A. RM-A2 is not the first monitor to sample this path.
- B. RM-A2 is not the first monitor to sample this path. These are the correct actions if RM-A2 were to trip.
- C. Correct. These actions will occur if RM-A11 reaches its high alarm setpoint.
- D. These are the actions that occur if RM-A2, not RM-A11, reaches its high alarm setpoint.

OPS 4-25, Obj. 3; OPS 4-25 Section 1-4.0.F.5.d

RO - Modified

Reference(s) provided: None

53. 073G2.3.11 001/2/1/RO #51/C/A 2.7/3.2/NEW/R/CR03501/

The plant is at normal full power operation. SDT-1 is ready for release. Which ONE of the following actions, if any, are required to satisfy the interlock(s) for SDV-90 (RM-L7 discharge isolation valve) and allow the valve to be opened?

- A. No additional actions are required.
- B. Start RWP-2A.
- C. Start RWP-2B.
- D. ✓ Place the RML-2/7 Valve/Pump Interlock By-Pass switch to "By-Pass".

Reasons:

- A. With the plant at normal power operation RWP-1 should be running and the RML-2/7 Valve/Pump Interlock By-Pass switch should be selected to "Normal". This meets the interlock requirements for WDV-892 but not SDV-90.
- B. & C. A DH/RW pump must be started or the bypass switch selected to bypass.
- D. Correct. No DH/RW pumps are running at full power operation.

OPS 4-59, Obj. 4; OPS 4-59 1-4.0 HH 2; OPS 4-25 1-4.0 G; OP-407N, Step 4.3.5

RO - New

Reference(s) provided: None

54. 076A4.01 001/2/1/RO #52/MEM 2.9/2.9/NEW/R/CR03501/

Which ONE of the following describes the status of the RW system after a loss of offsite power has occurred? (assume sufficient time for all automatic actions to occur)

- A. As soon as power is restored to the ES 4160V buses RWP-2A will start due to RW system low pressure.
- B. As soon as power is restored to the ES 4160V buses RWP-2B will start due to RW system low pressure.
- C. The automatic start on low pressure is blocked by the 4160V undervoltage lockout. No RWPs will be running.
- D. ✓ The automatic start on low pressure is blocked by the EDG output breaker closure. No RWPs will be running.

Reasons:

- A. There is no low pressure start for RWP-2A.
- B. The low pressure start for RWP-2B is blocked by breaker 3210 closure.
- C. The 4160V undervoltage lockout is not the signal that blocks the low pressure start of RWP-2B.
- D. Correct. The low pressure start for RWP-2B is blocked by breaker 3210 closure to ensure that a LOOP, coincident with an ES actuation, will not overload the EDG.

OPS 4-57, Obj. 4; OPS 4-57, Section 1-4.0.C.5.b

RO - New

Reference(s) provided: None

55. 078K1.05 001/2/1/RO #53/MEM 3.4/3.5/BANK/R/CR03501/ROT-5-91-029

The Control Room has entered EOP-12, Station Blackout, and has notified the SPO to align the backup air supply to the ADVs by opening IAV-676, "ADV Backup Air Supply ISO".

The purpose of this action is to:

- A. provide manual control of the ADVs by the SPO due to the loss of remote operation.
- B. force the ADVs closed since they have failed open and are causing an overcooling event due to the loss of IA.
- C. provide the Control Room with continued remote operation of the ADVs since the normal air supply is automatically isolated during a Station Blackout.
- D. ✓ provide the Control Room with continued remote operation of the ADVs because a sustained loss of IA can cause the MSIVs to drift close.

Reasons:

- A. The ADVs may be manually operated but when the backup air supply is aligned the Control Room will manipulate the valves.
- B. Aligning the backup air to the ADVs does not force them close. It only aligns an alternate air source for continued operation.
- C. There is no automatic signal to isolate the air supply to the ADVs.
- D. Correct. MSIVs will drift close on a loss of air.

OPS 5-91, Obj. 1; OPS 5-91Enclosure 1, Page 11

RO - Bank

Reference(s) provided: None



56. 078K3.02 001/2/1/RO #54/MEM 3.4/3.6/NEW/R/CR03501/

The following plant conditions exist:

- A slow loss of Instrument Air pressure is occurring.
- At time T = 0 air pressure is 79 psig at the MFW valves.
- At time T = 1 air pressure is 34 psig at the MFW valves.

