

# **Final Submittal**

(Blue Paper)

**CRYSTAL RIVER OCTOBER 2005 EXAM**

**05000302/2005301**

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

**Senior Operator Written Examination**

**U.S. Nuclear Regulatory Commission  
Site-Specific  
SRO 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 overall, with a 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.

**Applicant Certification**

All work done on this examination is my own. I have neither given nor received aid.

\_\_\_\_\_  
Applicant's Signature

**Results**

RO / SRO-Only / Total Examination Values      \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Points

Applicant's Scores      \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Points

Applicant's Grades      \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Percent

1. 001G2.1.33 001/1/2/SRO #1/C/A 3.4/4.0/NEW/S/CR03501/

The plant was initially at 47% power due to complications following a Loss of RCP runback. The following sequence of events have since occurred.

- A Continuous Control Rod Motion event.
- AP-525 was entered and control rod motion was stopped.
- Power increased to 52% and the plant was stabilized.
- The malfunction is now fixed and all ICS stations are in automatic.
- A deboration was started to return rod index to its previous value.

Final plant conditions are 52% power with a rod index of 125%.

Based on the above conditions determine which ONE of the following actions should be initiated?

- A. Rods are in the "Restricted Operation" region. Initiate boration to restore SDM to  $\geq 1\%$  within 15 minutes and restore regulating rod groups to within the "Acceptable Operation" region in 2 hours.
- B. Rods are in the "Restricted Operation" region. Verify  $F_Q$  and  $F^N \Delta H$  are within limits once every 2 hours and restore regulating rod groups to within the "Acceptable Operation" region in 24 hours.
- C. ✓ Rods are in the "Unacceptable Operation" region. Initiate boration to restore SDM to  $\geq 1\% \Delta k/k$  within 15 minutes and restore regulating rod groups to within the "Restricted Operation" region in 2 hours.
- D. Rods are in the "Unacceptable Operation" region. Verify  $F_Q$  and  $F^N \Delta H$  are within limits once every 2 hours and restore regulating rod groups to within the "Acceptable Operation" region in 24 hours.

Reasons:

- A. Using the 4 RCP curve of the COLR will put you in the Restricted Region but this action would be incorrect. Also stem conditions indicate only 3 RCPs in operation.
- B. Using the 4 RCP curve of the COLR will put you in the Restricted Region and this action would be correct if 4 RCPs were operating.
- C. Correct. Using the 3 RCP curve of the COLR will put you in the Unacceptable Region. Initiating boration to restore shutdown margin is required per TS 3.2.1.
- D. If the rods were in the Restricted Operation region then this would be the correct action to take.

OPS 5-01, Obj. 5; TS 3.2.1; COLR, 3 RCP Reg Rod Group Insertion Limits Curve;  
10 CFR 55.43.b.1

SRO - New

Reference(s) provided: COLR (Rod Insertion Limit curves only)

2. 002A2.04 001/2/2/SRO #16/C/A 4.3/4.6/NEW/S/CR03501/

During the performance of EOP-4, Inadequate Heat Transfer, as the CRS you reach the following step:

Verify adequate SCM exists in both RCS hot legs.

IF adequate SCM does NOT exist in both RCS hot legs,  
THEN vent affected RCS hot leg.

The following conditions exist:

The "A" Hot Leg temperature is 500° F.

The "B" Hot Leg temperature is 425° F.

RCS pressure is 425 psig.

Which ONE of the following describes the action(s) that should be taken and the reasons for these actions?

- A. Vent both the "A" and "B" hot legs with the associated High Point vents to restore the OTSGs as a heat sink by reducing Reactor Coolant pressure.
- B. Vent both the "A" and "B" hot legs with the associated High Point vents to restore the OTSGs as a heat sink by removing steam voids and/or non-condensable gases.
- C. Vent the "A" hot leg with the associated High Point vents to restore the OTSG as a heat sink by reducing Reactor Coolant pressure.
- D. ☒ Vent the "A" hot leg with the associated High Point vents to restore the OTSG as a heat sink by removing steam voids and/or non-condensable gases.

Reasons:

- A. Only the "A" hot leg needs to be vented; venting removes steam voids and non-condensibles.
- B. Only the "A" hot leg needs to be vented to remove steam voids and non-condensibles.
- C. The "A" hot leg is not subcooled, High Point vents are used to remove steam voids and non-condensibles.
- D. Correct. The "A" hot leg is not subcooled; venting removes steam voids and non-condensibles.

OPS-5-102 Objectives 4 and 5, EOP-4, Step 3.53

SRO - New

Reference(s) provided: None

3. 003A2.01 001/2/1/SRO #2/C/A 3.5/3.9/MOD/S/CR03501/4-060-001-OPS

The plant is operating at 90% power with the following RCP data:

**RCP SEAL STAGE PRESSURE (psig)**

Time	RCP-1A		RCP-1B		RCP-1C		RCP-1D	
	2nd Stage	3rd Stage	2nd Stage	3rd Stage	2nd Stage	3rd Stage	2nd Stage	3rd Stage
0100	1300	700	1400	800	1550	900	1425	725
0110	1325	725	1375	825	1575	925	1425	775
0120	1300	700	1400	800	1550	950	1400	775
0130	1325	725	1400	800	1575	1000	1550	850
0140	1350	725	1400	800	1575	1025	2155	1100

Dumpster  
clicks per  
minute at  
0140.

