FACILITY SUBMITTED OUTLINE

AND THE FACILITY INITIAL EXAM SUBMITTAL
(WRITTEN & OPERATING PORTIONS)

DESIGNATED FOR DISTRIBUTION UNDER
RIDS CODE A070

A070

CRYSTAL RIVER
UNIT 3

1999

RO

WRITTEN

EXAMINATION

DISTRIBUTION CODE
A070

Name: ______________________________

1. ROT-5-01 001/ B5/ / / G2.1.22/ 2.8/ / 33/ TS
The following plant conditions exist:

- A reactor trip has occurred.
- All rods have *not* fully inserted into the core.
- NI-3 and NI-4 indicate 5×10^{-7} amps and steady.

What Mode is the plant in for these conditions?

A. Mode 1

✓B. Mode 2

C. Mode 3

D. Mode 4

Reasons:

A., C. & D. 5×10^{-7} amps is approximately 1% power. If amps are steady then a K_{eff} of > 0.99 is indicated.

TS Table 1.1-1; ROT 4-10 Figure 1; 2/3-R26

NEW

2. ROT-4-14 007/ B1/ / / G2.4.45/ 3.6/ 3.6/ 33/ ICS

A power increase is in progress from 50% power. The "VERIFY FWV-29 ON AUTO" alarm has just annunciated.

Which of the following describes this plant condition?

A. This is *not* an expected alarm during a normal power increase. The Auto/Man toggle switch for FWV-29 must still be selected to the Manual position.

B. This is *not* an expected alarm during a normal power increase. FWV-29 should automatically open under these conditions.

C. This is an expected alarm during a normal power increase. This alarm will stay in until FWV-29 is fully open.

✓D. This is an expected alarm during a normal power increase. This alarm will stay in until FWV-29 is > 15% open.

Reasons:

A. This is an expected alarm on a power increase whether the Auto/Man toggle switch is selected to auto or not.

B. This is an expected alarm on a power increase.

C. The alarm clears after the valve is > 15% open.

ROT 4-14 Section 5.1.19; AR-503 EP 1227; 2/3-C71

NEW

3. ROT-4-14 001/ B1/ / / 015K3.04/ 3.4/ 4.0/ 33/ NNI/ICS

The following plant conditions exist:

- NI-5 indicates 73% reactor power.
- NI-6 indicates 75% reactor power.
- NI-7 indicates 76% reactor power.
- NI-8 indicates 74% reactor power.
- NI-5/6 selected for control.

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

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 76% power; SASS would not transfer; CRD system would initially withdraw control rods.

C. The neutron power signal from RPS to ICS would be 73% power; SASS would transfer and select NI-7/8 for control; CRD system would initially insert control rods.

✓D. The neutron power signal from RPS to ICS would be 73% power; SASS would not transfer; CRD system would initially withdraw control rods.

Reasons:

A. The power signal would be the highest of NI-5/6 (73%). SASS would not transfer because the error seen is only 3% (3.75% error required for transfer). CRD system would initially withdraw control rods.

B. The power signal would be the highest of NI-5/6 (73%).

C. SASS would not transfer because the error seen is only 3% (3.75% error required for transfer). CRD system would initially withdraw control rods.

ROT 4-09 Section 2.1.3, 2.1.4 & Figure 27; 2/3-R9

NRCM98

4. ROT-4-91 002/ F2/ / / G2.4.32/ 3.5/ 3.5/ 33/ VITALPOWER
With the plant at 100% power a catastrophic failure of VBIT-1C rendered itself inoperable and caused both of the VBXSs that it feeds to fail as is and not transfer to their alternate power supply.

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

A. AP-581, Loss of NNI-X, should be entered.

B. AP-582, Loss of NNI-Y, should be entered.

✓C. AP-430, Loss of Control Room Alarms, should be entered.

D. Trip both MFW pumps and the reactor due to the loss of ICS power. EOP-2, Vital System Status Verification, and Rule 3, EFW Control, should be entered.

Reasons:

A. The ABT for NNI-X should transfer to VBDP-1 on a loss of VBDP-5.

B. Neither VBDP-5 or 9 feed NNI-Y therefore no loss of power should occur.

D. This is the correct response for a loss of ICS power however neither VBDP-5 or 9 feed ICS therefore no loss of power should occur.

ROT 4-91 Figure 1; AP-430 Step 3.5; 2/3-C69

NRCM98

5. ROT-4-09 004/ B6/ / / 016K3.03/ 3.0/ 3.1/ 33/ NNI
The following plant conditions exist:

- The plant is at 100% power.
- The turbine is selected to the "A" steam header pressure transmitter for control.

Which statement below describes the expected ICS/SASS response to a low failure of the selected "A" turbine header pressure transmitter coincident with a reactor trip?

✓A. SASS will transfer the "A" header input to the turbine and bypass valves to the unaffected transmitter. No ICS upset will occur.

B. SASS will transfer the "A" header input to the turbine to the unaffected transmitter. The bypass valves will fail closed.

C. SASS will transfer the "A" header input to the bypass valves to the unaffected transmitter and transfer the turbine to the "B" steam header pressure transmitter for control.

D. SASS will transfer the "A" header input to the turbine to the unaffected transmitter. The bypass valves will fail open.

Reasons:

B. The bypass valve's input should also transfer to the unaffected transmitter.

C. Manual operator action is required to transfer turbine control to the "B" steam header pressure transmitter.

D. The bypass valve's input should also transfer to the unaffected transmitter. If the transfer didn't happen the bypass valves would fail closed, not open.

ROT 4-9 Figure 25; 1-C51

Modified Bank ROT 4-09 #8; ROTs J -T8; ROTs M - T5A

6. ROT-5-01 003/ B9/ / / 076AA1.04/ 3.2/ 3.4/ 11/ TS

The plant is at 100% full power when the letdown radiation monitor, RM-L1, fails high. Chemistry is notified and, after sampling, returns with the following data:

- Dose equivalent I-131 is 0.02 μCi/gm.
- Reactor coolant gross specific activity is 150/E-bar μCi/gm.

What technical specification action, if any, should be taken?

✓A. Be in Mode 3 with Tave < 500° F in six hours.

B. Verify dose equivalent I-131 within acceptable region and restore within 48 hours.

C. Verify gross specific activity within acceptable region and restore within 48 hours.

D. No technical specification action applies for these conditions.

Reasons:

B. Dose equivalent I-131 is within its technical specification limit.

C. Gross specific activity does not have an acceptable region, it is either within limit or not.

D. Gross specific activity is outside its technical specification limit.

TS 3.4.15; 2/3-C16

NRCCP97

7. ROT-4-15 001/B5///061A3.04/4.1/4.2/33/EFIC

The following plant conditions exist:

- A plant startup is in progress.
- A main steam line rupture downstream of MSV-55, MS supply to EFP-2, has occurred.
- "A" OTSG pressure is 540 psig.
- "B" OTSG pressure is 780 psig.

Based on the conditions above which of the following describes current plant configuration?

A. MSIVs on the "A" OTSG are open; MSIVs on the "B" OTSG are open; MFW is controlling the "A" OTSG at Low Level Limits.

B. MSIVs on the "A" OTSG are closed; MSIVs on the "B" OTSG are open; EFW is controlling the "A" OTSG at Low Level Limits.

C. MSIVs on the "A" OTSG are open; MSIVs on the "B" OTSG are open; MFW is controlling the "B" OTSG at Low Level Limits.

✓D. MSIVs on the "A" OTSG are closed; MSIVs on the "B" OTSG are open; EFW is controlling the "B" OTSG at Low Level Limits.

Reasons:

A. MSIVs close at 600# unless bypassed. TS requires that EFIC be in service at > 750# OTSG pressure. MSLI and MFLI would have actuated and isolated MFW.

B. FOGG would isolate EFW to the "A" OTSG.

C. MSIVs close at 600# unless bypassed. TS requires that EFIC be in service at > 750# OTSG pressure. MFLI will trip both running MFWPs securing MFW to both OTSGs. FWV-28 would not be closed at this power level.

ROT 4-15 Section 2.2.2.2 & 2.2.3.3; 2/3-R14

NRCM98

8. ROT-4-25 002/ B6/ / / 071A3.03/ 3.6/ 3.8/ 88/ RM

A small leak has just occurred in the Waste Gas Decay Tank area. Which of the following describes the *first* radiation monitor that should detect this leak and the automatic actuations that should occur?

A. RM-A4; trips AHF-10

✓B. RM-A3; trips AHF-11A/B and closes AHD-29 & 36.

C. RM-A3; trips AHF-11A/B, closes WDV-393, 394, & 395 (recycle isolation valves) and closes WDV-439 (common waste gas isolation).

D. RM-A11; closes WDV-393, 394, & 395 (recycle isolation valves) and closes WDV-439 (common waste gas isolation).

Reasons:

A. If RM-A4 trips then this action would occur. However RM-A3 will detect the gas leak first.

C. If RM-A3 trips it will not close the recycle valves or the common waste gas isolation valve.

D. If RM-A11 trips then these actions would occur. RM-A11 is not in service unless a waste gas release is in progress and will only trip if the preset release values are exceeded.

ROT 4-25 Table 4; 1-C47

NEW

9. ROT-5-31 001/ B3/ / / E09G2.1.23/ 3.9/ 4.0/ 33/ RSP

Step 3.34 of AP-990, Shutdown from Outside the Control Room, requires the performance of Enclosure 2, RSD Panel Log Readings. Natural Circulation is in progress with EFIC controlling OTSG level. The following data is recorded:

- OTSG 'A' Operate Level	91%
- OTSG 'B' Operate Level	92%
- T_{cold}	545°
- T_{hot}	572°
- $T_{incores}$	590°
- RCS Wide Range Pressure	1600 psig

Based on the above readings which of the following describes the condition of the RCS and EFIC level control?

✓A. Adequate Subcooling Margin does not exist. EFIC is controlling at the required level.

B. Adequate Subcooling Margin does not exist. EFIC should be controlling level at the Natural Circulation setpoint due to RCPs being secured.

C. Adequate Subcooling Margin does exist. EFIC is controlling at the required level.

D. Adequate Subcooling Margin does exist. EFIC should be controlling level at the Natural Circulation setpoint due to RCPs being secured.

Reasons:

B. EFIC should control at the ISCM setpoint, not the Nat Circ setpoint.

C. Adequate Subcooling Margin does not exist.

D. Adequate Subcooling Margin does not exist and EFIC should control at the ISCM setpoint, not the Nat Circ setpoint.

AP-990 Step 3.32 and Enclosure 2; EOP-13 Rule 1 and 3; 2/3-C5

NRCM98

10. ROT-4-87 001/ B9/ / / 061AA1.01/ 3.6/ 3.6/ 33/ CC VENT

Which of the following conditions best describes the configuration of selected Control Complex Ventilation system components after a RMA-5 Gas Actuation has occurred?

A. AHD-2C & 2E will be open.

✓B. The CC Normal Duty Supply Fans (AHF-17A/B) will trip.

C. The CC Ventilation system will be in the recirculation mode with a Normal Duty Supply fan (AHF-17A/B) running.

D. The selected Control Access Area Exhaust Fan (AHF-20A/B) will be running in fast speed.

Reasons:

A. These dampers will close.

C. The dampers will be aligned to the recirculation mode but the 17 fans will trip due to the RM-A5 actuation.

D. The 20 fans will remain running if in slow speed but will trip if in fast speed.

ROT 4-87 Section 1.1 & Figure 3; 1-C29

Bank ROT 4-87 #7

11. ROT-5-94 001/B3///E05EK2.1/3.8/4.0/44/EOP-5
A step in EOP-05, Excessive Heat Transfer, states:

IF at any time ES systems have,
OR should have actuated,
THEN ensure ES equipment is properly aligned.

If reactor coolant pressure is 1350 psig which of the following indications and associated operator responses is in compliance with this step?

A. The decay heat inlet valve to the reactor coolant system, DHV-5, has a green ES status light and the control board operator rotates the valve's switch to open it.

B. The "B" Building Spray Pump, BSP-1B, has an amber status light and the control board operator rotates the pump's control handle to start it.

C. High pressure injection valve, MUV-23, has a green status light and the control board operator rotates the valve's switch to open it.

✓D. The "A" Decay Heat Closed Cycle Cooling Pump, DCP-1A, has an amber status light and the control board operator rotates the pump's control handle to start it.

Reasons:

A. Pressure is too high for an LPI actuation to open DHV-5. A green light indicates it has opened inappropriately.

B. An HPI actuation will only give a permit for BSP-1B to start. The amber light was correct and the pump should not be started.

C. A green status light indicates the valve is already open. There is no need to manipulate the switch.

ROT 4-13 Table II; 2/3-C8

NRCCP97; NRCM98

12. ROT-4-14 004/B1///045A1.05/3.8//33/ICS

The following plant conditions exist:

- Plant is at 30% power.
- A spurious turbine trip occurs.
- 'A' OTSG TBVs fail closed.

Which of the following describes expected plant parameters 10 minutes after the event? (assume no operator intervention)

✓A. 'A' OTSG pressure 1025 psig
'B' OTSG pressure 885 psig
RCS T_{ave} 579° F

B. A' OTSG pressure 1025 psig
'B' OTSG pressure 1010 psig
RCS T_{ave} 555° F

C. A' OTSG pressure 885 psig
'B' OTSG pressure 1010 psig
RCS T_{ave} 579° F

D. A' OTSG pressure 1010 psig
'B' OTSG pressure 885 psig
RCS T_{ave} 555° F

Reasons:

B. 'B' OTSG pressure should be 885 psig and RCS temperature should be 579° F because reactor should not be tripped.

C. 'A' OTSG pressure should be 1025 since the ADV is controlling. 'B' OTSG pressure should be 885 psig because reactor should not be tripped.

D. A' OTSG pressure should be 1025 since the ADV is controlling. RCS temperature should be 579° F because reactor should not be tripped.

12. ROT-4-14 004/ B1/ / / 045A1.05/ 3.8/ / 33/ ICS
ROT 4-14 Section 3.2.5; 2/3-R24

NEW

13. ROT-4-14 005/B1///056K1.03/2.6/2.6/33/CD CONTROL
Which of the following describes the direct signal that decreases condensate flow demand on a loss of one MFW pump at 80% power?

A. A signal from the deaerator high level interlock.

B. A runback signal from the ULD sub-section of the ICS.

C. A signal that compares existing FW flow, CD flow and hotwell level.

✓D. A signal that compares existing FW flow, CD flow and deaerator level.

Reasons:

A. This interlock will trip all running CDPs, not lower CD demand.

B. A runback will be in effect however there is no direct signal to condensate to lower demand.

C. FW flow and CD flow are compared to modifiy condensate demand. Hotwell level will increase but this will only modify the position of CDV-88, not actual CD demand.

ROT 4-14 Section 3.6.2 & Figure 9; OP-603 Step 3.1.6; 1-C42

NEW

14. ROT-4-13 003/B2///006A4.07/4.4/4.4/33/ES

The following plant conditions exist:

- A controlled plant shutdown is in progress.
- RCS pressure is 250 psig.
- RCS temperature is 200° F.
- An RCS leak occurs and you elect to manually actuate LPI.