At T = 0 the \_\_\_\_\_ (1) \_\_\_\_\_ will lock in position. At T = 1 the \_\_\_\_\_ (2) \_\_\_\_\_ will lock in position. Depressing the associated valve's "Air Fail Reset" pushbutton on the MCB will allow air from the in-line accumulator(s) to be used to reposition the \_\_\_\_\_ (3) \_\_\_\_\_.

	(1)	(2)	(3)
A.	SUCV & LLCV	None	SUCV & LLCV
B.✓	SUCV	LLCV	LLCV
C.	LLCV	SUCV	SUCV
D.	None	SUCV & LLCV	LLCV

Reasons:

- A. The LLCV will not lock in position until T = 1. The SUCV does not have an accumulator.
- B. Correct. The SUCV will lock in position at < 80 psig. The LLCV will lock in position at < 35 psig. Depressing the "Air Fail Reset" pushbutton will allow air from the accumulator to reposition the LLCV.
- C. The LLCV will not lock in position until T = 1. The SUCV will lock in position at T = 0. The SUCV is not supplied with an air accumulator.
- D. The SUCV will lock in position at T = 0. At T = 1 the SUCV is already locked in position.

OPS 4-68, Obj. 3 & 7; OPS 4-68 Sections 1-4.0.U.5 and 1-4.0.X.5

RO - New

Reference(s) provided: None

57. 086K4.06 001/2/2/RO #65/MEM 3.0/3.3/BANK/R/CR03501/4-007-002

A fire alarm has sounded for the "A" main feedwater pump due to an oil fire. The cardox system has cycled one time and the fire is still burning. How can the cardox system be re-actuated such that the CO<sub>2</sub> will continuously flow to the "A" MFWP?

- A. Manually override the timer for the Control Room spurt pushbuttons.
- B. Using the manual actuation pushbutton on the Fire Service Panel in the Control Room.
- C. ✓ Using the manual actuation station on the outside wall of the control room (TB 145' elev) and at the storage tank (TB 119' elev).
- D. Manually override the individual pilot valve (TB 145' elev) for the "A" MFP using the handwheel and operate the manual actuation station at the storage tank (TB 119' elev).

Reasons:

- A. There is no manual override for the timer.
- B. There is no pushbutton for Cardox on the Fire Service Panel.
- C. Correct. The manual (break glass) actuation stations have to operated for the individual zone that is on fire and at the master valve (COV-24) manual (break glass) station on the wall north of the cardox tank.
- D. The individual pilot valves have no handwheel to provide manual override.

OPS 4-07, Obj. 3 & 4; OPS 4-07 Section 1-4.0.O.6.f

RO - Bank

Reference(s) provided: None

58. 103K4.06 001/2/1/RO #55/MEM 3.1/3.7/MOD/R/CR03501/ROT 4-056-068

The plant was operating at 100% power when a steam leak on the "A" steam generator occurred in the reactor building. RB pressure increased to 5 psig. Window C-1-8, "SW Surge Tank Level Low", is illuminated. In this situation the nuclear services closed cycle cooling (SW) system is providing cooling water to:

- A. Reactor coolant pumps only.
- B. ✓ Reactor building main fan assemblies only.
- C. Reactor coolant pumps and reactor building main fan assemblies.
- D. Reactor coolant drain tank and reactor building main fan assemblies.

Reasons:

- A. With a concurrent low level in the SW Surge tank SW to the RCPs is isolated.
- B. Correct. All other loads are isolated.
- C. RCPs are isolated because there is a coincident low level in the SW surge tank. RB main fan assemblies switched from CI to SW on an RBIC actuation.
- D. RCDT has SW isolated when an RBIC actuation occurs at 4 psig RB pressure.

OPS 4-13, Obj. 2; OPS 4-13 Table 6

History: NRCN99

RO - Modified

Reference(s) provided: None

59. BW/A04AA2.1 001/1/2/RO #24/C/A 3.3/3.7/MOD/R/CR03501/ROT 5-29-005

Reactor power is 40% when a turbine trip occurs. Valve indications are as follows:

Governor Valve #1 is closed.  
Governor Valve #2 is closed.  
Governor Valve #3 is open.  
Governor Valve #4 is open.  
Throttle Valve #1 is closed.  
Throttle Valve #2 is closed.  
Throttle Valve #3 is closed.  
Throttle Valve #4 is closed.