3

2

5

4

CBO Flow

X922 = 1.379 GPM

X923 = 1.853 GPM

X924 = 1.200 GPM

X925 = 1.552 GPM

Based on the above data which ONE of the following describes the actions you would direct the control board operators to take IAW OP-302, Reactor Coolant Pump Operation?

- A. Immediately stop RCP-1C and go to AP-545, Plant Runback.
- B. Immediately stop RCP-1D and go to AP-545, Plant Runback.
- C. Reduce power to < 72% per AP-510, Rapid Power Reduction, and stop RCP-1C.
- D. ✓ Reduce power to < 72% per AP-510, Rapid Power Reduction, and stop RCP-1D.

Reasons:

- A. If OP-302 is provided using Enclosure 4 of OP-302, RCP Operation, RCP-1C total seal leakage is 2.45 gpm. No requirement to stop RCP-1C until > 2.5 gpm.
- B. Total seal flow is 2.55 gpm. Per OP-302 power should be reduced and the pump tripped at 72% power.
- C. If total seal flow was > 2.5 gpm this would be the required action.
- D. Correct. Total seal flow is 2.55 gpm.

OPS 4-60, Obj. 7 & 9; OP-302 Section 4.7.2 and Enclosure 4; 10 CFR 55.43.b.5

SRO - Modified

Reference(s) provided: OP-302



4. 005G2.2.18 001/2/1/SRO #3/MEM 2.3/3.6/BANK/S/CR03501/ROT-5-038-020

The following plant conditions exist:

- The plant is in Mode 5.
- The "A" Decay Heat Pump, DHP-1A, is running.

You are the Control Room Supervisor. The load dispatcher has informed the control room that breaker work *must* be performed in both switchyards on this shift. No power interruption is anticipated for CR #3 but the potential does exist.

What is required, IAW AI-500, Conduct of Operations Department Organization and Administration, to be completed prior to performing the breaker work?

Discuss with the SSO and:

- A. ✓ power "A" DH train components from the "A" EDG.
- B. power "B" DH train components from the "B" EDG.
- C. power "A" and "B" DH train components from their respective EDGs.
- D. establish a backfeed from the 500 KV yard to supply power to the "B" ES bus.

Reasons:

- A. Correct. Per AI-500, Appendix 7, the operating DH train must be powered from its EDG.
- B. Only the operating DH train must be powered from an EDG.
- C. Only the operating DH train must be powered from an EDG.
- D. While this may be a good idea it is not required.

OPS 5-38, Obj. 21; AI-500, Appendix 7, Step 1.9.2; PRA - Loss of SDC; 10 CFR 55.43.b.5

SRO - Bank

Reference(s) provided: None

5. 009EA2.34 001/1/1/SRO #4/C/A 3.6/4.2/BANK/S/CR03501/5-116-006

The following plant conditions exist:

- A small break LOCA has occurred.
- EOP-3, Inadequate Subcooling Margin, and Rule 1, Loss of SCM, were performed.
- Current RCS pressure is 1300 psig.
- Current Tincore indication is 400° F.

Based on these conditions which of the following describes the appropriate method for HPI control?

- A. Rule 1 is applicable. HPI must *not* be throttled because the BWO accident mitigation strategy requires full flow from at least one HPI pump.
- B. Rule 4 is applicable. HPI must *not* be throttled because the BWO accident mitigation strategy requires full flow from at least one HPI pump.
- C. Rule 1 is applicable. HPI must be throttled because minimizing SCM using injection flow is fundamental in the BWO accident mitigation strategies.
- D. ✓ Rule 4 is applicable. HPI must be throttled because minimizing SCM using injection flow is fundamental in the BWO accident mitigation strategies.

Reasons:

- A. & C. Adequate SCM now exists. Rule 1 is no longer applicable.
- B. HPI must be throttled because a PTS event has occurred and Rule 4, PTS, is in effect.
- D. Correct. Since the stem states that Rule 1 has been performed then RCPs would have been secured and HPI actuated. This meets the criteria for a PTS event and Rule 4 must be followed now that SCM has been established.

OPS 5-116; EOP Cross-Step Document for EOP-13, Rules 1 & 4; 10CFR 55.43.b.5

History: NRCM98

SRO - Bank

Reference(s) provided: Steam Tables

6. 012A2.05 001/2/1/SRO #5/C/A 3.1/3.2/NEW/S/CR03501/

The plant is currently at 80% power with the "D" RPS Channel in the tripped condition. Which ONE of the following describes the action(s) that that are required to be taken based on the current plant conditions and the failures below?