Based on the above conditions what would be the expected status of DHP-1A & 1B?

✓A. Neither DHP will start.

B. Both DHPs will start immediately.

C. Both DHPs will start 15 seconds following the manual actuation in their normal block loading sequence.

D. The "B" DHP will start 15 seconds following the manual actuation in its normal block loading sequence. The "A" DHP will not start until five seconds later if EFP-1 is running.

Reasons:

B. & C. Due to the given conditions the student must realize that both HPI and LPI have been bypassed. A manual initiation of the LPI actuation system will not start the decay heat pumps unless the HPI SEAL IN is present (Block 4 Loaded). These pumps will have to be started using the manual start switches or by actuating the HPI system.

D. The second portion of the distractor refers to an interlock in effect only if a LOOP is present and would trip EFP-1, not delay the start of DHP-1A.

ROT 4-13 Section 1.2.4, Table II & IV; 2/3-C49

NEW

15. ROT-4-09 002/ B1/ / / 016A3.01/ 2.9/ / 33/ NNI/ICS
The following plant conditions exist:

- Plant is at 100% power.
- The turbine is aligned to the 'A' OTSG for header pressure control.
- The selected steam header pressure transmitter fails rapidly to mid-scale.

Which of the following describes the expected plant response?

A. SASS will automatically transfer to the alternate transmitter. A minor system upset may occur but will stabilize as soon as the transfer is complete.

B. SASS will not automatically transfer. The TBVs from the 'A' OTSG will open to reduce pressure.

C. A SASS mismatch alarm will annunciate but a SASS transfer will not occur. The turbine governor valves will close slightly to increase header pressure.

✓D. SASS will not automatically transfer. A major plant transient will occur without operator intervention.

Reasons:

A. SASS will not automatically transfer due to this failure. A mid-scale failure will only result in a 15# error (18# error required for transfer).

B. The pressure signal to the TBVs will increase to 900# but due to the 50# bias being applied to setpoint the TBVs will remain closed.

C. A SASS mismatch alarm also requires an 18# error. The governor valves will open in an attempt to lower header pressure.

ROT 4-9 Section 2.1.4; 2/3-R19

NEW

16. ROT-5-91 002/ G2/ / / 038EK3.06/ 4.2/ 4.5/ 77/ EOP/AP

EOP-06, Steam Generator Tube Rupture, has the following step:

> IF condenser is available,
> THEN notify SPO to
> **CONCURRENTLY PERFORM**
> EOP-14, Enclosure 6, OTSG
> Blowdown Lineup

Why is this step being performed?

A. Provides a means of OTSG pressure control if steaming is not permitted.

B. Provides an alternate means of OTSG pressure control if steaming is permitted.

✓C. Provides a path for OTSG inventory control if steaming is not permitted or is inadequate to keep up with the leak rate.

D. Provides a path for OTSG inventory control if steaming is permitted and is adequate to keep up with the leak rate.

Reasons:

A. & B. The blowdown lineup is not used for pressure control.

D. If steaming is adequate to maintain OTSG level then blowdown is not required.

EOP-6 Steps 3.3 & 3.36; 1-C24

Bank ROT 5-91 #13

17. ROT-4-56 002/ B1/ ROT-4-13/ / 103K4.06/ 3.1/ 3.7/ 33/ SW

The plant was operating at 100% power when a steam leak on the "A" steam generator occurred in the reactor building (RB). The following conditions exist:

- Reactor building pressure is 5 psig.
- Reactor coolant temperature (T_c) 490°F.
- RCS pressure 1400 psig and increasing.
- Pressurizer level is 10 inches.
- "A" steam generator is isolated.
- "B" steam generator is being fed from emergency feedwater and steamed through the atmospheric dump valve.

In this situation the nuclear services closed cycle cooling (SW) system is providing cooling water to:

✓A. Reactor coolant pumps and reactor building main fan assemblies.

B. Reactor coolant pumps and control rod drive mechanisms.

C. Reactor coolant drain tank and reactor building main fan assemblies.

D. Reactor coolant drain tank and control rod drive mechanisms.

Reasons:

B. CRDs have SW isolated on RBIC. Reactor coolant pumps are not isolated because a low level in the the SW surge tank does not exist.

C. RCDT has SW isolated on RBIC.

D. Both RCDT and CRDs have SW isolated on RBIC.

ROT 4-13 Table 6; ROT 4-56 Section 1.1; 1-C59

Bank ROT 4-56 #63; NRC 6-97; ROTs M - 5B

18. ROT-5-01 002/ B5/ / / 015A4.02/ 3.9/ 3.9/ 33/ TS/COLR

At 1600 the incore neutron flux detection system is declared inoperable. Power Range NIs indicate the following:

NI-5 = 85.0%	NI-7 = 95.0%
NI-6 = 89.5%	NI-8 = 93.5%

Which of the following is the calculated limiting Quadrant Power Tilt from the above NI readings?

A. + 6.3%

B. - 1.4%

✓C. + 4.7%

D. - 4.7%

A., B. & D. $$QPT = 100\left(\frac{\textit{power in any core quadrant}}{\textit{average power of all quadrants}} - 1\right)$$

Using 95% with an average power of 90.75% the QPT is equal to +4.7%.

TS Definition; 2/3-C39

NEW

19. ROT-5-91 003/ F1/F2/ / / 2.4.35/ 3.5/ 3.5/ 33/ EOP-3

With LPI established at > 1400 gpm in both lines a step in EOP-3, Inadequate Subcooling Margin, instructs the PPO to unlock and close the CFT isolation valve breakers. Where are these breakers located and what is the purpose for this action?

A. ES MCC 3A & 3B; to allow the control room operators to open the valves to provide an additional source of makeup to the RCS.

B. ES MCC 3A & 3B; to allow the control room operators to close the valves to prevent nitrogen injection into the RCS after the tanks are emptied.

C. ES MCC 3AB; to allow the control room operators to open the valves to provide an additional source of makeup to the RCS.

✓D. ES MCC 3AB; to allow the control room operators to close the valves to prevent nitrogen injection into the RCS after the tanks are emptied.

Reasons:

A. Breakers are located on ES MCC 3AB. With LPI flow > 1400 gpm the CFTs have already emptied into the RCS.

B. Breakers are located on ES MCC 3AB.

C. With LPI flow > 1400 gpm the CFTs have already emptied into the RCS.

EOP-3 Step 3.37; ROT 5-91 Page 34; 1-C70

NEW

20. ROT-4-56 001/ F3/ / / 076K4.02/ 2.9/ / 88/ SW

The following plant conditions exist:

- SWP-1C is in operation.
- An accident in the seawater room results in completely shearing off the SW surge tank suction line.

Which of the following describes the response of the SWPs?

A. SWP-1B auto starts and SWP-1C trips.

✓B. SWP-1B auto starts first; then SWP-1A auto starts and SWP-1C trips.

C. SWP-1A auto starts first; then SWP-1B auto starts and SWP-1C trips.

D. Both SWP-1A and SWP-1B auto start and SWP-1C continues to run.

Reasons:

A. SWP-1A auto starts 8 seconds later.

C. SWP-1B auto starts first.

D. SWP-1C trips 15 seconds after SWP-1A or 1B starts.

OP-408 Steps 3.1.3, 3.1.4 & 3.1.5; 1-R25

Modified Bank ROT 4-56 #26

21. ROT-4-06 005/ B9/ / / 064G2.1.8/ 3.8/ 3.6/ 33/ EDG

A step in SP-354A, Monthly Test of EDG-1A, requires the PPO to ensure that the Speed Droop is set to '60' and the Unit-Parallel switch to 'Parallel'. Where would you direct the PPO to go to perform these functions and why are they necessary?

A. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

✓B. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

C. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.

D. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.

Reasons:

A. Speed droop switch is located on the engine governor.

C. Speed droop switch is located on the engine governor. Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

D. Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

ROT 4-06 Section 4.6; SP-354A Step 4.4; 1-C57

NEW

22. ROT-4-06 004/ B4/ / / 063K3.02/ 3.5/ 3.7/ 33/ EDG

DPDP-1A is de-energized due to an internal fault on the bus coincident with a Loss of Offsite Power.

Based on these conditions which of the following describes the status of EDG-1A and the EFIC system?

A. EDG-1A will start and load on the bus; the 'A' and 'C' EFIC cabinet will lose power.

B. EDG-1A will start and come up to speed but will not energize the bus; the 'A' and 'C' EFIC cabinet will ***not*** lose power.

C. EDG-1A will start and load on the bus; the 'A' train EFIC control valves will fail full open.

✓D. EDG-1A will start and come up to speed but will not energize the bus; the 'B' train EFIC block valves will fail as is.

Reasons:

A. EDG-1A cannot load on the bus due to loss of field flashing.

B. The EFIC cabinet will lose power due to the loss of both of the dual input inverter power supplies.

C. EDG-1A cannot load on the bus due to loss of field flashing.

ROT 4-06 Section 1.2.7; ROT 4-64 Section 2.4; 2/3-C45

NEW

23. ROT-5-14 001/ B6/ / / G2.1.2/ 4.0/ 4.0/ 33/ AI-505
What is the policy for CR-3 Nuclear Operations for bypassing automatic safety system actuations? (10 CFR 50.54 X/Y has not been invoked)

A. Reactor Operators have the authority to immediately bypass inadvertent Safety System Actuations. Informing the Procedure Director is not required.

B. Reactor Operators have the authority to bypass automatic Safety System Actuations as required but must immediately inform the Procedure Director afterwards.

C. Reactor Operators must obtain approval from the Procedure Director prior to bypassing automatic Safety System Actuations for which there is no procedural guidance.

✓D. Reactor Operators must obtain concurrance from the Procedure Director prior to bypassing automatic Safety System Actuations as directed by approved plant procedures.

Reasons:

A., B. & C. Per AI-505 the PROCEDURE DIRECTOR's CONCURRENCE must be obtained prior to bypassing a safety system during all phases of operation, including during the performance of EOP-13, EOP Rules.

Safety systems may be bypassed when directed by EVENT PROCEDURES and the PROCEDURE DIRECTOR has determined it is appropriate based on current plant conditions.

AI-505 Step 4.4; 1-C63

Bank ROT 5-14 #20; ROTs J - T5; NRC 5-93; ROTs M - T7

24. ROT-4-62 001/B3///026A3.01/4.3/4.5/33/BS

The following plant conditions exist:

- A large break LOCA is in progress.
- HPI, LPI, RBIC and BS have actuated.
- HPI, LPI and RBIC were bypassed following actuation.
- RB pressure is currently 15 psig.
- BSV-3 failed to automatically control and was taken to manual and closed.
- The HPI seal-in permit was reset and the "A" BS pump was secured.

Which of the following methods of BS flow control are available when BSV-3 is repaired and returned to service?

✓A. Manual only.

B. Remote/Auto only.

C. Local/Auto only.

D. Local/Auto and Manual.

Reasons:

B., C. & D. With the HPI seal-in reset and the BS pump secured all automatic functions have been bypassed. The only way to restore automatic control (Remote/Auto or Local/Auto) would be to re-actuate RBIC.

ROT 4-62 Section 2.2.3; 2/3-R20

NRCM98

25. ROT-4-15 004/ B3/ / / 039K4.05/ 3.7/ 3.7/ 11/ MSLI
During normal full power operation a circuit failure occurs which results in the "SV1/SV2 Test" white indicating light for MSV-411 to illuminate. Using this indication only which of the following choices best describes the status of the MSIV air supply system?

A. SV1 and/or SV2 have de-energized, MSIV-411 should close.

✓B. SV1 and/or SV2 have energized, MSIV-411 should close.

C. SV1 and/or SV2 have de-energized, MSIV-411 should not reposition.

D. SV1 and/or SV2 have energized, MSIV-411 should not reposition.

Reasons:

A. SV1 and/or SV2 have energized.

C. SV1 and/or SV2 have energized. MSV-411 should close.

D. MSV-411 should close.

SP-332 Steps 3.2.1, 3.2.7 & Figure 1; 1-C55

Bank ROT 4-15 #69

26. ROT-4-28 002/ B1/ / / 001G2.1.32/ 3.4/ / 33/ CRD
The following plant conditions exist:

- OP-209, Plant Cooldown, is in progress.
- RCS pressure is 450 psig.
- RCS temperature is 300° F.
- A failure occurs which results in de-energizing the CRD system.

Which of the following describes the impact, if any, of this failure on the CRD system?

A. There will be no physical damage to the CRD assembly.

✓B. Possible damage could have occurred to the lead screw.

C. Possible damage could have occurred to the radial thrust bearing.

D. Due to the increased buffering action the control rods will insert at a slower rate than at normal system pressure and temperature.

Reasons:

A. Damage to the lead screw is likely due to the decreased buffering action at this RCS pressure.

C. This event has no effect on the radial thrust bearing.

D. Buffering action is decreased with these RCS conditions.

OP-103B Curves 5 or 6; OP-502 Step 3.2.7; ROT 4-28 Section 4.1.4; 1-R5

NEW

27. ROT-5-68 002/ B4/ / / 059G2.4.49/ 4.0/ 4.0/ 33/ MFW/AP-545
The following plant conditions exist:

- Plant is at 70% power during three RCP operation.
- MFW Booster pump 1A suction valve receives a false signal and strokes 10% in the closed direction and then stops.

Which of the following describes the required operator actions for this condition?

✓A. Reduce power to 45%.

B. Manually trip one MFWP and reduce power to 45%.

C. Reduce power to 55% and manually trip MFW Booster pump 1A.

D. There will be sufficient flow through the valve since it is still 90% open. Troubleshooting efforts should be initiated immediately.

Reasons:

B. The plant must be above 75% power before the requirement to trip a MFWP is in effect.

C. With 3 RCP operation power must be reduced to 45%. The MFWBP would have automatically tripped as soon as the suction valve left its full open position.

D. The MFWBP would have automatically tripped as soon as the suction valve left its full open position.

AP-545 Steps 2.0 & 3.6; OP-605 Step 3.1.1; 2/3-C43

NEW

28. ROT-4-90 001/ B7/ / / 055EA2.06/ 3.7/ 4.1/ 33/ EDG

The following plant conditions exist:

- A LOOP has occurred.
- 'A' EDG did not start due to an electrical lockout.
- 'B' EDG initially started and loaded on the bus and then the output breaker tripped open for no apparent reason. The EDG engine remained at 900 rpm.

Which of the following describes the electrical lockouts, at a minimum, which must be reset if both EDGs are to be loaded on the ES buses?

✓A. 'A' EDG - 86DG, generator differential current lockout
'B' EDG - 4160V undervoltage lockout

B. 'A' EDG - 4160V undervoltage lockout
'B' EDG - 4160V undervoltage lockout

C. 'A' EDG - 4160V undervoltage lockout
'B' EDG - 86DG, generator differential current lockout

D. 'A' EDG - 86DG, generator differential current lockout
'B' EDG - 86DG, generator differential current lockout

Reasons:

B. The 'A' EDG undervoltage lockout will not prevent the engine from starting.

C. The 'A' EDG undervoltage lockout will not prevent the engine from starting. The 'B' EDG engine would have shutdown if this lockout actuated.