Which ONE of the following best describes the operators required actions for this event?

- A. ✓ Enter AP-660, Turbine Trip.
- B. Close the MSIVs (prompt and prudent action) and enter AP-660, Turbine Trip.
- C. Enter EOP-02, Vital Systems Status Verification.
- D. Close the MSIVs (prompt and prudent action) and enter EOP-02, Vital Systems Status Verification.

Reasons:

- A. Correct. Since only GV's are open AP-660 entry conditions are met.
- B. The MSIVs are not required to be closed unless at least 1 GV AND 1 TV are open.
- C. A turbine trip at 40% power does not require a reactor trip.
- D. The MSIVs are not required to be closed unless at least 1 GV AND 1 TV are open and a turbine trip at 40% power does not require a reactor trip.

OPS 5-29, Obj. 4; AP-660; AI-505 Step 4.1.4.1.b

RO - Modified

Reference(s) provided: None

60. BW/A05AK2.1 001/1/2/RO #25/C/A 4.0/3.8/MOD/R/CR03501/4-006-001

Reactor Building pressure is 4.8 psig coincident with the Startup transformer's feeder breakers tripping due to an internal transformer fault. Which ONE of the following describes the status of the EDGs?

- A. "A" EDG is running with its 'Ready' light illuminated.  
"B" EDG is running with its 'Ready' light illuminated.
- B. ✓ "A" EDG is running with its 'Ready' light illuminated.  
"B" EDG is running with its 'Run' light illuminated.
- C. "A" EDG is running with its 'Run' light illuminated.  
"B" EDG is running with its 'Run' light illuminated.
- D. "A" EDG is running with its 'Run' light illuminated.  
"B" EDG is running with its 'Ready' light illuminated.

Reasons:

- A. Since an undervoltage condition was present on the "B" bus the "B" EDG's Run light will be on.
- B. Correct. The feeder breakers for the Startup xfmr also feed the BEST. The BEST is the normal power supply to the "B" ES bus. No undervoltage on the "A" bus, undervoltage on the "B" bus.
- C. No undervoltage condition on the "A" bus.
- D. No undervoltage condition on the "A" bus, undervoltage condition on the "B" bus.

OPS 4-06, Obj. 4; OPS 4-06 Section 1-4.0.E.9; OPS 4-90 Section 1-4.0.F.2

History: NRCN99

RO - Modified

Reference(s) provided: None

61. BW/A07AK1.2 001/1/2/RO #26/C/A 3.3/3.7/BANK/R/CR03501/5-083-005

The plant is at 80% power with the following maintenance activities in progress:

- "B" SCHE shoot and clean activities.
- "C" CWP breaker investigation (breaker tripped open for no apparent reason).

The "Cond. Pump Pit Sump Level High" alarm has just annunciated in conjunction with the SPO reporting water coming out of the SCHE and that CWV-5, "B" SCHE inlet valve from CWP-1D, has failed partially open. Water level in the CDP pit is about 1' and rising slowly.

Based on these conditions which ONE of the following actions are required?

- A. Trip the reactor and transition to EOP-02; then stop all CWPs.
- B. Trip the reactor and transition to EOP-02; then stop CWP-1D.
- C. Concurrently perform AP-510; stop CWP-1D and continue power operation at < 60%.
- D. ✓ Concurrently perform AP-510; when reactor power is < 45% trip the turbine; stop CWP-1D and transition to AP-660.

Reasons:

- A. The reactor does not need to be tripped and only the affected CWP should be stopped.
- B. The reactor does not need to be tripped.
- C. Since the affected CWP is in a hotwell that has only one CWP running then power must be decreased to < 45% and the turbine tripped.
- D. Correct. Since the affected CWP is in a hotwell with only 1 CWP running then power will have to be reduced to <45% and the turbine tripped.

OPS 5-83, Obj. 7; AP-1050 Step 3.6

RO - Bank

Reference(s) provided: None



62. BW/E04EK2.2 001/1/1/RO #18/MEM 4.2/4.2/MOD/R/CR03501/5-102-004

EOP-4, Inadequate Heat Transfer, has been entered. EFP-2 is the only running EFW pump. Tincore is currently 510° F. You are directed to increase and maintain OTSGs as a heat sink. Step details are as follows:

Lower OTSG PRESS using TBVs (preferred) or ADVs until the higher of the following occurs:

\_\_\_ OTSG PRESS 200 psig (if EFP-2 is only running EFWP)

\_\_\_ OTSG Tsat 90 to 110° F below Tincore

What would be the proper OTSG pressure for this situation?