- A. RCP-1 output for the "C" RCP rapidly fails to 0 mA; Enter AP-545, Plant Runback, and ensure plant runback to 75% power.
- B. RCP-1 output for the "C" RCP rapidly fails to 0 mA; Enter EOP-2, Vital Systems Status Verification, and perform required actions.
- C. ✓ The selected narrow range RCS pressure transmitter rapidly fails high; Enter EOP-2, Vital Systems Status Verification, and perform required actions.
- D. The selected narrow range RCS pressure transmitter slowly fails high; take manual control of PZR heaters, spray and PORV and stabilize the plant at 80% power.

Reasons:

- A. This failure will cause all the RPS channels to sense a failure of 1 RCP only. Other than an alarm and lights on the status panel RPS will not generate a reactor trip signal for this failure. This loss of RCP signal only goes to RPS and EFIC. ICS uses pump breaker contacts to generate a runback signal, in which case AP-545 would be the correct procedure to enter.
- B. Loss of a single RCP will not generate a reactor trip signal even when another RPS channel is already tripped.
- C. Correct. The selected narrow range transmitter comes from either the "A" or "B" RPS channels. With this information either the "A" or "B" RPS channel will trip, along with the "D" RPS channel that is already tripped, RPS will generate a reactor trip signal. EOP-2 should then be entered.
- D. The plant will trip because the selected narrow range transmitter comes from either the "A" or "B" RPS channels.

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OPS 4-12, Obj. 6; OPS 4-09, Obj. 7; OPS 4-12, Figure 9; OPS 4-9, Figure 5; 10  
CFR 55.43.b.5

SRO - New

Reference(s) provided: None

7. 015A2.01 001/2/2/SRO #6/C/A 3.5/3.9/NEW/S/CR03501/

The following conditions exist during a plant startup:

- The plant is at 40% power.
- NI-7/8 selected for control.
- Power is lost to the "C" RPS cabinet.
- Window K-3-3, "SASS Transfer", is NOT illuminated.

Based on these conditions determine how the plant will respond and the procedure that should be used/entered.

- A. Place the Reactor Diamond and Reactor Demand stations in Hand and stabilize the plant. Use OP-507, Operation of the ES, RPS and ATWAS Systems, to restore power to the RPS cabinet.
- B. Place the Reactor Diamond and Reactor Demand stations in Hand and stabilize the plant. Use OP-504, Integrated Control System, to return these stations to automatic after power is restored to the RPS channel.
- C. ✓ The reactor will trip due to high RCS pressure. Enter EOP-2, Vital Systems Status Verification, and perform required actions.
- D. The reactor will trip due to low RCS pressure. Enter EOP-2, Vital Systems Status Verification, and perform required actions.

Reasons:

- A. The high power auctioneer for NI-7/8 (Rx power signal to ICS) is located in and powered from the "C" RPS cabinet. On a loss of power this signal will go to 0 and SASS should select the output of NI-5/6 for control. With no SASS Transfer alarm in then SASS has failed to transfer. The reactor will trip on high RCS pressure.
- B. This would be correct if the NI power signal failed high but, with a loss of power to the high auctioneer located in the "C" RPS cabinet, the NI power signal will be failed low. If SASS transfers correctly the plant will remain stable.
- C. Correct. With no SASS transfer the NI power signal to ICS will be 0% power and will cause both cross-limits to occur, but only one can function. MFW will decrease to 0 flow and RCS pressure will increase and trip the reactor within 12 seconds.
- D. The reactor will trip on high RCS pressure since SASS did not transfer.

OPS 4-14, Obj. 3; OPS 4-14 Section 1-4.0.H.9.d.4; OPS 4-09, Figure 27; 10 CFR 55.43.b.5

SRO - New

Reference(s) provided: None

8. 022AA2.01 001/1/1/SR0 #7/C/A 3.2/3.8/MOD/S/CR03501/4-052-009

The following plant conditions exist:

- Reactor operating at 100%.
- RCS pressure is 2155 psig and stable.
- RCS Tave is 579° F and stable.
- PZR level is 220 inches and stable.
- MU tank level is 78 inches and decreasing slowly.
- Total RCP Seal Injection flow has decreased to 30 gpm but is now recovering.

Which ONE of the following describes a reason that could result in these plant conditions and the procedure that would be used to correct the problem?

- A. RCP seal failure. Enter AP-520, Loss of RCS Coolant or Pressure, to attempt to locate and isolate the leak.
- B. RCP seal failure. Use OP-302, RCP Operation, and determine if the RCP needs to be secured.
- C.✓ Makeup line leak. Enter AP-520, Loss of RCS Coolant or Pressure, to attempt to locate and isolate the leak.
- D. Makeup line leak. Use OP-402, Makeup and Purification System, and utilize MUV-24 to maintain PZR level.

Reasons:

- A. RCP seal failure will not cause RCP Seal Injection flow to decrease.
- B. RCP seal failure will not cause RCP Seal Injection flow to decrease. AP-520 should be used for leak isolation.
- C. Correct. A makeup line leak will cause MUT level to drop with no cooldown of the RCS. This also will divert flow from the RCP seal injection flowpath resulting in reduced RCP seal injection flow until MUV-16 can compensate. AP-520 would be entered to locate and isolate the leak.
- D. AP-520 would be entered to locate and isolate the leak.