D. The 'B' EDG engine would have shutdown if this lockout actuated.

ROT 4-06 Section 1.2.4; ROT 4-90 Section 2.5.5; 2/3-C10

NEW

29. ROT-4-12 003/ B4/ / / G2.4.2/ 4.1/ 4.1/ 33/ RPS/EOP-2

The following plant conditions exist:

PARAMETER	DATA
Rx power	90%
Linear amp power range	top 45 bottom 45
RCS T_{hot}	601
RCS pressure	1955
RCS flow	1.47×10^8 lbm/hr
RB pressure	+0.5 psig
RCP monitor	A 8,300 kw B 7,100 kw C 9,500 kw D 8,000 kw
Turbine control oil	99 psig
MFW control oil	114 psig

Based on the above data which of the following parameter changes will require immediate entry into EOP-2, Vital System Status Verification? (consider each option independently)

A.	Linear amp power range	top 30	bottom 60
✓B.	RCS pressure	1900 psig	
C.	RCP monitor	B 2152 kw	
D.	Turbine control oil	50 psig	

Reasons:

A. For this power level axial imbalance would need to be > 44.

C. Setpoint for loss of an RCP is < 1152 kw.

D. Turbine control oil pressure setpoint is 45 psig.

29. ROT-4-12 003/ B4/ / / G2.4.2/ 4.1/ 4.1/ 33/ RPS/EOP-2
TS Table 3.3.1-1; COLR; 2/3-C68

NEW

30. ROT-4-13 004/B6///013A4.01/4.5/4.8/33/ESAS

The following plant conditions exist:

- A LOOP has occurred.
- A steam leak in containment is in progress.
- RB pressure is 12 psig.
- RCS pressure is 600 psig.

Based on the above conditions which of the following describes the status of EFP-1, DHP-1A, DHV-5 and BSV-3?

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

Reasons:

A. EFP-1 and DHP-1A will not be running simultaneously with a LOOP. At this RCS pressure DHP-1A is only armed, but is not running.

C. EFP-1 will be running due to the EF block being actuated from the HPI/RBIC signal. BSV-3 would be open due to the RBIC signal.

D. EFP-1 will be running due to the EF block being actuated from the HPI/RBIC signal. At this RCS pressure DHP-1A is only armed, but is not running. DHV-5 would be open due to the RBIC signal.

30. ROT-4-13 004/ B6/ / / 013A4.01/ 4.5/ 4.8/ 33/ ESAS
ROT 4-15 Section 4.4.2 & 4.4.3; ROT 4-13 Tables 4 & 6; 2/3-C37

NEW

31. ROT-5-60 001/ B1/ / / G2.3.9/ 2.5/ / 33/ AP-250

The following plant conditions exist:

- Plant is in Mode 5.
- A Reactor Building purge is in progress.

If RM-A1 trips which of the following describes the automatic action(s) that will occur and the manual action(s) which should be taken?

A. AHV-1A, 1B, 1C, and 1D will automatically close; AHF-6A/6B should be manually shutdown.

✓B. AHV-1A, 1B, 1C, and 1D will automatically close; AHF-6A/6B & AHF-7A/7B should be manually shutdown.

C. AHF-6A/6B & AHF-7A/7B will automatically stop; AHV-1A, 1B, 1C, and 1D should be manually closed.

D. AHF-6A/6B will automatically stop; AHV-1A, 1B, 1C, and 1D should be manually closed and AHF-7A/7B should be manually stopped.

Reasons:

B., C. & D. The automatic actions associated with RMA-1 are to close AHV-1A, 1B, 1C, 1D. Per the AP the purge supply and exhaust fans must be tripped manually.

AP-250 Steps 3.1, 3.3 and Table 1; 1-R29

Modified NRCM98

32. ROT-4-06.003/ B1/ / / E08EK2.1/ 3.7/ 3.9/ 33/ EDG/LOCA
EOP-8, LOCA Cooldown, is in progress. HPI and LPI actuated as designed and recovery efforts are in progress. The NSS directs you to shutdown the EDGs. Which of the following methods should be used to shutdown an EDG in this situation?

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.

D. The diesel is not loaded and ES must be bypassed or reset to secure the engine from the control room.

ROT 4-06 Sections 4.10.1 & 4.10.2; 1-C20

NEW

33. ROT-4-60 004/ B6/ / / 007G2.4.46/ 3.5/ 3.6/ 33/ PORV

SP-379, PORV Exercise Test, is in progress with the following initial plant conditions:

- RCDT pressure is 2 psig.
- RCDT temperature is 90° F.
- RCDT level is 100".
- Tailpipe temperature is 100° F.
- RCS pressure is 700 psig.
- PZR level is 90".

Immediately after the PORV is cycled which of the following sets of conditions indicate that the stroke test was successful and the PORV is closed?

✓A. 'PORV Safety Valve Open' alarm is annunciated.
Tailpipe temperature is 320° F.
RCS pressure is 650 psig.

B. 'PORV Safety Valve Open' alarm is annunciated.
Tailpipe temperature is 220° F.
RCS pressure is 650 psig.

C. 'PORV Safety Valve Open' alarm is out.
Tailpipe temperature is 320° F.
RCDT temperature is 93° F.

D. 'PORV Safety Valve Open' alarm is out.
Tailpipe temperature is 220° F.
RCDT level is 103".

33. ROT-4-60 004/ B6/ / / 007G2.4.46/ 3.5/ 3.6/ 33/ PORV
Reasons:

B. Using the Mollier diagram temperature should equal 320° F. Using steam tables for 17 psia temperature would equal 220° F.

C. The 'PORV Safety Valve Open' alarm requires reset manually in the 4160V ES switchgear room. It this alarm was not in immediately after the PORV stroked then either the test failed or their is an alarm problem.

D. The 'PORV Safety Valve Open' alarm requires reset manually in the 4160V ES switchgear room. It this alarm was not in immediately after the PORV stroked then either the test failed or their is an alarm problem. Using the Mollier diagram temperature should equal 320° F. Using steam tables for 17 psia temperature would equal 220° F.

AR-501 EP 1959; SP-379 Step 4.6; 2/3-C60

NEW

34. ROT-5-97 001/B6///074EA1.12/4.1/4.4/33/ICC
EOP-3, Inadequate Subcooling Margin, has been entered due to a LOOP/LOCA event. Which of the following sets of conditions would require entry into EOP-7, Inadequate Core Cooling?

A. RCS pressure; 1965 psig
T_{hot}; 660° F
T_{incore}; 650° F
T_{cold}; 630° F

✓B. RCS pressure; 1875 psig
T_{hot}; 660° F
T_{incore}; 650° F
T_{cold}; 630° F

C. RCS pressure; 1705 psig
T_{hot}; 640° F
T_{incore}; 630° F
T_{cold}; 625° F

D. RCS pressure; 900 psig
T_{hot}; 550° F
T_{incore}; 552° F
T_{cold}; 540° F

34. ROT-5-97 001/B6///074EA1.12/4.1/4.4/33/ICC

Reasons:

Per EOP-3 you must be > 20° F superheat based on T_{incore} for entry into EOP-7. Absolute pressure values must be used with the steam tables.

A. T_{hot}; 26° F T_{incore}; 16° F

C. T_{hot}; 25° F T_{incore}; 15° F

D. T_{hot}; 16° F T_{incore}; >20° F if absolute values are not used.

EOP-3 Step 3.19; Steam Tables; 2/3-C14

NEW

35. ROT-4-55 001/ F3/ / / 026K1.02/ 4.1/ 4.1/ 33/ BS/DC
The following plant conditions exist:

- RB pressure is 32 psig.
- RCS pressure 900 psig.
- Adequate subcooling margin does exist.
- A 480V OCLO has occurred on the 'B' bus.

Which of the following describes *some* of the actions that should be taken for these conditions?

✓A. BSP-1B and MUP-1C should be secured.

B. RWP-2B and RWP-3B should be secured.

C. BSP-1B, MUP-1B and RWP-3B should be secured.

D. DHP-1B, MUP-1C, BSP-1B and RWP-3B should be secured.

Reasons:

B. RWP-2B is cooled by SW and should be left running.

C. MUP-1B is cooled by SW and should be left running.

D. DHP-1B will not be running for these conditions.

ROT 4-55 Figure 1; ROT 4-13 Table II; ROT 4-90 Section 2.2.5.2; OP-700A Enclosure 9; 2/3-C41

NEW

36. ROT-5-90 001/ B1/ ROT-5-01/ / G2.2.12/ 3.4/ 3.4/ 33/ NNI

Technical Specification 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) limits, requires verification of RCS total flow every 12 hours. Which of the following describes the procedure and location where RCS total flow is read to meet this surveillance?

A. SP-225, Reactor Coolant Flow Measurement at Hot Full Power; Main Control Board ICS section.

B. SP-225, Reactor Coolant Flow Measurement at Hot Full Power; Main Control Board PSA section.

✓C. SP-300, Operating Daily Surveillance Log; Main Control Board ICS section.

D. SP-300, Operating Daily Surveillance Log; Main Control Board PSA section.

Reasons:

A. & B. SP-225 is a refueling frequency and is performed by the reactor engineer.

D. RCS total flow is not read on the PSA section of the MCB.

SP-300 page 30; 1-C65

Bank; NRC 96; ROT-5-01 B3; ROTs M - T7

37. ROT-5-61 001/B6///062AK3.03/4.0/4.2/33/SW

The following plant conditions exist:

- The plant is at 32% power.
- MUP-1B, SWP-1A, and RWP-2A are running.
- A failure in the 230KV switchyard caused the OPT feed from the switchyard to trip open but its normal feeder breaker to the ES bus did not open.

What is the appropriate operator response to this situation?

A. Trip the reactor and secure SW cooled components.

B. Ensure MUP-1B, SWP-1A and RWP-2A are still in operation.

C. Ensure SWP-1B and RWP-2B start; transfer MUP-1A to DC then start DCP-1A, RWP-3A; start MUP-1A.

✓D. Ensure SWP-1B and RWP-2B start; start DCP-1B, RWP-3B; align the makeup system to start MUP-1C; start MUP-1C.

Reasons:

A. The 'B' ES bus is still energized and can supply SW and RW cooling so the reactor is not required to be tripped.

B. & C. The 'A' ES bus is de-energized due to the loss of the OPT and the EDG being unable to load on the bus.

AP-330 Steps 3.2 & 3.15; ROT 4-88 Section 2.7; ROT 4-90 Section 2.1.3.1.n; 2/3-C12

NEW

38. ROT-4-59 001/ F4/ / / G2.3.11/ 3.2/ 3.2/ 11/ LIQ WAST

You are about to start a release from ECST-A when you notice that there is a work request written on flow recorder WD-101-FR because of erratic indication. The SSOD gives his permission to perform the release with the recorder inoperable provided release rate data is taken every 15 minutes. At the start of the release ECST-A level is at 95%. The level is at 84% 15 minutes later. Which of the following was the release rate during this 15 minute period?

A. ≈ 25 gpm

B. ≈ 47 gpm

✓C. ≈ 62 gpm

D. ≈ 78 gpm

Reasons:

A., B. & D. Using OP-103F Figure 12 the following data is obtained.

If using 'tank volume' figures the answer is 62 gpm.
If using 'usable volume' figures the answer is 64 gpm.

Enclosure 4 of OP-407A uses 'tank volume' however the operator is not required to memorize this information. The selection of answers is sufficiently spaced to allow the correct choice with either set of figures used.

OP-103F Figure 12; 2/3-C66

Bank ROT 4-59 #26

39. ROT-4-62 002/ B1/ / / 011EK2.02/ 2.6/ 2.7/ 33/ BS/LOCA

The ES Actuation System has failed to properly operate following a large break LOCA.

The following plant conditions exist:

- RCS pressure is 300 psig.
- Reactor Building pressure indicates 30 psig.
- No ES actuations have occurred.
- Health Physics reports detection of a severe containment radiation leak directly to the environment through a crack surrounding a penetration.

Which of the following actions would be the preferred method to reduce the radiation leakage to the environment?

A. Align both LPI/HPI suction from the RB sump and initiate flow.

B. Align RB purge using both supply and exhaust fans and initiate flow.

C. Start two RB fans in slow speed and initiate cooling.

✓D. Start two RB spray pumps and initiate cooling.

Reasons:

A. No advantage.

B. & C. Both of these actions will help reduce pressure however two RB spray pumps will reduce pressure much more rapidly.

EOP-13 Rule 1; 1-C1

Bank; NRC 5-93 & 11-93; ROTs J - T10B; ROTs M - T5A; ROTs M - 5B

40. ROT-4-09 001/B1///011A2.10/3.4//11/PZR/NNI
The following plant conditions exist:

- RCS temperature is 530° F.
- SASS alarm is annunciated.
- Approximately two minutes later two PZR level alarms annunciate (pressurizer level < 40" *and* level > 240").

Which of the following describes the probable cause for these indications?

✓A. RC-1-LT1 is failing high.

B. RC-1-LT1 is failing low.

C. RC-1-LT3 is failing high.

D. RC-1-LT3 is failing low.

Reasons:

B. At this temperature PZR level should be maintained at 60" per OP-103A. RC-1-LT1 is normally selected for control. A SASS mismatch alarm will annunciate when LT1 and LT3 reach a 9.6" delta. If LT1 was failing low then actual level should be increasing and the < 40" (sensed by a level switch) alarm will not come in.

C. LT3 failing high will annunciate the SASS mismatch alarm but only the selected transmitter can annunciate the > 240" alarm.

D. LT3 failing low will annunciate the SASS mismatch alarm.

ROT 4-09 Section 2.2.3, 2.2.4, 2.3 & Figure 5; OP-103A Curve 5; AR-501 EP 1373 & 1374; 2/3-R16

NEW

41. ROT-4-89 001/B6///010K2.01/3.0/3.4/33/ELECT
With the plant operating at 65% power a 'Sudden Pressure' relay actuates on the Startup Transformer.

Based on the above which of the following electrical line-ups could be used to supply power to the 'A' Train PZR heaters?

A. MTDG-1; 4160V Rx Aux Bus 3; 480V Rx Aux Bus 3A.

✓B. EDG-1A; ES 4160V Bus 3A; ES 480V Bus 3A; 480V Rx Aux Bus 3A.

C. BEST; ES 4160V Bus 3A; ES 480V Bus 3A; 480V Rx Aux Bus 3A.

D. EDG-1B; ES 4160V Bus 3B; 480V Plant Aux Bus; 480V Rx Aux Bus 3A.

Reasons:

A. 4160V Rx Aux Bus 3 cannot feed 480V Rx Aux Bus 3A.

C. The BEST has been lost due to the relay actuation associated with the Startup Transformer.

D. This used to be a viable option until the removal of the feed to 480V Rx Aux Bus 3A.

ROT 4-89 Figure 9; ROT 4-88 Section 2.8; AP-770 Enclosure 4; 2/3-C50

NEW

42. ROT-4-25 004/B7///072A2.02/2.8/2.9/11/RAD MON

The following plant conditions exist:

- RCS temperature is 220° F.
- RM-A6 has been declared inoperable due to a blocked sample line in the ductwork of AHF-3B.