- A. 200 psig
- B. ✓ 260 psig
- C. 600 psig
- D. 730 psig

Reasons:

- A. This value would be correct if Tincore was lower and EFP-2 was the only running EFW pump.
- B. Correct. Using approx. 400° F Psat will be about 260 psig.
- C. This is where OTSG isolation will occur.
- D. This is saturation pressure for a Tincore temp of 510° F.

OPS 5-102, Obj. 5; EOP-4 Step 3.61 & Figure 4

RO - Modified

Reference(s) provided: Steam Tables

63. BW/E05EK2.2 001/1/1/RO #11/MEM 4.2/4.4/NEW/R/CR03501/

Step 3.34 in EOP-5, Excessive Heat Transfer, states the following:

IF all the following exist:

\_\_\_ At least 1 RCP running

\_\_\_ Level in any OTSG  $\leq 12 \frac{1}{2}$  inches

THEN establish RCS cooldown rate of  $\approx 6^\circ \text{F/hr.}$

What is the basis for this limit?

- A. Allows for a more rapid recovery of OTSG level.
- B. Matches RCS cooldown rate with OTSG tube cooldown rate of the dry OTSG.
- C. Limits Delta Tc control problems between the dry OTSG and the good OTSG.
- D. ✓ Matches RCS cooldown rate with OTSG shell cooldown rate of the dry OTSG.

Reasons:

- A. FW flow rates are limited due to OTSG tube to shell stresses.
- B. OTSG tube temperature will be the same as RCS temperature.
- C. At this power level core delta T is essentially  $0^\circ \text{F}$  so delta Tc control is not a concern.
- D. Correct. OTSG shell cooldown rate due to ambient losses is about  $6^\circ \text{F/hr.}$  Since the OTSG is dry tube to shell stresses must be minimized. By keeping the RCS cooldown rate matched with the shell cooldown rate these stresses will be maintained within analyzed ranges.

OPS 5-94, Obj. 3; EOP Cross-Step Document, EOP-5, Step 3.34

RO - New

Reference(s) provided: None

64. BW/E08EK3.3 001/1/2/RO #27/MEM 4.0/3.6/NEW/R/CR03501/

EOP-8, LOCA Cooldown, performance is in progress. Step 3.9 requires the operator to ensure emergency RB cooling is in service.

Which ONE of the following describes the number of RB main fans that should be started or ensured running and the reason for this requirement?

- A. Both ES selected RB main fans; to ensure RB temperature and pressure are maintained within the analyzed values.
- B. Both ES selected RB main fans; to ensure balanced EDG loading if a LOOP was in progress or were to occur.
- C. ✓ One ES selected RB main fan; to ensure the SW system heat load is maintained within analyzed values.
- D. One ES selected RB main fan; to ensure additional margin on the opposite train's EDG if a LOOP was in progress or were to occur.

Reasons:

- A. Only 1 RB fan should be in service. One fan, with an RB Spray pump, is adequate to ensure RB temperature and pressure are maintained within the analyzed values.
- B. Only 1 RB fan should be in service.
- C. Correct. One RB fan in service to ensure that the SW system does not get too hot.
- D. EDG margin is not a reason for this requirement.

OPS 4-63, Obj. 4; OPS 4-63 Section 1-4.0.B.1.a; EOP-8 Step 3.9

RO - New

Reference(s) required: None

65. BW/E10EK1.2 001/1/1/RO #1/MEM 3.5/4.0/BANK/R/CR03501/ROT 5-096-071

Initial plant conditions:

- The plant is in Mode 3 with a cooldown in progress per OP-209, Plant Cooldown.
- Control Rod Drive Group 1 is fully withdrawn.

A loss of off-site power (LOOP) occurs.

Plant conditions 20 minutes later are:

- RCS temperatures are stable.
- Off-site power is restored.

Which ONE of the following is the appropriate *initial* EOP entry and next subsequent transition for the given conditions?