OPS 4-52, Obj. 2 & 7; 10 CFR 55.43.b.5

SRO - Modified

Reference(s) provided: None

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9. 026G2.2.23 001/2/1/SRO #8/C/A 2.6/3.8/BANK/S/CR03501/5-001-006

With the Reactor at 100% thermal power the following sequence of events occurs:

<u>DATE</u>	<u>TIME</u>	<u>EVENT</u>
12 June	0500	BSP-1A is tagged out.
14 June	0800	BSP-1B is declared inoperable.
14 June	1000	BSP-1A is returned to operable status.

TS 3.0.3 was applicable from 0800 to 1000 on June 14th. When must BSP-1B be returned to OPERABLE status to avoid having to enter ~~TS 3.0.3~~ again?

Condition B of TS 3.6.6

- A. ✓ Within 45 hours from the time it was declared inoperable.
- B. Within 21 hours from the time it was declared inoperable.
- C. Within 24 hours from the time it was declared inoperable.
- D. Within 10 days from the time BSP-1A was tagged out for maintenance.

Reasons:

- A. Correct. TS 1.3 states that LCOs that do not allow separate entry will be "tracked" when subsequent components expressed in the condition are inoperable. Also TS 1.3 defines length of extension time allowed. This situation will be allowed the extension time due to concurrent inoperability and second inoperable component (BSP-1B) remains inoperable after the first (BSP-1A) is returned. Since BSP-1B was declared inoperable 51 hours after BSP-1A the extension time allowed is 24 hours from the initial entry into TS 3.6.6 Condition "A" for BSP-1A since it is more restrictive than 72 hours from when BSP-1B was declared inoperable.
- B. This was the initial completion time for BSP-1A. This situation allows extension time as explained in reason "A".
- C. TS 1.3 allows a 24 hour extension time in addition to the 21 hours left from the initial time BSP-1A was declared inoperable.
- D. The 10 day completion time is used to limit the time that the LCO can not be met when going from one Condition to another Condition in the LCO. The first completion time listed for each Condition must still be met in order to comply with the LCO. In this case, the first completion time listed for the subject Condition is 72 hours. Barring any extensions this would be the time when the BSP must be returned to Operable status. However, if another Condition (e.g. Containment Cooling Train) were entered concurrent with the BSP then the 10 day completion time could become applicable for the subsequent Condition (e.g. Containment Cooling Train). This 10 day completion time prevents companies from cycling from one component to another and potentially never meeting the LCO.

OPS 5-01, Obj. 6; TS 3.6.6 and 1.3; 10 CFR 55.43.b.1

SRO - Bank

Reference(s) provided: TS 3.6.6 and 1.3

10. 036AA2.02 001/1/2/SRO #9/MEM 3.4/4.1/NEW/S/CR03501/

Fuel movement activities are in progress. Determine which ONE of the following conditions meet the criteria for a "Significant Fuel Handling Event" IAW FP-203, Defueling and Refueling Operations?

- A. ✓ Movesheet error discovered that would have resulted in setting one fuel assembly on top of another.
- B. Securing the operating Decay Heat Removal train to facilitate core mapping operations.
- C. Fuel movement is stopped due to decreasing pool clarity.
- D. RM-A1 increase to its "Warning" setpoint. Investigation reveals that work on the reactor vessel head caused the increase.

Reasons:

**Significant fuel handling event** – fuel handling events are events that have, or could have, resulted in fission product gas release, loss of required shutdown margin, personnel injury, damage to fuel, control components or fuel handling equipment, violation of Tech Specs associated with fuel movement, or loss of SNM.

- A. Correct. Example provided in FP-203, Step 4.4.1.
- B. See above definition.
- C. See above definition.
- D. This would be correct if fuel handling activities caused this alarm.

OPS 4-26, Obj. 6; FP-203, Section 4.4; 10 CFR 55.43.b.6 & 7

SRO - New

Reference(s) provided: None

11. 037AA2.10 001/1/2/SRO #10/MEM 3.2/4.1/NEW/S/CR03501/

Primary-to-secondary leakage is determined to be 125 gpd.

This is     (1)     the TS limit.

The basis for this leakage limit is     (2)    .

- A.       (1)       above  
          (2)       because the leak is from a known source that does not interfere with the detection of unidentified leakage, and is well within the capability of the RCS makeup system.
- B.       (1)       above  
          (2)       to ensure that tubes initially leaking during normal operation do not contribute excessively to total leakage during an accident condition.
- C.       (1)       below  
          (2)       because the leak is from a known source that does not interfere with the detection of unidentified leakage, and is well within the capability of the RCS makeup system.
- D. ✓     (1)       below  
          (2)       to ensure that tubes initially leaking during normal operation do not contribute excessively to total leakage during an accident condition.

Reasons:

- A.    Leakage is below the TS limit of 150 gpd and this is the basis for Identified leakage, not tube leakage.
- B.    Leakage is below the TS limit of 150 gpd.
- C.    This is the basis for Identified leakage, not tube leakage.
- D.    Correct. The limit is 150 gpd and this is the correct reason for this limit.