Which of the following action(s), if any, could be taken to ensure compliance with Technical Specifications?

A. No actions are required.

B. Start AHF-3A within 6 hours and repair the sample line within 30 days.

C. Start the back-up sample pump on RM-A6 and perform SP-317 every 24 hours.

✓D. Perform SP-317 every 24 hours and repair the sample line within 30 days.

Reasons:

A. If temperature was below 200° F then this choice is correct.

B. Starting AHF-3A will not return RM-A6 to operable status unless the sample line valve lineup is also changed.

C. Starting the backup sample pump will not return RM-A6 to operable status unless the sample line valve lineup is changed and AHF-3A is started.

TS 3.4.14; ROT 4-25 page 18; 2/3-C48

NEW

43. ROT-4-06 002/ B1/ / / A05AK2.1/ 4.0/ 3.8/ 33/ EDG

Reactor Building pressure is 4.8 psig. Which of the following describes the status of the EDGs and the effect of protective relay actuation on the output breaker?

✓A. The EDGs are running with their 'Ready' lights illuminated. Actuation of the generator differential current relay will shut down the engine and trip or prevent closure of the output breaker.

B. The EDGs are running with their 'Ready' lights illuminated. Actuation of the exciter field short relay will shut down the engine and trip or prevent closure of the output breaker.

C. The EDGs are running with their 'Run' lights illuminated. Actuation of the generator differential current relay will shut down the engine and trip or prevent closure of the output breaker.

D. The EDGs are running with their 'Run' lights illuminated. Actuation of the exciter field short relay will shut down the engine and trip or prevent closure of the output breaker.

Reasons:

B. The exciter field short relay will only trip or prevent closure of the output breaker.

C. Since there is no undervoltage condition the 'Run' lights will not be illuminated.

D. Since there is no undervoltage condition the 'Run' lights will not be illuminated. The exciter field short relay will only trip or prevent closure of the output breaker.

ROT 4-06 1.2.6.2, 1.2.12 & 4.10.1; 2/3-C32

NEW

44. ROT-4-52 002/ B19/ / / 004K1.15/ 3.8/ 4.0/ 33/ MU

The following plant conditions exist:

- RCS pressure has decreased to 1450 psig.
- Reactor building pressure is 1 psig.
- Makeup Tank outlet check valve, MUV-65, has seated.

Which of the following describes the Makeup Tank level response and cause for the change?

✓A. Increases because of RCP Controlled Bleed Off return flow.

B. Decreases because of high pressure injection flow into the reactor core.

C. Increases because of Makeup pump recirc return flow.

D. Decreases because letdown flow is isolated.

Reasons:

B. & D. BWST level head pressure is greater than MUT level head pressure making it the suction source for HPI flow.

C. Recirc valves are closed due to the HPI actuation at 1500 psig.

ROT 4-52 Section 4.4; 2/3-C35

Bank; NRC 11-93; ROTs J - T10A

45. ROT-4-12 002/ B3/ / / 029EK3.01/ 4.2/ 4.5/ 33/ RPS
The following plant conditions exist:

- The plant is at 50% reactor power.
- The ICS power supply monitor fails resulting in a loss of + 24 volt power.

What is the plant's response to this situation?

A. ATWS removes power from the safety rods and initiates EFIC.

✓B. AMSAC trips the main turbine and initiates EFIC.

C. DSS removes power from the regulating control rods.

D. RPS trips the reactor due to the loss of both MFW pumps.

Reasons:

A. The ATWS subsystem (DSS) removes power from the regulating rods, not the safety rods, if conditions are met. The other sub-system of ATWS (AMSAC) will initiate EFIC under these conditions (>45% power and <17% MFW flow).

C. DSS will remove power from the regulating rods if RCS pressure exceeds 2450#. This would require RPS to fail to actuate.

D. This failure will cause both MFW pumps to decrease to minimum speed but will not cause the pumps to trip.

ROT 4-12 Section 1.2.1 & 1.2.2; ROT 4-14 Section 2.3 & 4.3; 2/3-C7

NEW

46. ROT-4-68 001/B3///059K4.16/3.1//33/MFW

Which of the following conditions will cause an automatic trip of both Main Feedwater pumps (FWP-2A & 2B) with the plant at 80% power?

✓A. Deaerator level of one foot.

B. Both suction valves are 75% open.

C. Lube oil pressure of ≤ 5 psig on one pressure switch.

D. 'A' OTSG pressure < 600 psig.

Reasons:

B. Both suction valves 75% closed will trip both pumps.

C. Requires two of three pressure switches ≤ 5 psig.

D. At this initial power level low 'A' OTSG pressure will only trip the 'A' MFWP.

OP-605 Step 3.1.2; ROT 4-68 Section 1-2.4.m; 1-R11

NEW

47. ROT-4-09 005/ B6/ / / A02AK1.3/ 3.8/ 3.8/ 33/ NNI

Which of the following describes the PZR level control response to a loss of NNI-X power?

✓A. A backup power supply will allow manual operation of MUV-31 following a loss of all NNI-X DC power.

B. A backup power supply will allow automatic operation of MUV-31 following a loss of all NNI-X AC power.

C. A loss of NNI-X AC or DC power will cause MUV-31 to fail closed. MUV-24 will be used for PZR level control.

D. A loss of NNI-X AC or DC power will cause the valve controller to swap to NNI-Y for control power.

Reasons:

B. The backup power supply will only allow for manual operation.

C. MUV-31 will fail as is on a loss of power. MUV-24 is available for level control but should not be needed.

D. The level input signal will swap to the NNI-Y input, however control power can only be supplied by NNI-X or the backup power supply.

ROT 4-09 Section 2.2.4; 1-C17

Modified Bank ROT 4-51 #51

48. ROT-5-96 001/ B4/ / / 024AK3.02/ 4.2/ 4.4/ 33/ EOP-2

The plant has experienced a reactor trip. While completing the follow-up actions of EOP-2, Vital Safety System Verification, you observe that control rod 1 in group 1 and control rod 3 in group 6 do not have their in-limit or 0% lights energized. API shows both control rods at about 20% withdrawn. Which of the following should be performed?

A. Open breakers 3305 and 3312.

✓B. Start boration using a boric acid storage tank and associated pump.

C. Start boration from a reactor coolant bleed tank with a concentration greater than reactor coolant.

D. Depress "HPI Manual Actuation" on Train A and B.

Reasons:

A. This action is not required unless a CRD group is not fully inserted.

C. This is not an accepted method of emergency boration.

D. This action is only required if the NIs indicate the Rx is not shutdown.

EOP-2 Step 3.3; 1-C6

Bank; NRC 6-97; ROTs M Final

49. ROT-4-26 002/ B1/ / / 036AK1.03/ 4.0/ 4.3/ 33/ FUEL HAND
While placing a fuel assembly into the core the following is observed:

- Count rate doubles on the source range instruments.
- RM-G16, Radiation Monitor for the RB Fuel Handling Bridge, is in alarm.
- Bubbles are emerging from the core.

Which of the following could have caused the above conditions?

✓A. A fuel assembly has been damaged.

B. The reactor has gone critical.

C. The fuel assembly has been placed in the incorrect location.

D. The decay heat removal train was alternated.

Reasons:

B. One doubling of the count rate is insufficient for criticality.

C. This should not cause RM-G16 to alarm or bubbles to emerge from the core.

D. This should not cause RM-G16 to alarm or the count rate to double.

FP-203 Section 4.7.1; 1-C31

NEW

50. ROT-5-72 001/B4///033A1.01/2.7/3.3/33/AP-1080

Twenty minutes prior to completion of defueling activities the Spent Fuel (SF) pool level was 158 feet. Defueling has now been completed and the following plant conditions exist:

- Spent Fuel (SF) pool level is 156 feet and decreasing.
- The SF pool low level annunciator is in alarm.
- The transfer tube valves are open.
- The auxiliary building sump level is increasing.
- All other building sumps are stable.
- SFP-1B is operating; SFP-1A is secured.
- Reactor building pressure is 1 psig.

Which of the following could stop the decrease in Spent Fuel pool level?

A. Close the transfer tube valves.

✓B. Secure SFP-1B.

C. Transfer SF heat exchangers.

D. Secure the reactor building purge.

Reasons:

A. The leak is in the AB. Closing the transfer tube valves would only prevent the transfer canal level from decreasing.

C. If the heat exchanger had a leak then SW would be leaking into the SF system.

D. The purge may cause the pressure to lower in the reactor building, which would lower SF pool level slightly, but would not cause the AB sump level to increase.

ROT 5-72 Overview; AP-1080 Steps 3.7 thru 3.24; 2/3-C52

NRCCP97

51. ROT-5-85 001/B6///E03EK2.2/4.3/4.3/33/EOP-03

The following plant conditions exist:

- A large steam line break on the "B" OTSG has occurred.
- The "B" steam generator has been isolated.
- Reactor coolant pressure is 1300 psig.
- Reactor coolant temperature is 532°F.

Based on the above conditions what is the function of HPI and when can it be throttled?

A. HPI is required for core cooling and can be throttled when low pressure injection through DHV-5 or 6 has been established for 20 minutes.

B. HPI is required for core cooling and can be throttled when heat removal through the "A" OTSG is established.

C. HPI is required to compensate for RCS contraction and can be throttled when the pressurizer level exceeds 40 inches.

✓D. HPI is required to compensate for RCS contraction and can be throttled when adequate subcooling margin is recovered.

Reasons:

A. & B. High pressure injection is required to compensate for RCS contraction due to the overcooling.

C. HPI cannot be throttled unless adequate subcooling margin is recovered.

ROT 5-94 Overview & page 12; 2/3-C15

NRCCP97

52. ROT-4-26 001/B1///G2.2.30/3.5/3.3/33/FH

During refueling operations the following radiation monitors come into alarm:

- RM-G17, Reactor Building Personnel Hatch.
- RM-G18, Reactor Building Incore Instrument Area.

Which of the following actions are required?

A. Secure refueling operations.

✓B. Secure the RB purge if in operation.

C. Perform the actions required in the ODCM.

D. Perform the actions required in Technical Specifications.

Reasons:

A. Refueling operations are not required to be secured due to these RMGs being in alarm.

C. & D. There are no ODCM or Technical Specification requirements for these RMGs.

FP-203 Step 3.2.14.5; 1-R28

NRCCP97

53. ROT-4-81 001/G2///055AA1.02/2.6/2.8/33/IA

The following sequence of events have occurred:

- Instrument Air (IA) pressure drops to 70 psig.
- The air leak is then isolated.
- Air pressure recovers to 115 psig.

Which of the following describes the response of IAV-30 and required operator action(s), if any, to this sequence of events?

A. IAV-30 will close and automatically open when IA pressure increases above 80 psig.

B. IAV-30 will open and automatically close when IA pressure increases above 80 psig.

✓C. IAV-30 will close and must be manually reset and opened when IA pressure increases above 80 psig.

D. IAV-30 will open and must be manually reset and closed when IA pressure increases above 80 psig.

Reasons:

A. IAV-30 will not automatically open.

B. & D. IAV-30 closes at less than 80 psig.

ROT 4-81 Section 2.7; OP-411 Steps 3.1.7 & 4.1.6; 1-C30

NEW

54. ROT-4-60 001/ B9/ / / 003A4.06/ 2.9/ 2.9/ 33/ RCS

The following conditions are observed for the "A" Reactor Coolant Pump (RCP-1A).

- First seal cavity pressure is 2150 psig.
- Second seal cavity pressure is 1100 psig.
- Third seal cavity pressure is 1055 psig.
- Controlled bleed off flow has increased.
- Seal leakage flow has not changed.

Which of the following conditions would cause the above indications?

A. Seal number 1 has failed.

✓B. Seal number 2 has failed.

C. Seal number 3 has failed.

D. Restriction bushing has failed.

Reasons:

A. First seal cavity pressure should be reactor coolant pressure (2155 psig) if working correctly.

C. When the second seal has failed then the cavity pressures of the second and third seal should be approximately one-half of reactor coolant pressure.

D. The restriction bushing limits reactor coolant flow when a major seal failure has occurred. The data does not support bushing failure.

ROT 4-60 Section 2.4.1; 1-R6

NRCCP97

55. ROT-4-14 003/ B1/ / / 059A4.10/ 3.9/ / 33/ ICS
During operation at power replacement of the signal generator which is supplying the RCS flow signal for the "A" RCP is required. Which of the following describes the *minimum* control stations which must be taken to manual to prevent changing feedwater flow in either train during this evolution?

A. Load Ratio Hand/Auto station.

B. "A" Feedwater Master Hand/Auto station.

✓C. Both Feedwater Master Hand/Auto stations.

D. Both Feedwater Master Hand/Auto stations and the Steam Generator/Reactor Master Hand/Auto station.

Reasons:

A. FW flow would still move due to the RCS flow signal.

B. "B" FW flow would still move due to the RCS flow signal.

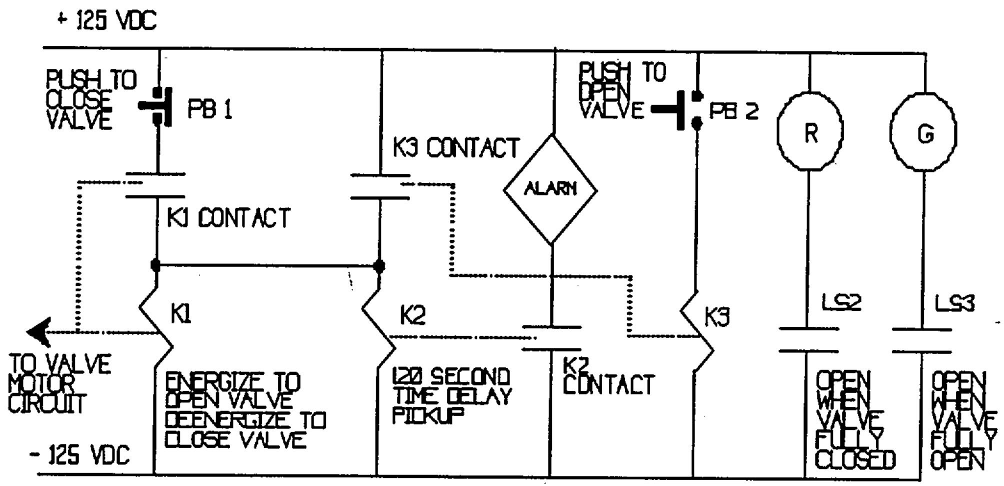
D. While this will work placing the Steam Generator/Reactor Master Hand/Auto station in manual is not required.

ROT 4-14 Sections 3.4.8, 7.3.1.E & Figure 8; 1-R12

Bank

56. ROT-2-20 001/G3///G2.1.24/2.8/3.1/77/PRINTS

In the valve control circuit shown below the valve being controlled is initially closed.