- A. Enter EOP-02, Vital Systems Status Verification, and transition to EOP-09, Natural Circulation Cooldown, as directed by EOP-02 follow-up steps.
- B. Enter EOP-09, Natural Circulation Cooldown, and transition to EOP-10, Post Trip Stabilization, as directed by EOP-09 follow-up steps.
- C. ✓ Enter EOP-02, Vital Systems Status Verification, and transition to EOP-10, Post Trip Stabilization, as directed by EOP-02 follow-up steps.
- D. Enter EOP-09, Natural Circulation Cooldown, and transition to EOP-02, Vital Systems Status Verification, as directed by EOP-09 follow-up steps.

Reasons:

- A. EOP-02 does not direct a transition to EOP-09. The operator should know, without a procedure, that a natural circulation cooldown will not be started if the plant is stable and off-site power is available.
- B. & D. EOP-9 is only entered when no other EOP is applicable. In this case EOP-02 is applicable.
- C. Correct. Entry conditions for EOP-2 are met and EOP-2 will transition to EOP-10.

OPS 5-96, Obj. 1; EOP-2; EOP-9

RO - Bank

Reference(s) provided: None

66. G2.1.12 001/GENERIC/1/RO #66/C/A 2.9/4.0/MOD/R/CR03501/4-006-011

One Emergency Diesel Generator (EDG) is declared inoperable at 0100. The first SR 3.8.1.1 was performed at 0200. Which ONE of the following describes the *latest* allowable completion time for the next performance of SR 3.8.1.1?

- A. 1000
- B. 1100
- C. ✓ 1200
- D. 1300

Reasons:

- A. This time could be calculated by adding the 8 hour frequency to the completion time of the original SR 3.8.1.1 performance. This answer is incorrect because it does not include the allowable 25% (2 hr) extension time.
- B. This time could be calculated by adding the 8 hour frequency plus the 25% (2 hr) allowable extension to the original time that the EDG was declared inoperable. This answer is incorrect because it does not start from the completion of the previous SR 3.8.1.1.
- C. Correct. The start time is completion of the previous SR 3.8.1.1 and the required completion time includes the maximum allowed 25% (2 hr) extension.  
 $(0200 + 8 \text{ hrs} + 2 \text{ hrs (extension)}) = 1200$
- D. See above.

OPS 5-01, Obj. 6; TS 3.8.1

RO - Modified

Reference(s) provided: TS 3.8.1

67. G2.1.29 001/GENERIC/1/RO #67/MEM 3.4/3.3/BANK/R/CR03501/5-038-001

The following conditions exist for a normally locked open valve:

- The valve was repaired during the latest outage.
- An initial valve lineup is being performed.
- The position must be verified.

Which ONE of the following is the preferred method to determine the position of this valve? (initial verifier)

- A. Verification that the locking device is properly installed on the valve.
- B. Verification that the valve stem is in the open position and then locking the valve.
- C. Attempting to move the valve in the open direction and then locking the valve.
- D. ✓ Moving the valve in the closed direction, then in the open direction and then locking the valve.

Reasons:

- A. This method would only verify that the valve is locked in position. Does not verify what position.
- B. Valve stem position may be used for a backup method per AI-500, Appendix 10, Section 4.4.
- C. Valve maybe stuck in the closed position and not move giving a false open indication.
- D. Correct. This is the method used for the initial verification per AI-500, Appendix 10, Section 4.1.

OPS 5-38, Obj. 32; AI-500, Appendix 10, Step 4.1 & 4.2

RO - Bank

Reference(s) provided: None



68. G2.2.1 001/GENERIC/2/RO #68/C/A 3.7/3.6/NEW/R/CR03501/

The following plant conditions exist:

- A reactor startup is in progress.
- Control rod index is 245%.
- +1%  $\Delta K/K$  rod position of the ECP is 250%.
- Initial count rate was  $4 \times 10^1$  on source range NIs 1 & 2.
- Current count rate is stable at  $6 \times 10^2$  on source range NIs 1 & 2.

Which ONE of the following describes the next action that should be taken?

- A. ✓ Insert control rod groups 2 through 7 and evaluate.
- B. Begin emergency boration to ensure a 1% shutdown margin.
- C. Continue with the startup and request a new boron value from Chemistry.
- D. Dilute the RCS to lower rod index and continue the reactor startup.

Reasons:

- A. Correct. Per OP-210 all groups except group 1 should be driven in and a new ECP calculated.
- B. As long as rod index is within the ECP values you have not violated the OP-103D Rod Withdrawal Index curve and > 1% shutdown margin still exists.
- C. 30 times your initial count rate is 1200 cps. With your current count rate at 600 cps you would not expect to reach criticality within the allowed rod index upper limit. The startup should not continue from this point.
- D. While this may be the ultimate solution the rods must be inserted and a re-evaluation completed prior to deborating.