OPS 5-01, Obj. 12; TS 3.4.12; 10 CFR 55.43.b.2

SRO - New

Reference(s) provided: None

12. 041A2.02 001/2/2/SRO #11/C/A 3.6/3.9/NEW/S/CR03501/

A symptom scan is being performed two minutes after a reactor trip from 100% power. Only the Immediate Actions of EOP-2, Vital System Status Verification, have been performed. The following plant conditions currently exist:

- Tave is 541° F and stable.
- Both OTSGs are at 935 psig and stable.
- Adequate SCM does exist.

Which ONE of the following describes the most probable reason for these indications and what procedure should be used once the symptom scan is complete?

- A. TBVs have failed open; enter EOP-5, Excessive Heat Transfer, and isolate both OTSGs.
- B. TBVs have failed open; remain in EOP-2, Vital System Status Verification, and isolate both OTSGs.
- C. The correct TBV bias was not applied following the reactor trip; enter EOP-5, Excessive Heat Transfer, and minimize RCS temperature changes using available OTSGs.
- D. ✓ The correct TBV bias was not applied following the reactor trip; remain in EOP-2, Vital System Status Verification, and check operation of TBVs and ADVs.

Reasons:

- A. If the TBVs had failed open then OTSG pressure and RCS temperature would have continued to decrease.
- B. If the TBVs had failed open then OTSG pressure and RCS temperature would have continued to decrease. In this case EOP-5 should be entered.
- C. Since OTSG pressure and RCS temperature are now steady EOP-5 should not be entered.
- D. Correct. At 100% power a 50# bias is applied to the TBVs (935#). Following a reactor trip a 125# bias should be applied. Since the OTSGs steadied out at 935# one should be able to determine that the wrong bias is now applied. Also, now that the plant is stable, even though at a lower Tave than expected, EOP-5 entry would not be preferred.

OPS 4-14 Obj. 5; OPS 4-14 Section 1-4.0.G.5.e; 10 CFR 55.43.b.5

SRO - New

Reference(s) provided: None



13. 054AA2.03 001/1/1/SRO #12/C/A 4.1/4.2/NEW/S/CR03501/

The following plant conditions exist:

- A LOOP has occurred.
- EFP-2 and EFP-3 will not start.

Which of the following is the preferred EFW/AFW source for these conditions and why?

- A. EFP-1 because automatic flow control is provided by EFIC.
- B. FWP-7 because automatic flow control is provided by EFIC.
- C. EFP-1 because EDG load management is not a concern.
- D. ✓ FWP-7 because EDG load management is not a concern.

Reasons:

- A. If EDG load management was not the priority then this would be the reason why EFP-1 is preferred.
- B. Automatic flow control is not provided by EFIC.
- C. "A" EDG load management is the reason FWP-7 is preferred over EFP-1.
- D. Correct. With a LOOP in progress FWP-7 is the preferred pump because EDG load management is a concern.

OPS 5-116, Obj. 2; EOP-14 Cross Step Document, Step 7.1

SRO - New

Reference(s) provided: None

14. 055EG2.4.6 001/1/1/SRO #13/C/A 3.1/4.0/NEW/S/CR03501/

The following plant conditions exist:

- The plant was initially at full power with the "A" EDG tagged out.
- A loss of offsite power (LOOP) has occurred.
- The "B" EDG has failed to start.

Which ONE of the following describes the appropriate procedure to enter and the reason for closing MUV-49, Letdown Isolation valve?

- A. AP-770, Emergency Diesel Generator Actuation, should be entered. Closing MUV-49 is necessary to prevent challenging its automatic closure on high letdown temperature.
- B. AP-770, Emergency Diesel Generator Actuation, should be entered. Closing MUV-49 is necessary to minimize RCS inventory loss.
- C. EOP-12, Station Blackout, should be entered. Closing MUV-49 is necessary to prevent challenging its automatic closure on high letdown temperature.
- D. ✓ EOP-12, Station Blackout, should be entered. Closing MUV-49 is necessary to minimize RCS inventory loss.

Reasons:

Under SBO conditions, the capability to provide RCS makeup is lost. Minimizing losses ensures that adequate RCS inventory remains available to allow natural circulation cooling to remove decay heat. The SBO coolant inventory analysis assumes 25 gpm/RCP seal leakage combined with 10 gpm identified and 1 gpm unidentified leakage. This is a required consideration for an SBO coolant analysis. Even with this amount of leakage the analysis shows that the core will remain covered for the coping duration. In addition, the isolable paths for letdown and controlled bleed off are assured closed. This step is sequenced as the first step to ensure these leakage paths are isolated as soon as possible.

"D" is the correct response.

EOP-12, Step 3.2; EOP Cross Step Document, EOP-12 3.2

SRO - New

Reference(s) provided: None

15. 057G2.4.32 001/1/1/SRO #14/MEM 3.3/3.5/BANK/S/CR03501/5-111-001

The following plant conditions exist:

- The plant is at 75% power.
- Maintenance is trouble shooting a governor control problem on the "A" MFWP (FWP-2A).
- A breaker trips on VBDP-5 resulting in a loss of power to all MCB annunciator windows.
- The Primary Plant Operator informs the Control Room that SWP-1B has a large gearbox oil leak.