Which of the following describes when the motor-operated valve will begin to stroke open? (Note: contacts are shown in standard "de-energized" condition.)

✓A. Immediately after PB2 is depressed.

B. At the same time the alarm actuates.

C. 120 seconds after PB2 is depressed.

D. Immediately after PB1 is depressed if contact #1 is closed.

Reasons:

B. The K2 relay will not energize until 120 seconds after PB2 has been depressed.

C. There is no time delay to energize the K1 relay after PB2 has been depressed.

D. If PB1 is depressed the contact will open and the K1 relay cannot be energized.

56. ROT-2-20 001/ G3/ / / G2.1.24/ 2.8/ 3.1/ 77/ PRINTS
ROT 2-20; 1-R27

Bank ROT 2-20 #4; ROTs J - T4; ROTs L - T1; Fund98 - T1

57. ROT-4-09 003/ B1/ ROT 5-01/ / 027AK3.02/ 2.9/ 3.0/ 11/ NNI/TS
The following plant conditions exist:

- Plant is at 100% power.
- RC-1-LT1 is selected for PZR level control.
- RC-1-LIR-1 and LIR-3 indicate 215" and steady.

The control room operator observes RC-1-LIR-1 decrease to 155" at ≈ 15" per minute. RC-1-LIR-3 is steady and normal makeup flow is unchanged.

Based on the above which of the following is the probable cause of these indications and the proper operator response?

A. RC-1-LT1 has failed. Swap to the alternate source per procedure and return the transmitter to operable status within 30 days.

B. RC-1-LT1 has failed. SASS will automatically transfer to the alternate source. Initiate repair efforts and return the transmitter to operable status within 72 hours.

✓C. Temperature input to RC-1-LIR-1 has failed. Swap to the alternate source per procedure and return the transmitter to operable status within 30 days.

D. Temperature input to RC-1-LIR-1 has failed. SASS will automatically transfer to the alternate source. Initiate repair efforts and return the transmitter to operable status within 72 hours.

Reasons:

A. If RC-1-LT1 failed the recorder would indicate 0" or off-scale high.

B. If RC-1-LT1 failed the recorder would indicate 0" or off-scale high. The rate of change is too slow for SASS to automatically transfer. TS allows 30 days for repair of the transmitter.

D. A failure of the temperature input will cause the recorder to indicate ≈ 160" at this power level however the rate of change is too slow for SASS to automatically transfer. TS allows 30 days for repair of the transmitter.

57. ROT-4-09 003/ B1/ ROT 5-01/ / 027AK3.02/ 2.9/ 3.0/ 11/ NNI/TS
TS 3.3.17 Condition A; ROT 4-09 Section 2.1.4 & Figure 5; 2/3-C27

NEW

58. ROT-4-13 002/B6///013A2.06/3.7//33/ES

With the plant at 100% power a spurious 'A' Train ES HPI actuation occurs. Which of the following describes *some* of the actions which must be taken to restore normal plant operation?

✓A. Secure EDG-1A.

B. Secure MUP-1A.

C. Secure EFP-1 and EFP-2.

D. Secure EDG-1A, EFP-1 and DHP-1A.

Reasons:

B. With a normal plant lineup MUP-1A is not ES selected for start.

C. EFP-2 will not get a start signal unless both trains of ES actuate.

D. DHP-1A will not start unless a coincident LPI actuation is present.

ROT 4-13 Section 4.4 & Table II; 2/3-R8

NEW

59. ROT-4-15 002/ B5/ / / 061K4.02/ 4.5/ / 33/ EFW

The following plant conditions exist:

- The plant is at 100% power.
- A 'Sudden Pressure' lockout relay has actuated on the BEST transformer.

Which of the following describes the EFW and/or AFW automatic start signal(s), if any, for this condition?

A. No automatic start signal will be actuated for EFW or AFW.

✓B. Both EFPs will start due to the loss of all RCPs and both MFWPs .

C. FWP-7 and EFP-1 will start due to the loss of control power to MTDG-1 and the loss of all RCPs.

D. Both EFPs will start due to the loss of both MFWPs and the DSS signal generated due to the loss of FW flow.

Reasons:

A. The Startup transformer will also be lost. All RCPs and MFWPs (due to the loss of both booster pumps) will trip generating a start signal for EFW.

C. FWP-7 does not automatically start due to a loss of control power to MTDG-1.

D. A DSS signal is generated based on RCS pressure and will only trip control rods, not initiate EFIC.

ROT 4-15 Section 2.1.1; 2/3-R13

NEW

60. ROT-4-13 001/B6///026G2.1.30/3.9//33/SW

Following an event in which RB pressure reached a maximum of 7 psig the SSOD directs you to restore SW cooling to the Letdown Coolers. Which of the following describes the *minimum* actions that must be taken to perform this task?

A. Bypass/Reset the 'A' RBIC actuation, select the 'B' ES reset switch on the MCB to 'Reset' and select the valves to open from the MCB.

B. Bypass/Reset the 'B' RBIC actuation, direct the PPO to depress the local 'Open' pushbuttons in the Triangle Room and then select the valves to open from the MCB.

C. Bypass/Reset the 'A' and 'B' RBIC actuation, select the 'B' ES reset switch on the MCB to 'Reset' and direct the PPO to depress the local 'Open' pushbuttons in the Triangle Room.

✓D. Bypass/Reset the 'A' and 'B' RBIC actuation, direct the PPO to depress the local 'Open' pushbuttons in the Triangle Room and select MCB switches to open.

Reasons:

A. Valves must be reset locally.

B. Must bypass/reset the 'A' train RBIC actuation also.

C. MCB reset swich has no control function with these four valves.

ROT 4-13 Section 2.3.12 & Table VI; EOP-14 Enclosure 4 Step 4.2; 2/3-R1

NEW

61. ROT-5-116 001/ B1/ / / 054AK3.03/ 3.8/ 4.0/ 33/ EOP-04

Per EOP-13, Rule 3, if EFW control is in manual during an Inadequate Subcooling Margin condition, flow to the OTSGs should be directed through a single line to each available steam generator. Which of the following is the basis for using only a single line to feed the OTSG(s)?

✓A. Use of a single line results in higher flowrates which place the flow instrumentation in a region of smaller errors.

B. Use of a single line places the control valves in a position where they have more precise flow control.

C. Use of a single line provides fewer parameters for the operator to monitor, thus simplifying manual control.

D. Use of a single line was used in accident analysis involving manual EFW flow and is proceduralized to ensure we are operating within analyzed methods.

Reasons:

B., C. & D. Recent calculations have shown that use of a single line with higher flow rates places the intruments in regions of smaller flow error.

ROT 5-116 Page 8; Rule 3, EFW Control; 1-C25

Bank; ROTs M - T7

62. ROT-4-15 003/ B10/ / / 061K5.01/ 3.6/ 3.9/ 33/ EFIC

Which of the following describes the reason for varying the rate of OTSG level increase in proportion to OTSG pressure when EFW is actuated?

A. To maintain steam pressure above a pre-determined value.

B. To assist the EFW overfill logic in controlling OTSG level.

C. To prevent excessive thermal shocking of the OTSG tube sheets.

✓D. To minimize RCS cooldown.

Reasons:

A., B. & C. The main reason to control EFW flow based on OTSG pressure is to minimize RCS cooldown.

ROT 4-15 Section 4.3.2; 1-C44

Bank ROT 4-15 #62

63. ROT-3-03 001/ B8/ / / 011EK1.01/ 4.1/ 4.4/ 33/ NAT CIRC
Following a large break loss of coolant accident reactor coolant system pressure is 435 psig. Steam generator pressure is 140 psig. What should the hot and cold leg temperatures be if boiler-condenser heat transfer has been established?

A. T_h is 468° F; T_c is 428° F.

B. T_h is 456° F; T_c is 428° F.

✓C. T_h is 456° F; T_c is 360° F.

D. T_h is 448° F; T_c is 360° F.

Reasons:

T_{hot} should be saturation temperature for RCS pressure; T_{cold} should be saturation temperature for OTSG pressure.

A. T_h is superheated.

B. T_c is not coupled to the OTSG.

D. T_h is subcooled.

ROT 3-03 Section 4.0; 2/3-C2

Bank ROT 3-03 #38; NRC 6-97; ROTs M - T7

64. ROT-5-91 001/B1///005A1.01/3.5//11/EOP/AP
The following plant conditions exist:

- RCS pressure is 180 psig.
- RCS temperature is 175° F.
- Instrument air pressure is 85 psig and decreasing.

Which of the following describes the expected plant response and required operator actions for these conditions?

A. DHHE DC control valves will fail to the NO cooling position on loss of air. Manual control is necessary to limit the the RCS heatup rate to ≤ 10° F in any 1 hour period.

B. DHHE DC control valves will fail to the full cooling position on loss of air. Manual control is necessary to limit the the RCS cooldown rate to ≤ 10° F in any 1 hour period.

C. DHHE DC control valves will fail to the NO cooling position on loss of air. Manual control is necessary to limit the the RCS heatup rate to ≤ 25° F in any 1/2 hour period.

✓D. DHHE DC control valves will fail to the full cooling position on loss of air. Manual control is necessary to limit the the RCS cooldown rate to ≤ 25° F in any 1/2 hour period.

Reasons:

A. DHHE DC control valves fail to the full cooling position on a loss of air.

B. For this temperature the cooldown limit is ≤ 25° F in any 1/2 hour period.

C. DHHE DC control valves fail to the full cooling position on a loss of air.

OP-103B Curve 5A; AP-470 Step 3.4; 2/3-R23

NEW

65. ROT-5-14 002/ B7/ / / G2.4.1/ 4.6/ 4.6/ 33/ AI-505

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 and the flume water level is almost empty.

Based on these conditions which of the following actions, and applicable reasons for these actions, should be performed?

A. Since RWP-1 and RWP-2B are not affected by this flume water level decrease continue with the plant shutdown per applicable OPs and inform maintenance personnel of the problem.

B. Trip the reactor and initiate EFIC due to the loss of CW cooling to the condenser.

C. Trip the reactor due to low PZR level.

✓D. Trip the reactor due to the loss of SW RW flow.

Reasons:

A. This failure will render RWP-1 and RWP-2B inoperable. The reactor should be tripped due to the loss of SW RW flow.

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.

AI-505 Enclosure 1; ROT 4-57 Section 1.4; 2/3-C67

NEW

66. ROT-5-72 002/ B3/ / / 034K1.02/ 2.5/ 3.2/ 33/ AP-1080

The following plant conditions exist:

- Plant is in Mode 6 with refueling activities in progress.
- An RCS leak results in a decrease in refueling canal level.
- AP-1080, Refueling Canal Level Lowering, is entered.

A step in AP-1080 states:

> IF irradiated fuel is suspended form Main Fuel Handling Bridge,
> THEN notify bridge operator to place fuel in Rx vessel.
>
> IF irradiated fuel can NOT be placed in the Rx vessel,
> THEN notify bridge operator to place the fuel in an available upender and lower.

The primary concern addressed by this step is to:

A. Place the bridge in a condition where the operator can leave.

B. Place the bridge in the location where it will receive the least radiation exposure.

C. Place the fuel assembly in a location where it can be transferred to the spent fuel pool and the gates closed

✓D. Place the fuel assembly in a location where uncovery is least likely and shielding is maximized.

Reasons:

A., B. & C. This step assumes that level is lowering at a slow enough rate to allow the operator to move the fuel to a safe position without endangering personnel. Placing the assembly in an upender and lowering will ensure that the assembly is in the deepest part of the canal and should remain covered under all credible circumstances.

ROT 5-72 Overview; 1-C53

Bank ROT 5-72 #1

67. ROT-4-57 001/ F2/ / / 025AK2.01/ 2.9/ 2.9/ 33/ RW

The plant is in Mode 5 with the 'A' DH train in service under steady state conditions. The control room operators observe a steady increase in RCS temperature. Which of the following describes a possible reason for this increase?

✓A. An increase in RWP-3A discharge pressure.

B. A decrease in the ΔT across the tube side of DCHE-1A.

C. RWV-150 has failed open and is raising the temperature in the raw water pit.

D. The temperature feedback loop for the DC control valves is malfunctioning and decreasing the DC flow through the DHHE.

Reasons:

B. A decreased ΔT is indicative of a clean heat exchanger.

C. The failure of this valve will only raise the temperature in the 'B' raw water pit.

D. A recent MAR has removed the temperature feedback loop for these valves.

ROT 4-57 Section 4.1; 2/3-C21

NEW

68. ROT-4-51 001/B2///017K4.01/3.4/3.7/33/INCORE

The "A" Saturation Monitor has been selected to "Incore" for its temperature input. Incore temperature input is 600° F and RCS pressure is 500 psia. Which of the following statements describes the temperature input signal and the status of core cooling which should be indicated by this Saturation Monitor?

A. The average of the 6 selected incore thermocouples indicate that subcooling margin has been lost but the core is being adequately cooled.

B. The highest of the 6 selected incore thermocouples indicate that subcooling margin has been lost but the core is being adequately cooled.

C. The average of the 6 selected incore thermocouples indicate that an inadequate core cooling event is in progress.

✓D. The highest of the 6 selected incore thermocouples indicate that an inadequate core cooling event is in progress.

Reasons:

A. The input is the highest of the 6 selected incores. For this pressure and temperature the core is not adequately being cooled.

B. For this pressure and temperature the core is not adequately being cooled.

C. The input is the highest of the 6 selected incores.

ROT 4-51 Section 2.4; 2/3-C40

NEW

69. ROT-4-91 003/ F2/ / / 058AA1.03/ 3.1/ 3.3/ 33/ VITAL PWR

Due to a switching error both the 'B' and 'D' battery charger's output breakers have been opened. What is the expected status light indication on the 'B' vital bus inverter for this condition?

✓A.	Normal Source Available	ON
	Battery Source Available	ON
	Normal Source Supplying Load	ON
	Battery Supplying Load	OFF
	In Sync	ON
B.	Normal Source Available	ON
	Battery Source Available	OFF
	Normal Source Supplying Load	ON
	Battery Supplying Load	OFF
	In Sync	OFF
C.	Normal Source Available	OFF
	Battery Source Available	ON
	Normal Source Supplying Load	OFF
	Battery Supplying Load	ON
	In Sync	ON
D.	Normal Source Available	ON
	Battery Source Available	OFF
	Normal Source Supplying Load	ON
	Battery Supplying Load	OFF
	In Sync	ON

Reasons:

B., C. & D. Losing the battery chargers supplying the 'B' inverter will not change the normal status indication due to the battery backup. Normal indication is listed in choice 'A'.

ROT 4-91 Sections 2.1 & 2.4.1.2; 2/3-C27

NEW

70. ROT-5-96 002/B1///E02EK1.3/3.8/3.8/33/EOP-02

The following plant conditions exist:

- The plant is in Mode 3 with Group 1 control rods withdrawn.
- A Loss of Offsite Power occurs.
- EDG-1A fails to start.
- EFP-2 will not start.
- RCS temperatures are increasing.

Which of the following is the appropriate EOP entry and transition sequence for the given conditions?