OPS 5-104, Obj. 5; OP-210 Step 4.2.18 & 4.2.20

RO - New

Reference(s) provided: None

69. G2.2.11 001/GENERIC/2/RO #69/MEM 2.5/3.4/BANK/R/CR03501/5-077-002

Given the following conditions:

- The quarterly Reactor Building Spray Pump surveillance is in progress.
- The operator who is reviewing the surveillance and an I&C technician inform the Control Room Supervisor that the tolerance listed in the surveillance acceptance criteria is incorrect.
- The I&C technician states that a new flow instrument has been installed and the tolerances should be  $\pm 2\%$  and not  $\pm 5\%$  as indicated in the procedure.

Which ONE of the following actions should be taken?

- A. Stop the surveillance and perform a Temporary Change per PRO-NGGC-0204.
- B. Have the CRS make a note in the procedure and continue with the surveillance.
- C. Continue with the surveillance and record in the Component Deviation Log.
- D. ✓ Stop the surveillance and perform a Permanent Procedure Revision.

Reasons:

- A. A change of tolerances is not within the allowable procedural changes which can be made under the "Temporary Change" guidance of PRO-NGGC-0204.
- B. & C. PRO-NGGC-0200 requires a permanent change.
- D. Correct. This is classified as a "Change of Intent" which requires permanent procedure revision per PRO-NGGC-0204.

OPS 5-77, Obj. 6 & 8; PRO-NGGC-0204, Step 3.5

RO - Bank

Reference(s) provided: None

70. G2.2.28 001/GENERIC/2/RO #70/MEM 2.6/3.5/NEW/R/CR03501/NEW

The plant is in Mode 6 with fuel handling activities in progress. Which ONE of the following individuals is directly responsible for monitoring the countrate during core alterations?

- A. Refueling Engineer
- B. RB Upender Operator
- C. Superintendent Shift Operations
- D. ✓ Control Center Refueling Communicator

Reasons:

- A. The Refueling Engineer is a floating position, not continuously in the control room.
- B. The RB upender operator will probably hear a change in count rate but is not responsible for monitoring.
- C. The SSO has multiple other duties during an outage and does not continuously stay in the control room during fuel movement activities.
- D. Correct. The CCRC's responsibility, at a minimum, is to monitor countrate and notify the Refueling Supervisor of unexpected changes.

OPS 5-50, Obj. 2; FP-203 Step 3.4.3.5.3

RO - New

Reference(s) provided: None

71. G2.3.1 001/GENERIC/3/RO #71/MEM 2.6/3.0/NEW/R/CR03501/

The plant is in Mode 5. You and your co-worker are working near each other in the Letdown Cooler room performing a valve lineup. The lineup should be complete in about 10 minutes. When you check your ED it is reading 0 mrem. Your co-worker's ED is reading 34 mrem. Which ONE of the following actions should be taken?

- A. Exit the Letdown Cooler room, move to a low dose area in the RB and promptly notify the HP reactor building rover.
- B. ✓ Exit the reactor building and the Auxiliary Building and promptly notify the HP office.
- C. Exit the reactor building, move to a low dose area within the Auxiliary Building and promptly notify the HP office.
- D. Expedite completion of the valve lineup and when the lineup is complete exit the RCA and promptly notify the HP office.

Reasons:

- A. By procedure you should immediately exit the RCA and notify HP.
- B. Correct. By exiting the AB you are out of the RCA.
- C. The AB should also be exited.
- D. By procedure you must exit the RCA if you suspect your ED has malfunctioned.

OPS 5-43, Obj. 11; RSP-101 Section 4.21

RO - New

Reference(s) provided: None

72. G2.3.10 001/GENERIC/3/RO #72/MEM 2.5/2.9/BANK/R/CR03501/2-032-005

Work is to be completed in an area with a radiation point source of 10 R/hr. Two feet away from this source the dose rate is 8 R/hr. Which ONE of the following will have the most effect on reducing total dose received for the job?

- A. Reducing the amount of time to complete the job by 60%.
- B. ✓ Moving the job from two feet to four feet from the source
- C. Using two employees to complete the job in 50% of the time.
- D. Adding a half thickness of shielding material between the job and the source.