No other activities are ongoing at this time. Which ONE of the following describes the required actions IAW AP-430, Loss of Control Room Alarms?

- A. ✓ Stop the troubleshooting of FWP-2A and enter the TS for SWP-1B.
- B. Stop the troubleshooting of FWP-2A and enter the TS for "Loss of MCB Annunciator Windows".
- C. Enter the TS for SWP-1B and reduce power to 52% in case FWP-2A trips.
- D. Enter the TS for "Loss of MCB Annunciator Windows" and reduce power to 52% in case FWP-2A trips.

Reasons:

- A. Correct. Per AP-430 all activities that could cause a plant transient should be stopped and TS 3.7.7 should be entered for SWP-1B.
- B. There is no TS for "Loss of MCB Annunciator Windows".
- C. Troubleshooting of FWP-2A should stop; there is no requirement to reduce power.
- D. There is no TS for "Loss of MCB Annunciator Windows" and no requirement to reduce power.

OPS 5-111, Obj. 1; AP-430, Step 3.12; 10 CFR 55.43.b.1 & 5

SRO - Bank

Reference(s) provided: None

16. 061G2.1.12 001/2/1/SRO #15/MEM 2.9/4.0/NEW/S/CR03501/

The following plant conditions exist:

- The plant is in Mode 2.
- EFP-3 is tagged out for pump shaft replacement.
- The PPO has just reported an oil leak on EFP-2 due to a large crack in the bearing housing.

Which of the following describes the action(s) that should be taken?

- A. Be in Mode 3 within 6 hours and Mode 4 within 12 hours.
- B. ✓ Immediately take actions to restore EFP-2 *or* EFP-3 to operable status.
- C. Restore EFP-2 *or* EFP-3 to operable status within 72 hours.
- D. Verify EFP-1 is operable and commence a plant shutdown.

Reasons:

- A. This is the required action if a single EFP was out of service for > 72 hours.
- B. Correct. With both safety related EFPs out of service the safest thing to do is to keep the plant stable and immediately fix at least one pump.
- C. This is correct if only one safety related pump was inoperable.
- D. EFP-1 is no longer a safety related pump so the actions of TS 3.7.5, Condition D apply.

OPS 5-01, Obj. 12; TS 3.7.5, Condition D; 10 CFR 55.43.b.2

SRO - New

Reference(s) provided: None

17. BW/A04AA2.2 001/1/2/SRO #17/C/A 3.7/3.7/NEW/S/CR03501/

A spurious turbine trip has occurred from 25% reactor power. During performance of AP-660, Turbine Trip, the RO states that the output breakers are still closed after selecting the MCB switches to the 'TRIP' position. Which of the following actions would you direct the RO to take and what is the reason for this action?

- A. ✓ Select the 'Backup' trip coils and trip the output breakers to prevent turbine damage due to overheating.
- B. Select the 'Backup' trip coils and trip the output breakers to prevent turbine damage due to overspeed.
- C. Open the generator Exciter breaker to prevent generator damage due to overheating.
- D. Open the generator Exciter breaker to prevent generator damage due to overspeed.

Reasons:

- A. Correct. This is the first step to take. If this does not work then the dispatcher will have to open additional breakers. With the generator motoring turbine speed will be held constant at 1800 rpm, however the turbine will soon overheat because there is no steam flow to carry away the heat being generated by the rotating blades.
- B. Turbine speed is held at grid frequency for this condition.
- C. The exciter breaker should never be opened with the output breakers closed. Excessive stresses will be placed on the generator.
- D. The exciter breaker should never be opened with the output breakers closed. Excessive stresses will be placed on the generator. The generator also cannot overspeed with the output breakers still closed.

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OPS 4-70, Obj. 1; OPS 5-96, Obj. 3; OPS 4-70 Section 1-4.0.G.4; ECD-EOP-2 Step 3.13, NPTS97-0275; AP-660 Step 3.7; 10 CFR 55.43.b.5

SRO - New

Reference(s) provided: None



18. BW/E02EA2.1 001/1/1/SRO #18/C/A 2.5/4.0/NEW/S/CR03501/

The following plant conditions exist following a reactor trip and HPI actuation:

- HPI has been throttled to 80 gpm.
- RCS pressure is stable at 1900 psig.
- Reactor building pressure is stable at 0.3 psig.
- OTSG pressures are at their normal post trip values.
- OTSG levels are stable at LLL.
- RM-A2, Auxiliary Building Exhaust Duct Rad Monitor, has increased to its "Warning" alarm setpoint.

After performing the symptom scan in EOP-2, Vital System Status Verification, which of the following action(s) should be taken?

- A. Transition to EOP-8, LOCA Cooldown, and concurrently perform Rule 4, PTS.
- B. Transition to EOP-8, LOCA Cooldown, and perform a plant cooldown at  $\leq 50^{\circ}\text{F} / \frac{1}{2}\text{ hr}$ .
- C. Remain in EOP-2 and concurrently perform AP-250, Radiation Monitor Actuation, when directed.
- D. ✓ Remain in EOP-2 and concurrently perform AP-520, Loss of RCS Coolant or Pressure, when directed.