A. Immediately enter EOP-02, Vital Systems Status Verification, and transition to EOP-04, Inadequate Heat Transfer, as directed by EOP-02 follow-up steps.

B. Immediately enter EOP-09, Natural Circulation Cooldown, and transition to EOP-10, Post Trip Stabilization, as directed by EOP-09 follow-up steps.

✓C. Immediately enter EOP-02, Vital Systems Status Verification, and transition to EOP-04, Inadequate Heat Transfer, when EOP-04 symptoms become apparent.

D. Immediately enter EOP-04, Inadequate Heat Transfer, based on EOP symptoms, and transition to EOP-08, LOCA Cooldown, as directed by EOP-04 follow-up steps.

Reasons:

A. After the Immediate Actions of EOP-2 then transition should be made to EOP-4 due to the Inadequate Heat Transfer symptom.

B. A reactor trip should have occurred due to the LOOP and EOP-2 should be entered immediately.

D. A reactor trip should have occurred due to the LOOP and EOP-2 should be entered immediately. Should not have to enter EOP-8 due to the availability of AFW.

70. ROT-5-96 002/ B1/ / / E02EK1.3/ 3.8/ 3.8/ 33/ EOP-02
AI-505 Step 4.2.1; 2/3-C18

Bank ROT 5-96 #73

71. ROT-4-52 001/B10///004A1.06/3.0/3.2/11/MU

The Make-up Tank (MUT) low pressure alarm has just actuated with the level at 80 inches. Which of the following is the amount that the pressure should be increased from its current value to operate in the preferred region without receiving further MUT alarms?

A. 12 psig.

✓B. 14 psig.

C. 16 psig.

D. 18 psig.

Reasons:

A. The low pressure alarm is at 3 psig. Raising the pressure by 12 psig (15 psig) is not in the acceptable region.

C. At 19 psig the computer high pressure alarm will be actuated.

D. At 21 psig both the computer and annunciator high pressure alarms will be actuated.

OP-103B pages 30 - 33; ROT 4-52 Section 1.4.20; 2/3-R7

NRCCP97

72. ROT-5-84 001/ B3/ / / 078A4.01/ 3.1/ 3.1/ 11/ AP-470

Instrument air pressure has decreased to 76 psig and makeup flow decreases to 15 gpm. Which of the following describes the operator's actions for this scenario?

A. Restore letdown flow using MUV-50, bypass around MUV-51, to normal value and adjust MUT level as required.

✓B. Trip the reactor and concurrently perform EOP-2.

C. Bypass instrument air dryers then trip the reactor and concurrently perform EOP-2.

D. Manually control MUV-31 is to maintain PZR level at > 80 inches.

Reasons:

A. Both letdown control valves are air operated and the AP directs you to isolate letdown.

C. Due to the loss of normal makeup flow tripping the reactor will be performed much earlier in the AP than bypassing the air dryers.

D. AP directs the use of MUV-24 for PZR level control.

AP-470 Step 3.5; 1-C62

Mod Bank ROT 5-84 #2; NRC 11-93; CP FPC final; ROTs M - T7

73. ROT-5-69 001/ B3/ / / 067G2.4.27/ 3.0/ 3.5/ 33/ AP-880

One of the followup actions in AP-880, Fire Protection, directs the operator to ensure RB fans are aligned for SW cooling if the fire is in the auxiliary building. Which of the following describes reason for performing this action?

A. The CI common supply and return valves could fail to the mid-position compromising the integrity of the SW system.

B. The CI common supply and return valves could fail closed resulting in a loss of cooling water to the RB fans and RCDT coolers.

C. The CI common supply and return valves could fail open resulting in increased condensation in the motor coolers of the RB fans.

✓D. The CI common supply and return valves could fail closed resulting in a loss of cooling water to the RB fans.

Reasons:

A., B. & C. The CI valves fail closed if a fire damages their control circuits resulting in a loss of cooling to the RB fans.

AP-880; 1-C13

Bank ROT 5-69 #1; ROTs J - T7, T9 & T10B; ROTs K - T2

74. ROT-5-99 001/B3///025G2.1.20/4.3/4.2/11/AP-404

The following plant conditions exist:

- The plant is in Mode 5.
- The operating decay heat pump, DHP-1A, trips on overload.
- The standby decay heat pump, DHP-1B, is started, cavitates and trips.
- Reactor coolant level is 131'.
- Reactor coolant temperature is 93° F.
- Upper hand holds on the steam generator are removed.

Based on these conditions which of the following methods should be used to restore core heat removal?

A. Establish decay heat removal with DHP-1A.

✓B. Establish high pressure injection.

C. Establish steam generator heat removal.

D. Establish decay heat removal using spent fuel cooling.

Reasons:

A. DHP-1A should not be started until the reason for DHP-1B cavitation is corrected.

C. The RCS is not filled and OTSG integrity does not exist.

D. Due to seismic concerns spent fuel cooling is not to be used for decay heat removal.

AP-404 Steps 3.2 thru 3.15; 2/3-C22

Bank ROT 5-99 #14; ROT 5-78 B6 & B16; NRC 6-97

75. ROT-4-77 001/G2///008K3.01/3.4/3.5/33/SC

SCP-1A has been in operation for two hours when the open limit switch on its discharge valve malfunctions, indicating the valve is not full open. Which of the following describes the plant response to this failure?

A. SCP-1A will trip, its discharge *and* suction valves will be demanded closed and SCP-1B will auto start 10 seconds later.

✓B. SCP-1A will remain in operation. No auto start signal will be generated for SCP-1B.

C. SCP-1A will trip, its discharge valve will be demanded closed and SCP-1B will auto start 10 seconds later.

D. SCP-1A will remain in operation because its discharge valve full open indication is only required for pump start.

Reasons:

A. The discharge valve must reach its full closed position to trip the pump. The suction valve will remain open even if the pump is demanded to trip.

C. The discharge valve must reach its full closed position to trip the pump.

D. The discharge valve must be full closed to start the pump.

ROT 4-77 Sections 2.1 & 2.2; 1-C61

NEW

76. ROT-4-25 001/ B1/ / / 068K6.10/ 2.5/ 2.9/ 33/ RAD MON

The following plant conditions exist:

- The plant is in Mode 6 with refueling operations in progress.
- The 'A' DH Train is in service.
- A malfunction occurs in the Radiation Monitoring Panel which renders RM-L1, RM-L6 & RM-L7 inoperable.
- Control room operators notice a slow decreasing trend in refueling canal water level.

Which of the following combination of indications could be used to determine the reason for the decrease in refueling canal water level?

A. If the leak is into the SW system; RM-L3 would increase and SW surge tank level would increase.

✓B. If the leak is into the DC system; RM-L5 would increase and DC surge tank level would increase.

C. If the leak is into the SF system; RM-L5 would increase and DC surge tank level would remain constant.

D. If the leak is into the DC system; RM-L3 would increase and DC surge tank level would increase.

Reasons:

A. With refueling in progress RCS pressure cannot be above SW pressure.

C. RM-L5 will not detect a leak into the SF system.

D. RM-L3 will not detect a leak into the DC system.

ROT 4-25 Table 3; 2/3-C46

NEW

77. ROT-4-75 001/B4///075A2.03/2.5/2.7/33/CW/VAV

The following plant conditions exist:

- The plant is at 47% power.
- 'A' CWP is out of service for bearing replacement.

Which of the following describes the expected plant response and/or operator actions required if the 'B' CWP were to trip?

A. With the plant at 47% power the remaining two CWPs are sufficient. No additional operator actions are required.

✓B. The operator should immediately trip the turbine and enter EOP-2, Vital System Status Verification.

C. The operator should enter AP-510, Rapid Power Reduction, reduce power to < 45% then enter AP-660, Turbine Trip, and trip the turbine.

D. The operator should immediately trip the turbine, enter EOP-2, Vital System Status Verification and ensure the ADVs for the 'A' OTSG are controlling due to the "Loss of CWP" interlock closing the 'A' OTSG turbine bypass valves.

Reasons:

A. & C. OP-604 requires an immediate turbine trip for this condition.

D. This interlock requires a loss of all four CWPs.

OP-604 Step 3.2.8; 2/3-C58

NEW

78. ROT-3-20 001/B1///09G2.4.47/3.4/3.9/33/LOCA
With the plant at 60% power which of the following sets of conditions could indicate a small break LOCA inside the Reactor Building?

A. T_{ave} is constant.
RCS pressure is decreasing.
RB sump level is constant.

B. T_{ave} is decreasing.
RCS pressure is decreasing.
RB pressure is constant.

✓C. T_{ave} is constant.
RCS pressure is constant.
RB fan high condensate alarms are illuminated.

D. T_{ave} is decreasing.
RCS pressure is decreasing.
RB temperature is constant.

Reasons:

A. RB sump level should increase.

B. RB pressure should increase.

D. RB temperature should increase.

ROT 3-20 Section 4.0; 1-C19

Bank ROT 3-20 #8; NRC 11-93; CP FPC final; ROTs M Final

79. ROT-4-10 001/B2///012K6.06/2.7/2.8/33/RPS
The plant is operating at 100% power with a 0% imbalance. Which of the following describes the RPS response if the lower chamber of NI-7 fails?

A. Assuming a failure of the instrument high the associated RPS channel would trip due to a large positive imbalance.

✓B. Assuming a failure of the instrument low the associated RPS channel would trip due to a large positive imbalance.

C. Assuming a failure of the instrument high the associated RPS channel would trip due to a large negative imbalance.

D. Assuming a failure of the instrument low the associated RPS channel would trip due to a large negative imbalance.

Reasons:

A. A high failure will result in a negative imbalance. The channel would trip on high flux.

C. The maximum imbalance for this failure is -22% which should not trip the flux/delta flux/flow bistable. The channel would trip on high flux.

D. A low failure will result in a large positive imbalance.

ROT 4-10 Section 2.3; 2/3-R18

NEW

80. ROT-4-28 001/ B5/ / / 003AK3.04/ 3.8/ / 33/ CRD/AP-545

AP-545, Plant Runback, requires the operator to reduce power to < 60% rated thermal power in the event of an assymetric fault. What is the reason for this step?

A. To minimize local fuel temperature gradients.

B. To maintain axial power imbalance within limits.

✓C. To ensure LHR (kw/ft) limitations are not exceeded.

D. To ensure regulating rod insertion limits are not exceeded.

Reasons:

A., B. & D. Per ROT 4-28 and TS Bases 3.1.4 this reduction is required to ensure that the local LHR will not cause core design criteria to be exceeded.

ROT 4-28 Section 4.1.11; TS 3.1.4; 1-R3

NEW

81. ROT-4-91 001/B5///057AA1.01/3.7/3.7/11/VITAL/TS

The following plant conditions exist:

- The plant is in Mode 1.
- A failure in the 'A' inverter has caused its transfer switches to automatically swap to the alternate power supplies.
- Operations manually bypasses the inverter and transfer switches to assist troubleshooting activities.
- Electricians replace a circuit board and report that the inverter is functioning properly and ready to supply the vital buses.

Prior to re-alignment of the inverter and transfer switches which of the following describes the operability condition for this equipment?

A. The vital buses and inverter are *operable.*

B. The vital buses and inverter are *inoperable.*

✓C. The vital buses are operable but the inverter is inoperable until the transfer switches are placed back in service.

D. The inverter is operable but the vital buses are inoperable until the transfer switches are placed back in service.

Reasons:

A. The inverter is not operable until it is supplying the vital buses.

B. The vital buses are operable because they are energized to their proper voltages.

D. The inverter is not operable until it is supplying the vital buses.

TS 3.8.7 & 3.8.9; 1-C11

NEW

82. ROT-4-10 002/ B15/ / / 002K5.10/ 3.6/ 4.1/ 33/ NI

The initial power escalation following a refueling outage is being performed. The reactor power level is stabilized to perform testing. The following indications are available to the operator at the control board:

NI-5	28.0%
NI-6	26.0%
NI-7	28.0%
NI-8	29.0%

T_h Loop A	588.5° F
T_h Loop B	588.0° F
T_c Loop A	569.5° F
T_c Loop B	570.0° F
RCS Tave	579.0° F

Which of the following is an accurate estimate of the thermal power level of the reactor at this point?

A. 549 MWt

B. 661 MWt

C. 738 MWt

✓D. 1040 MWt

Reasons:

A., B. & C. Due to the change in Tcold on a power increase the NIs will need calibrating at approximately 25% power increments. Using alternate indications, such as core deltaT, is a more accurate indication of power level. A core deltaT of 18° F indicates a power level of approx. 41% with a corresponding thermal power level of approx. 1040 MWt.

ROT 4-10 Section 3.1; OP-103A Curve 7; 2/3-R15

Bank; ROTs M - T3

83. ROT-2-16 001/B6///062A4.03/2.8//33/ELEC

OP-203, Plant Startup, is in progress. Which of the following describes the frequency and voltage conditions procedurally required for generator output breaker closure?

A. Synchroscope rotating slowly in the clockwise direction. Incoming voltage slightly higher than running voltage.

B. Synchroscope rotating slowly in the counter-clockwise direction. Incoming voltage slightly lower than running voltage.

✓C. Synchroscope rotating slowly in the clockwise direction. Incoming voltage equal to running voltage.

D. Synchroscope rotating slowly in the counter-clockwise direction. Incoming voltage equal to running voltage.

Reasons:

A. The breaker will still close with these conditions. Procedurally incoming and running voltages should be equal.

B. The breaker will still close with these conditions. Procedurally the synchroscope must be rotating slowly in the clockwise direction and the incoming and running voltages should be equal.

D. The breaker will still close with these conditions. Procedurally the synchroscope must be rotating slowly in the clockwise direction.

OP-203 Steps 4.2.44 & 4.2.45; 1-R22

NEW

84. ROT-4-14 008/ B1/ / / G2.2.2/ 3.5/ 3.5/ 33/ ICS

The following plant conditions exist:

- Plant is operating ≈ 20% power.
- SUCV position ≈ 95% open.
- LLCV position ≈ 5% open.

I & C technicians have requested that the 'B' train SUCV and LLCV hand/auto stations be taken to hand in order to record some data on the proportional/integral module supplying the input to these stations. Permission is received and these stations are placed in manual. After the technicians are finished, with no problems noted, preparations are made to return these stations to automatic.

Which of the following describes the appropriate actions to return these stations to automatic?

A. Place the SUCV in auto first, then place the LLCV in auto.

✓B. Place the LLCV in auto first, then place the SUCV in auto.

C. Open the SUCV to 100% to allow the LLCV full control. Place the LLCV in auto first and then the SUCV.

D. Close the LLCV to allow the SUCV full control. Place the SUCV in auto first and then the LLCV.

Reasons:

A. The LLBV must be open at this point. The SUCV cannot be placed in automatic first if the LLBV is open.

C. The SUCV and LLCV are operating as designed. The operator should not manipulate control valve position unnecessarily.

D. The SUCV and LLCV are operating as designed. The operator should not manipulate control valve position unnecessarily. The SUCV cannot be placed in automatic first if the LLBV is open.