Reasons:

- A. This action would reduce the total dose by 60%.
- B. Correct. This action would reduce the total dose by 75%.  
 $I_1/I_2 = D^2_2/D^2_1$   
 $8/x = 4^2/2^2$   
 $I_2 = 2 \text{ R/hr}$
- C. This action would result in no change in total dose.
- D. This action would reduce the total dose by 50%.

OPS 2-32, Obj. 12; OPS 2-32 Section 1-7.0.B.7

RO - Bank

Reference(s) provided: None

73. G2.4.35 001/GENERIC/4/RO #74/MEM 3.5/3.5/NEW/R/CR03501/

A step in EOP-14, Enclosure 19, ECCS Suction Transfer, requires the operator to bypass the MUT low level interlocks. Where are these switches located and what is the purpose for this action?

- A. The "A" and "B" ES 4160V switchgear rooms; ensures BWST isolation valves remain open.
- B. ✓ The "A" and "B" ES 4160V switchgear rooms; ensures BWST isolation valves remain closed.
- C. The "A" and "B" ES 480V switchgear rooms; ensures BWST isolation valves remain open.
- D. The "A" and "B" ES 480V switchgear rooms; ensures BWST isolation valves remain closed.

Reasons:

- A. Operation of these switches ensures MUV-58 and 73 remain closed.
- B. Correct. Operation of these switches ensures MUV-58 and 73 remain closed following ECCS suction transfer to the RB sump.
- C. Switches are located in the ES 4160V switchgear rooms. Operation of these switches ensures MUV-58 and 73 remain closed.
- D. Switches are located in the ES 4160V switchgear rooms.

OPS 5-91, Obj. 1 & 2; OPS 5-91 Enclosure 2; EOP-14, Enclosure 19, Steps 14, 29 & 42

RO - New

Reference(s) provided: None

74. G2.4.43 001/GENERIC/4/RO #75/MEM 2.8/3.5/NEW/R/CR03501/

An Alert has been declared. The primary method for notifying state and local agencies is using the \_\_\_\_\_ and the primary method for notifying the NRC is using the \_\_\_\_\_.

- A. ✓ State Hot Ringdown (SHRD); Emergency Notification System (ENS)
- B. State Hot Ringdown (SHRD); Emergency Response Data System (ERDS)
- C. Emergency Notification System (ENS); Emergency Response Data System (ERDS)
- D. Florida Emergency Satellite Communication System (ESATCOM); Emergency Notification System (ENS)

Reasons:

- A. Correct. These are the primary methods. Commercial telephone is the first backup.
- B. ERDS is activated to send data to the NRC but this is not used for voice notification.
- C. ENS is used to notify the NRC. ERDS is activated to send data to the NRC but this is not used for voice notification.
- D. ESATCOM is the third method to notify state and local agencies.

OPS 5-34, Obj. 8; EM-202 Enclosure 2, page 3

RO - New

Reference(s) provided: None

75. G2.4.6 001/GENERIC/4/RO #73/MEM 3.1/4.0/BANK/R/CR03501/5-116-010

When aligning the DH system for boron precipitation EOP-14, Enclosure 20, Boron Precipitation Control, directs that the seal-in circuits for DHV-42 and 43 (RB sump to DHP valves) be defeated. Enclosure 20 also directs that the valve control switch be held in the open position for 6 seconds before the DH drop lines valves are opened.

Which ONE of the following describes the purpose of these steps for initiating "Drop-Line" flow?

- A. Ensures excessive drop-line flow will not cause vortexes in the core region.
- B. ✓ Prevents damage to RB sump screens from possible flashing of hot RCS water.
- C. Ensures adequate NPSH for the decay heat pump that is aligned to the RB sump.
- D. Prevents voiding in the core region from the rapid pressure drop that would occur if the valves were fully opened.

Reasons:

- A. Drop line flow cannot cause vortexing in the Rx vessel due to the flowpaths in the Rx vessel.
- B. Correct. This limits the flowrate and therefore the flashing and pressure force exerted on the RB sump screens and other sump components.
- C. Minimizing the flowrate to the RB sump from the drop line has nothing to do with NPSH for the DH pump.
- D. Voiding in the core region will not occur due to the flowpath from the core to the hotleg and then out the drop line to the RB sump.

OPS 5-116, Obj. 2; EOP-14, Enclosure 20, Step 20.19

RO - Bank

Reference(s) provided: None