Reasons:

- A. Rule 4 is not applicable at this time and transition to EOP-8 is not required.
- B. Transition to EOP-8 is not required unless leakage is  $> 100\text{ gpm}$ . Also this branch point is not addressed until Step 3.29.
- C. Performance of AP-250 is not required until RM-A2 reaches its high alarm setpoint.
- D. Correct. With HPI actuated and RCS pressure remaining stable then an RCS leak is in progress. Stable OTSG levels rule out an OTSG tube leak. RM-A2 in alarm indicates an RCS leak in the Auxiliary Building. Performance of AP-520 will isolate/locate the leak.

OPS 5-114, Obj. 4; EOP-2, AP-520; 10CFR 55.43.b.5

SRO - New

Reference(s) provided: None

19. G2.1.22 001/GENERIC/1/SRO #19/MEM 2.8/3.3/NEW/S/CR03501/

Following a refueling outage with a predicted criticality at a rod index of 250, which ONE of the following groups of data indicate that the plant is in Mode 2 within an acceptable rod index?

- A.  $Q_{\text{core}}$  from NAS is 110 MW<sub>th</sub>.  
Rod index of 110.
- B.  $Q_{\text{core}}$  from NAS is 140 MW<sub>th</sub>.  
Rod index of 150.
- C.  $Q_{\text{core}}$  from NAS is 140 MW<sub>th</sub>.  
Rod index of 110.
- D. ✓  $Q_{\text{core}}$  from NAS is 110 MW<sub>th</sub>.  
Rod index of 150.

Reasons:

Mode 2 is defined as  $\leq 5\%$  rated thermal power (100% RTP is 2568 MW<sub>th</sub>) with  $K_{\text{eff}} \geq 0.99$ .

Appropriate rod index is - 1.0 % $\Delta k/k$ . For a rod index of 250 the lower boundary is an index of 134 and the upper is 300.

- A. Rod index is too low.
- B. 140 MW<sub>th</sub> is  $> 5\%$  RTP.
- C. 140 MW<sub>th</sub> is  $> 5\%$  RTP. Rod index is too low.
- D. Correct 110 MW<sub>th</sub> is 4.3% RTP.

OP-103C, Curve 8A

SRO - New

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

20. G2.1.34 001/GENERIC/1/SRO #20/MEM 2.3/2.9/NEW/S/CR03501/

Chemistry has determined that RCS Dose Equivalent I-131 is 1.3  $\mu\text{Ci/gm}$ . The RCS was resampled and this value verified.

This is       (1)       the TS limit for RCS activity.

The basis for this limit is to ensure the resulting doses are within limits during       (2)      .

- A.       (1)       above  
          (2)       normal plant operations (10 CFR 20.1201, Occupational Dose Limits for Adults).
- B. ✓      (1)       above  
          (2)       analyzed transients and accidents (10 CFR 50.67, Accident Source Term Limits)
- C.       (1)       below  
          (2)       normal plant operations (10 CFR 20.1201, Occupational Dose Limits for Adults).
- D.       (1)       below  
          (2)       analyzed transients and accidents (10 CFR 50.67, Accident Source Term Limits).

Reasons:

- A.    RCS activity limit is based on 10CFR 50.67.
- B.    Correct. The TS limit for I-131 is 1.0  $\mu\text{Ci/gm}$ . This limit is based on 10 CFR 50.67.
- C.    This is above the TS I-131 limit. RCS activity limit is based on 10CFR 50.67.
- D.    This is above the TS I-131 limit.

OPS 5-01 Obj. 12; TS 3.4.15; 10 CFR 55.43.b.2

SRO - New

Reference(s) provided: None

21. G2.2.22 001/GENERIC/2/SRO #21/MEM 3.4/4.1/NEW/S/CR03501/

The following plant conditions exist:

- A plant startup is in progress.
- RCS temperature is 250° F.
- A transient has occurred that raised RCS pressure to 2775 psig.

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

Reduce RCS pressure to < 2750 psig:

- A. within 1 hour to preserve material integrity.
- B✓ within 5 minutes to preserve material integrity.
- C. within 1 hour to prevent exceeding the DNBR design limit.
- D. within 5 minutes to prevent exceeding the DNBR design limit.

Reasons:

- A. The requirement for Mode 4 is 5 minutes.
- B. Correct. Violating TS 2.1.2, RCS Pressure Safety Limit, requires a reduction in pressure within 5 minutes. This limit preserves the material integrity (prevents gross rupture) of the RCS.
- C. The requirement is 5 minutes. The Reactor Core Safety Limits, TS 2.1.1, preserve DNBR design limits.
- D. The Reactor Core Safety Limits, TS 2.1.1, preserves DNBR design limits.