84. ROT-4-14 008/ B1/ / / G2.2.2/ 3.5/ 3.5/ 33/ ICS
OP-504 Step 4.5; ROT 4-14 Section 7.1.7; 2/3-C64

Bank ROT 4-14 #110

85. ROT-4-60 002/B18///15AK3.03/3.7/4.0/33/RCP

The following plant conditions exist:

- The plant is at 100% power.
- Seal injection flow has been lost.
- RCP-1B vibrations are in the "action" range on one monitor and in the "alert" range on another monitor.
- Cooling water leaving RCP-1B is 190° F.
- Thrust bearing temperatures for RCP-1B are 190° F.

Which of the following actions are required to be taken for the above conditions?

A. The Reactor Coolant pump must be secured after reducing power to 95%.

B. Notify Engineering and continue to monitor the pump.

C. Start both lift oil pumps for RCP-1B and notify engineering.

✓D. Trip RCP-1B immediately.

Reasons:

A. This is the correct action for the high vibration concern; however the high cooling water temperature response overrides this action.

B. This is the correct action if the high vibration reading were on different parameters; however the high cooling water temperature response overrides this action.

C. This is the correct action for thrust bearing temperatures greater than 185° F; however the high cooling water temperature response overrides this action.

OP-302 Steps 3.2.11, 3.2.14, 3.2.15, 3.2.16 & 4.8.4; 1-C3

NEW

86. ROT-4-14 002/ B1/ / / 001AA2.03/ 4.5/ / 33/ ICS

The following plant conditions exist:

- The reactor is at 40% power.
- The controlling T_{ave} signal slowly fails low.
- The control rods commence a continuous rod withdrawal.
- The operator quickly places the Diamond and Rx Demand hand/auto station to manual.
- Feedwater flow is observed to be decreasing.

Which of the following describes the reason for the feedwater reduction?

A. The ICS is in Track causing feedwater demand to be reduced.

B. The 'Reactor Limited by Feedwater' cross-limit is driving feedwater demand down.

✓C. Feedwater is attempting to correct T_{ave}.

D. The 'Feedwater Limited by Reactor' cross-limit is driving feedwater demand down.

Reasons:

A. The ICS is in track for this condition however the only possible effect it could have on FW demand would be to increase, not decrease.

B. The 'Reactor Limited by Feedwater' will only affect rod control, not FDW.

D. With both the Diamond and Rx Demand hand/auto station in manual neutron error will be 0 and will not actuate this circuit.

ROT 4-14 Section 3.3.2; ROT 4-09 Section 2.1.3; 2/3-R2

NEW

87. ROT-5-100 001/ B3/ / / 055EK3.02/ 4.3/ 4.6/ 33/ EOP-12
A step in EOP-12, Station Blackout, directs the operator to actuate MS line isolation on both OTSGs.

Which of the following is the reason for this step?

✓A. To help control cooldown by minimizing the length of steam line available for steam control problems.

B. To prevent OTSG dry out due to the loss of main feedwater.

C. To maintain greater than 100 psig in the OTSGs due to the impact of the loss of power on turbine bypass valves.

D. To ensure OTSGs are isolated due to the impact of the loss of power on the MS line isolation logic.

Reasons:

B., C. & D. Even with RCS inventory losses minimized the crew must not permit any unnecessary cooldown of the RCS. Contraction from the cooldown could lead to emptying the Pressurizer and a saturated RCS (lack of makeup capability). This step eliminates possible sources of continued cooldown from the secondary plant.

ROT 5-100 Page 9; 1-C9

Bank ROT 5-100 #17; NRC 96; NRC 5-93; CP FPC final; ROTs M - T7

88. ROT-5-116 002/ B6/ / / E04EK1.3/ 4.0/ 4.0/ 33/ EOP-13

The following plant conditions exist:

- During a plant heatup a Loss of Offsite Power occurred.
- EOP-02, Vital System Status Verification, immediate actions have been completed.
- Due to EFIC control problems EOP-4, Inadequate Heat Transfer, was entered and HPI/PORV cooling was established.

Ten minutes into the event the following plant conditions exist:

- AFW is established and feeding both OTSGs.
- HPI/PORV cooling has been secured.
- Subcooling margin is now 70° F and increasing (based on T_{incore}).
- PZR level is off scale high.
- T_{incore} is decreasing at 20° F per 1/2 hour.
- RCS pressure and temperature is above and to the left of the Nat Circ curve.

Which of the following describes the actions that should be taken in this situation and why is it being done?

A. HPI may be throttled because cooldown limits have been exceeded.

B. HPI must be throttled to restore PZR level since adequate subcooling margin exists.

C. HPI may be throttled when T_{cold} reaches 380° F to ensure NDT limits are not exceeded.

✓D. HPI must be throttled to minimize SCM because PTS guidelines are applicable.

Reasons:

A. Cooldown limits have not been exceeded. If limits were exceeded and T_{cold} was below 380° F then HPI must be throttled per Rule 4.

B. There is no HPI throttling criteria based on PZR level.

C. If cooldown limits were exceeded then HPI must be throttled for this condition. Cooldown limits have not been exceeded.

88. ROT-5-116 002/ B6/ / / E04EK1.3/ 4.0/ 4.0/ 33/ EOP-13
EOP-13 Rules 2 & 4; 2/3-C26

NEW

89. ROT-4-90 002/B1///1013K2.01/3.6/3.8/33/BUS POWER
With the plant at 100% power which of the following power sources could feed the 'B' ES 4160V bus?

A. Unit 3 Startup transformer, Offsite Power transformer, Backup ES transformer or the Unit Auxiliary transformer.

✓B. Offsite Power transformer, Backup ES transformer, EDG-1B or the Unit Auxiliary transformer.

C. Unit 3 Startup transformer, Offsite Power transformer, Backup ES transformer or EDG-1B

D. Offsite Power transformer, Backup ES transformer, MTDG-1 or EDG-1B.

Reasons:

A. & C. The Startup transformer is no longer able to feed the ES buses.

D. MTDG-1 can only feed 4160V Rx Aux Bus 3A.

ROT 4-90 Figure 17; 1-C36

NEW

90. ROT-5-95 001/B6///022A3.01/4.1/4.3/33/EOP-08

The following plant conditions exist:

- EOP-8, LOCA Cooldown, performance is in progress.
- RCS pressure is 1600 psig.
- RCS temperature is 450° F.
- RB pressure is 4.2 psig.

Which of the following describes the status of the RB main fans (AHF-1A, 1B and 1C)?

A. Both ES selected RB main fans are in slow speed and being cooled by Nuclear Services Closed Cycle Cooling.

B. Both ES selected RB main fans are in slow speed and being cooled by Industrial Cooling.

✓C. One ES selected RB main fan is in slow speed and being cooled by Nuclear Services Closed Cycle Cooling.

D. One ES selected RB main fan is in slow speed and being cooled by Industrial Cooling.

Reasons:

A. RBIC has actuated which cascades a signal for HPI actuation. HPI starts ONE main fan in slow speed. Recent MAR.

B. RBIC has actuated which cascades a signal for HPI actuation. HPI starts ONE main fan in slow speed. The RBIC signal will swap cooling to SW.

D. RBIC has actuated which cascades a signal for HPI actuation. The RBIC signal will swap cooling to SW.

ROT 4-63 Section 2.2; EOP-8 Step 3.10; 2/3-R10

NRCM98

91. ROT-4-12 001/B2///012K4.01/3.7/4.0/33/RPS
The following sequence of events are in progress:

- Unit is at 100% power with the "A" RPS channel in bypass for testing.
- A feedwater flow problem causes RCS pressure to exceed the RPS high pressure trip setpoint.
- RPS channels "B" and "D" actuate as designed.
- RPS channel "C" does not actuate due to a failed RCS pressure bistable.

Which of the following describes the expected response of the RPS/CRD system?

A. No CRD breakers will open.

✓B. All CRD breakers will open.

C. The "B" & "D" breakers and the "F" electronic trip will open. This will not result in a reactor trip because the "A" and "C" CRD breakers and the "E" electronic trip do not open.

D. The "B" & "D" breakers and the "F" electronic trip will open. This will result in a reactor trip even though the "A" and "C" CRD breakers and "E" electronic trip do not open.

Reasons:

A., C. & D. With one RPS channel in bypass the trip logic is modified to a 2 out of 3 scheme. RPS channels "B" and "D" actuated as designed and tripped all CRD breakers.

ROT 4-12 Section 4.4.2; 1-R17

NRCM98

92. ROT-4-60 003/ B10/ / / 003K6.14/ 2.6/ 2.9/ 33/ RCP
The following plant conditions exist:

- Plant is at 28% power.
- Preparations are in progress to re-start RCP-1A due to a spurious trip.

Which of the following will electrically prevent RCP-1A from being started? (consider only the effect on RCP interlocks for each failure)

✓A. Selected wide range T_{cold} signal input failed low.

B. Selected narrow range T_{cold} signal input failed low.

C. Common controlled bleed-off valve, MUV-253, closed.

D. Selected reactor power signal input failed low.

Reasons:

B. Narrow range scale is 520° F to 620° F. Interlock setpoint is > 465° F.

C. Only individual CBO valve open is required for pump start.

D. Only a high failure will prevent pump start.

OP-302 Step 3.1.12; ROT 4-9 Section 2.6.2; 2/3-C34

NEW

93. ROT-4-06 001/ B9/ / / 062K1.02/ 4.1/ 4.4/ 33/ EDG/AC

SP-354A, Monthly Functional Test of the Emergency Diesel Generator, is in progress with the EDG output breaker closed and an electrical load of three megawatts. A grid disturbance occurs and grid frequency decreases.

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

A. The EDG output breaker will automatically open due to a Volts/Hertz lockout 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. A Voltz/Hertz lockout relay actuation will only open the main generator output breakers.

B. The effect of a grid frequency decrease could only attempt to increase power out of 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.

ROT 4-06 Section 4.6; ROT 2-16 Sections 7.16 & 7.18; 2/3-R21

NRCM98

94. ROT-4-25 003/B6///060AA1.02/2.9/3.1/33/RM
During a waste gas release, with a normal "B" side ventilation lineup, RM-A2, Auxiliary Building Purge Exhaust Radiation Monitor, goes into high alarm. Which of the following groups of fans trip?

A. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-14A and 14C, Auxiliary Building Exhaust Fans.
AHF-30, Chem Lab Supply Fan.

B. AHF-10, Fuel Handling Area Fan.
AHF-14B and AHF-14D, Auxiliary Building Exhaust Fans.
AHF-9B, Penetration Cooling Fan.
AHF-34A, Hot Machine Shop Welding Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

C. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-44B, Chemistry Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

✓D. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-34A, Hot Machine Shop Welding Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

Reasons:

A., B. & C. A high alarm on RM-A2 will trip the following fans: AHF-10, AHF-11B, AHF-9B, AHF-34A, and AHF-30.

ROT 4-25 Table 4; 1-C28

NRCCP97

95. ROT-5-68 001/B1///A01AA1.1/3.7/3.7/33/AP-545

Which of the following sets of conditions would require a plant runback to 55%?

A. "A" Main Feedwater pump lube oil pressure of 10 psig and a deaerator level of two feet.

B. "B" Main Feedwater pump lube oil pressure of 0 psig and a deaerator level of two feet.

✓C. "A" Feedwater Booster pump lube oil pressure of 0 psig and a deaerator level of six feet.

D. "B" Feedwater Booster pump lube oil pressure of 10 psig and a deaerator level of six feet.

Reasons:

A. Low Deaerator level will trip both booster pumps, which will trip both main feedwater pumps which will cause a reactor trip, not a plant runback.

B. The "B" main feedwater pump will trip on low lube oil pressure but low Deaerator level will trip both booster pumps, which will trip both main feedwater pumps which will cause a reactor trip, not a plant runback.

D. Oil pressure and deaerator level are above booster pump trip setpoints.

AR-504 EP 1424; OP-605 Steps 3.1.1 & 3.1.2; AP-545 Step 1; 2/3-R4

NRCCP97

96. ROT-4-28 004/ B17/ / / 001A3.05/ 3.5/ 3.5/ 33/ CRD

The following plant conditions exist:

- A power increase is in progress.
- Group 7 rods are at 45% withdrawn when rod 7-4 sticks in place.
- PI panel indication is selected to RPI.

As the power increase continues which of the following indications could be used to determine that rod 7-4 is no longer moving?

A. Individual control rod position indication on PI panel.

B. Individual control rod position indication on plant computer.

C. Group average indication on MCB or plant computer.

✓D. Individual control rod amber fault light illuminates.

Reason:

A. & B. With RPI selected neither the PI panel or plant computer will indicate actual rod position, only rod position as a function of field rotation.

C. The group average cannot determine which particular rod is not moving.

ROT 4-28 Section 1.4.8; 2/3-C33

NEW

97. ROT-5-98 001/B3///E09EK1.2/3.7/4.0/33/NAT CIRC

EOP-09, Natural Circulation Cooldown, contains a table which provides limits on natural circulation cooldown rates.

For RCS pressure maintained above the Natural Circulation curve of Figure 1 & 2 in the EOP, the cooldown rate limit is ≤ 25° F per 1/2 hour.

Which of the following describes the reason for this limit?

A. To limit thermal stress in the OTSG.

✓B. To prevent/limit voiding in the reactor vessel head region.

C. To prevent water hammer in the EFW lines.

D. To conserve EFT-2 inventory.

Reasons:

A. & C. Other operational limits are used to control these parameters.

D. Slower C/D rates will have minimal affect or may even increase EFW required.

EOP-9 Table 1; ROT 5-98 Overview; 1-C4

Bank; ROTs J - T10A

98. ROT-4-14 006/B1///035A3.01/4.0/3.9/33/ICS

The following plant conditions exist at 100% power:

'A' OTSG Level	80%	'B' OTSG Level	80%
'A' MFW Flow	5.4 E6 lbm/hr	'B' MFW Flow	5.4 E6 lbm/hr

Core ΔT 44 °F

A problem develops with RCP-1C and the decision is made to run the plant back and secure the pump. At 80% power RCP-1C trips and an ICS runback occurs to 75% power. Which of the following describes the approximate expected plant parameters, as compared to the above values, after the plant stabilizes at 75% power?

✓A.

'A' OTSG Level	unchanged
'B' OTSG Level	50% of original
'A' MFW Flow	unchanged
'B' MFW Flow	50% of original
Core ΔT	44 °F

B.

'A' OTSG Level	unchanged
'B' OTSG Level	50% of original
'A' MFW Flow	unchanged
'B' MFW Flow	50% of original
Core ΔT	33 °F

C.

'A' OTSG Level	75% of original
'B' OTSG Level	50% of original
'A' MFW Flow	75% of original
'B' MFW Flow	50% of original
Core ΔT	44 °F

D.

'A' OTSG Level	75% of original
'B' OTSG Level	50% of original
'A' MFW Flow	75% of original
'B' MFW Flow	50% of original
Core ΔT	33 °F

98. ROT-4-14 006/ B1/ / / 035A3.01/ 4.0/ 3.9/ 33/ ICS

Reasons:

B. Core ΔT will remain at 44 °F for these conditions.

C. The 'A' OTSG is still removing the same amount of energy therefore level and flow will remain at the same value.

D. The 'A' OTSG is still removing the same amount of energy therefore level and flow will remain at the same value. Core ΔT will remain at 44 °F.