OPS 5-01, Obj. 9; TS 2.1.2; 10 CFR 55.43.b.1 & 2

SRO - New

Reference(s) provided: None

22. G2.2.24 001/GENERIC/2/SRO #22/C/A 2.6/3.8/NEW/S/CR03501/

The following plant conditions exist:

- Plant is at full power.
- While performing SP-146A, EFIC Monthly Functional Test, an I & C technician broke the "Low Level Initiate" bistable in the "A" Cabinet for the "A" OTSG.
- Replacement parts are expected within 24 hours.
- "A" EFIC Channel has been placed in "BYPASS" per TS requirements.

An engineering evaluation has determined that a recently installed EFIC "Low Level" transmitter for the "B" Channel, "A" OTSG, is the wrong type and must be replaced. The SSO has now declared this transmitter inoperable.

Which ONE of the following action(s) are *required* by Technical Specification?

- A. ✓ Trip the "B" EFIC Channel within 1 hour *and* restore 1 channel to service within 72 hours.
- B. Bypass the "B" EFIC Channel within 1 hour *and* restore 1 channel to service within 72 hours.
- C. Trip the "B" EFIC Channel within 4 hours *or* be in Mode 3 within 6 hours.
- D. Bypass the "B" EFIC Channel within 4 hours *or* be in Mode 3 within 6 hours.

Reasons:

- A. Correct. Since 2 required channels in a single function are declared inoperable then one channel must be tripped and one channel placed in bypass within one hour and additionally one of the channels must be restored within 72 hours..
- B. See above.
- C. The time requirement is 1 hour.
- D. See above.

OPS 5-01, Obj. 8; TS 3.3.11 & Table 3.3.11-1; 10 CFR 55.43.b.1

SRO - New

Reference(s) provided: None

23. G2.3.2 001/GENERIC/3/SRO #23/MEM 2.5/2.9/NEW/S/CR03501/

The following plant conditions exist:

- A valve lineup is being performed on the Waste Gas system.
- The first positioner picked up 20 mrem in five minutes checking open three valves located in the same general area.
- These valves are now ready to be Independently Verified.

As the CRS which ONE of the following actions would be preferred IAW AI-500, Conduct of Operations Department Organization and Administration, Appendix 10, Verification of Activities/Questioning Attitude?

- A. Have the most experienced operator perform the verification so that less time will be spent on the verification.
- B. Have the on-shift operator that has received the least dose perform the verification to keep individual exposure as low as possible.
- C. ✓ Waive the independent verification requirement for these valves to reduce personnel exposure.
- D. Waive the independent verification requirement for these valves since this is not a Class 1E, Safety Related system.



Reasons:

*AI-500, Appendix 10, Step 3.3.5, states:*

*Under certain conditions, the SSO or CRS may waive independent verification requirements. Concerning radiation exposure the following criteria should be used when considering waiving the Independent Verification requirement:*

- 1) More than 0.5 mrem for a specific verification task, or*
  - 2) Based upon the first positioner's dose the aggregate dose from all activities in a particular area would exceed 2.0 mrem.*
- 
- A. While this is a good idea this is not the preferred action per AI-500, Appendix 10.
  - B. The goal is to minimize exposure to all personnel. AI-500, Appendix 10 states the preferred action.
  - C. Correct. AI-500, Appendix 10 states conditions that Independent Verification requirements may be waived. This is one of the conditions.
  - D. The Waste Gas system is not a safety related system.

OPS 5-38, Obj. 32; AI-500, Appendix 10, Step 3.3.5; 10 CFR 55.43.b.4

SRO - New

Reference(s) provided: None

24. G2.4.11 001/GENERIC/4/SRO #24/C/A 3.4/3.6/BANK/S/CR03501/5-099-005

A plant cooldown is in progress with the "A" Decay Heat Removal train in service. DHP-1B is tagged out and is not available. If DHP-1A were to fail which ONE of the following describes the method of core cooling that would be established IAW AP-404, Loss of Decay Heat Removal?

Establish:

- A. LPI cooling.
- B. ✓ OTSG cooling.
- C. BWST gravity drain cooling.
- D. cooling with the Spent Fuel System.

Reasons:

- A. The RCS is not vented at this point and both LPI pumps are OOS.
- B. Correct. The required conditions per step 3.18 of AP-404 are met.
- C. No vent path exists.
- D. Due to seismic concerns the spent fuel cooling system is not used for DHR.

AP-404, Step 3.18; OPS 5-99, Obj. 7

SRO - Bank

Reference(s) provided: None

25. G2.4.30 001/GENERIC/4/SRO #25/MEM 2.2/3.6/NEW/S/CR03501/

*Required* shutdown to Mode 3 was not completed within TS time limits. Which of the following is the *maximum* time allowed to notify the NRC of this condition?

- A. 15 minutes
- B. ✓ 1 hour
- C. 4 hours
- D. 8 hours

Reasons:

- A. Maximum of 1 hour is allowed.
- B. Correct. This requires entry into an Unusual Event. Notification to the NRC must be made within 1 hour.
- C. Maximum of 1 hour is allowed.
- D. Maximum of 1 hour is allowed.

OPS 5-42 Obj. 18; EM-202, EAL 3.5; 10 CFR 55.43.b.1

SRO - New

Reference(s) provided: None