ROT 4-14 Section 7.2.3; OP-103A Curve 6; 2/3-C54

NEW

99. ROT-4-28 003/ B20/ / / 014A1.04/ 3.5/ 3.6/ 11/ AP-525/TS

The following plant conditions exist at 200 EFPD:

- Group 7 rods begin to move in continuously.
- Rod motion stops when group 7 reaches its in-limit.
- Proper rod sequencing was observed.
- Reactor power has decreased from 100% to 70%.
- Group 8 is at 30% withdrawn.

What core operating limit has been exceeded?

A. Quadrant power tilt limit.

✓B. Regulating rod insertion limits.

C. Axial power imbalance limit.

D. Axial power shaping rod insertion limits.

Reasons:

A. & C. With Group 7 inserting with proper rod sequencing and no rod misalignment there will be no quadrant power tilt or axial power imbalance concerns.

D. Prior to 640 EFPD the APSRs may be positioned as necessary.

AP-525 Steps 3.6, 3.7 & 3.8; OP-103D Curve 1 & 5; COLR; 2/3-C38

Bank ROT 5-67 #1; NRC 11-93; CP FPC final

100. ROT-4-69 001/B8///055K3.01/2.5/2.7/33/CONDENSER

The plant is operating at 60% 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 ΔT is 3° F.
- "A" Air Removal Pump, ARP-1A, has tripped.
- "B" Air Removal Pump, ARP-1B, has failed to auto-start.

Which 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. The main turbine is within procedural limits; condenser vacuum will continue to degrade.

D. The main turbine is within procedural limits; condenser vacuum will stabilize at a slightly lower value.

Reasons:

A. For this power level a turbine trip is not required unless condenser vacuum exceeds 5.5" Hg absolute.

B. For this power level a turbine trip is not required unless condenser vacuum exceeds 5.5" Hg absolute. Vacuum will continue to degrade after a turbine trip.

D. Vacuum will continue to degrade under these conditions.

100. ROT-4-69 001/ B8/ / / 055K3.01/ 2.5/ 2.7/ 33/ CONDENSER
OP-607 Step 3.2.4; 2/3-C56

Bank ROT 4-69 #31; NRC 96; ROTs K - Final 97; ROTs M - T5A

CRYSTAL RIVER UNIT 3

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WRITTEN EXAMINATION

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1. ROT-5-01 002/ A1/ / / A01AA2.2/ 3.5/ 3.8/ 55/ AP/TS/COLR
The plant was operating at 100% power when control rod 7-2 drops fully into the core. AP-545, Plant Runback, was entered and the plant is stabilized at 58% power. A QPT calculation is required per AP-545. Power Range NIs indicate as follows:

- NI-5 58% power
- NI-6 57% power
- NI-7 58% power
- NI-8 42% power

Which of the following actions would be acceptable for these conditions?

A. Enter TS 3.2.4 and comply with Condition A.

✓B. Enter TS 3.2.4 and comply with Condition B.

C. Enter TS 3.2.4 and comply with Condition D.

D. Enter TS 3.2.4 and comply with Condition F.

Reasons:

A., C. & D. QPT ratio is 7.9 based on NIs. This is greater than the transient limit but less than the maximum limit. TS requires actions associated with Condition B.

TS 3.2.4; COLR; 2/3-S8

NRCM98

2. ROT-5-43 001/ A4/ / / G2.3.4/ 2.5/ 3.1/ 55/ RAD
Which of the following radiation exposures would require immediate notification to the Nuclear Regulatory Commission (NRC)?

A. 18 Rem CEDE.

B. 23 Rem TEDE.

✓C. 82 Rem LDE.

D. 210 Rem SDE-WB.

Reasons:

A. The immediate notification limit for CEDE is 25 Rem.

B. The immediate notification limit for TEDE is 25 Rem.

D. The immediate notification limit for SDE-WB is 250 Rem.

ROT 5-43 Section 8.1; HPP-218 Step 4.4; 1-S27

NRCCP97

3. ROT-4-75 001/ B4/ / / 075A2.03/ 2.5/ 2.7/ 33/ CW/VAV

The following plant conditions exist:

- The plant is at 47% power.
- 'A' CWP is out of service for bearing replacement.

Which of the following describes the expected plant response and/or operator actions required if the 'B' CWP were to trip?

A. With the plant at 47% power the remaining two CWPs are sufficient. No additional operator actions are required.

✓B. The operator should immediately trip the turbine and enter EOP-2, Vital System Status Verification.

C. The operator should enter AP-510, Rapid Power Reduction, reduce power to < 45% then enter AP-660, Turbine Trip, and trip the turbine.

D. The operator should immediately trip the turbine, enter EOP-2, Vital System Status Verification and ensure the ADVs for the 'A' OTSG are controlling due to the "Loss of CWP" interlock closing the 'A' OTSG turbine bypass valves.

Reasons:

A. & C. OP-604 requires an immediate turbine trip for this condition.

D. This interlock requires a loss of all four CWPs.

OP-604 Step 3.2.8; 2/3-C58

NEW

4. ROT-4-12 002/ B3/ / / 029EK3.01/ 4.2/ 4.5/ 33/ RPS
The following plant conditions exist:

- The plant is at 50% reactor power.
- The ICS power supply monitor fails resulting in a loss of + 24 volt power.

What is the plant's response to this situation?

A. ATWS removes power from the safety rods and initiates EFIC.

✓B. AMSAC trips the main turbine and initiates EFIC.

C. DSS removes power from the regulating control rods.

D. RPS trips the reactor due to the loss of both MFW pumps.

Reasons:

A. The ATWS subsystem (DSS) removes power from the regulating rods, not the safety rods, if conditions are met. The other sub-system of ATWS (AMSAC) will initiate EFIC under these conditions (>45% power and <17% MFW flow).

C. DSS will remove power from the regulating rods if RCS pressure exceeds 2450#. This would require RPS to fail to actuate.

D. This failure will cause both MFW pumps to decrease to minimum speed but will not cause the pumps to trip.

ROT 4-12 Section 1.2.1 & 1.2.2; ROT 4-14 Section 2.3 & 4.3; 2/3-C7

NEW

5. ROT-5-96 002/ B1/ / / E02EK1.3/ 3.8/ 3.8/ 33/ EOP-02

The following plant conditions exist:

- The plant is in Mode 3 with Group 1 control rods withdrawn.
- A Loss of Offsite Power occurs.
- EDG-1A fails to start.
- EFP-2 will not start.
- RCS temperatures are increasing.

Which of the following is the appropriate EOP entry and transition sequence for the given conditions?

A. Immediately enter EOP-02, Vital Systems Status Verification, and transition to EOP-04, Inadequate Heat Transfer, as directed by EOP-02 follow-up steps.

B. Immediately enter EOP-09, Natural Circulation Cooldown, and transition to EOP-10, Post Trip Stabilization, as directed by EOP-09 follow-up steps.

✓C. Immediately enter EOP-02, Vital Systems Status Verification, and transition to EOP-04, Inadequate Heat Transfer, when EOP-04 symptoms become apparent.

D. Immediately enter EOP-04, Inadequate Heat Transfer, based on EOP symptoms, and transition to EOP-08, LOCA Cooldown, as directed by EOP-04 follow-up steps.

Reasons:

A. After the Immediate Actions of EOP-2 then transition should be made to EOP-4 due to the Inadequate Heat Transfer symptom.

B. A reactor trip should have occurred due to the LOOP and EOP-2 should be entered immediately.

D. A reactor trip should have occurred due to the LOOP and EOP-2 should be entered immediately. Should not have to enter EOP-8 due to the availability of AFW.

5. ROT-5-96 002/ B1/ / / E02EK1.3/ 3.8/ 3.8/ 33/ EOP-02
AI-505 Step 4.2.1; 2/3-C18

Bank ROT 5-96 #73

6. ROT-4-91 002/ F2/ / / G2.4.32/ 3.5/ 3.5/ 33/ VITALPOWER

With the plant at 100% power a catastrophic failure of VBIT-1C rendered itself inoperable and caused both of the VBXSs that it feeds to fail as is and not transfer to their alternate power supply.

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

A. AP-581, Loss of NNI-X, should be entered.

B. AP-582, Loss of NNI-Y, should be entered.

✓C. AP-430, Loss of Control Room Alarms, should be entered.

D. Trip both MFW pumps and the reactor due to the loss of ICS power. EOP-2, Vital System Status Verification, and Rule 3, EFW Control, should be entered.

Reasons:

A. The ABT for NNI-X should transfer to VBDP-1 on a loss of VBDP-5.

B. Neither VBDP-5 or 9 feed NNI-Y therefore no loss of power should occur.

D. This is the correct response for a loss of ICS power however neither VBDP-5 or 9 feed ICS therefore no loss of power should occur.

ROT 4-91 Figure 1; AP-430 Step 3.5; 2/3-C69

NRCM98

7. ROT-5-90 001/ B1/ ROT-5-01/ / G2.2.12/ 3.4/ 3.4/ 33/ NNI

Technical Specification 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) limits, requires verification of RCS total flow every 12 hours. Which of the following describes the procedure and location where RCS total flow is read to meet this surveillance?

A. SP-225, Reactor Coolant Flow Measurement at Hot Full Power; Main Control Board ICS section.

B. SP-225, Reactor Coolant Flow Measurement at Hot Full Power; Main Control Board PSA section.

✓C. SP-300, Operating Daily Surveillance Log; Main Control Board ICS section.

D. SP-300, Operating Daily Surveillance Log; Main Control Board PSA section.

Reasons:

A. & B. SP-225 is a refueling frequency and is performed by the reactor engineer.

D. RCS total flow is not read on the PSA section of the MCB.

SP-300 page 30; 1-C65

Bank; NRC 96; ROT-5-01 B3; ROTs M - T7

8. ROT-4-06 001/ B1/ / / A05AK2.1/ 4.0/ 3.8/ 33/ EDG

Reactor Building pressure is 4.8 psig. Which of the following describes the status of the EDGs and the effect of protective relay actuation on the output breaker?

✓A. The EDGs are running with their 'Ready' lights illuminated. Actuation of the generator differential current relay will shut down the engine and trip or prevent closure of the output breaker.

B. The EDGs are running with their 'Ready' lights illuminated. Actuation of the exciter field short relay will shut down the engine and trip or prevent closure of the output breaker.

C. The EDGs are running with their 'Run' lights illuminated. Actuation of the generator differential current relay will shut down the engine and trip or prevent closure of the output breaker.

D. The EDGs are running with their 'Run' lights illuminated. Actuation of the exciter field short relay will shut down the engine and trip or prevent closure of the output breaker.

Reasons:

B. The exciter field short relay will only trip or prevent closure of the output breaker.

C. Since there is no undervoltage condition the 'Run' lights will not be illuminated.

D. Since there is no undervoltage condition the 'Run' lights will not be illuminated. The exciter field short relay will only trip or prevent closure of the output breaker.

ROT 4-06 1.2.6.2, 1.2.12 & 4.10.1; 2/3-C32

NEW

9. ROT-5-85 001/ A2/ / / 022AA2.01/ 3.2/ 3.8/ 55/ HPI
The following plant conditions exist:

- Plant is in Mode 3.
- RCS pressure is 1920 psig.
- T_{incore} is 606° F.
- HPI flows

	Wide Range	Narrow Range
A1	220 gpm	180 gpm
A2	250 gpm	200 gpm
B1	200 gpm	170 gpm
B2	190 gpm	155 gpm

Based on the conditions above which of the following action(s), if any, should be taken associated with HPI flow directing?

✓A. No additional actions are required.

B. Isolate MUV-30, bypass around MUV-31, due to higher than expected flow indication on line A2.

C. Bypass and/or reset ES actuations, close MUV-27 and ensure flow decreases on line A2.

D. Bypass and/or reset ES actuations, close HPI valve on line A2 and remove power from affected valve.

Reasons:

B. MUV-30 will already be isolated due to completion of EOP-3, Step 2.1, Rule 1, Loss of SCM.

C. MUV-27 should have closed due to completion of EOP-3, Step 2.1, Rule 1, Loss of SCM. Bypassing or resetting ES actuations will have no effect on the ability to close MUV-27.

D. Flow directing guidance requires the use of *narrow* range instrumentation with a delta of greater than 50 gpm.

9. ROT-5-85 001/ A2/ / / 022AA2.01/ 3.2/ 3.8/ 55/ HPI
ROT 5-85 pages 5 & 6; EOP-3 Step 3.6; 2/3-S9

NEW

10. ROT-5-84 001/B3///078A4.01/3.1/3.1/11/AP-470

Instrument air pressure has decreased to 76 psig and makeup flow decreases to 15 gpm. Which of the following describes the operator's actions for this scenario?

A. Restore letdown flow using MUV-50, bypass around MUV-51, to normal value and adjust MUT level as required.

✓B. Trip the reactor and concurrently perform EOP-2.

C. Bypass instrument air dryers then trip the reactor and concurrently perform EOP-2.

D. Manually control MUV-31 is to maintain PZR level at > 80 inches.

Reasons:

A. Both letdown control valves are air operated and the AP directs you to isolate letdown.

C. Due to the loss of normal makeup flow tripping the reactor will be performed much earlier in the AP than bypassing the air dryers.

D. AP directs the use of MUV-24 for PZR level control.

AP-470 Step 3.5; 1-C62

Mod Bank ROT 5-84 #2; NRC 11-93; CP FPC final; ROTs M - T7

11. ROT-4-14 003/ B1/ / / G2.4.45/ 3.6/ 3.6/ 33/ ICS
A power increase is in progress from 50% power. The "VERIFY FWV-29 ON AUTO" alarm has just annunciated.

Which of the following describes this plant condition?

A. This is *not* an expected alarm during a normal power increase. The Auto/Man toggle switch for FWV-29 must still be selected to the Manual position.

B. This is *not* an expected alarm during a normal power increase. FWV-29 should automatically open under these conditions.

C. This is an expected alarm during a normal power increase. This alarm will stay in until FWV-29 is fully open.

✓D. This is an expected alarm during a normal power increase. This alarm will stay in until FWV-29 is > 15% open.

Reasons:

A. This is an expected alarm on a power increase whether the Auto/Man toggle switch is selected to auto or not.

B. This is an expected alarm on a power increase.

C. The alarm clears after the valve is > 15% open.

ROT 4-14 Section 5.1.19; AR-503 EP 1227; 2/3-C71

NEW

12. ROT-5-85 002/ B6/ / / E03EK2.2/ 4.3/ 4.3/ 33/ EOP-03

The following plant conditions exist:

- A large steam line break on the "B" OTSG has occurred.
- The "B" steam generator has been isolated.
- Reactor coolant pressure is 1300 psig.
- Reactor coolant temperature is 532°F.

Based on the above conditions what is the function of HPI and when can it be throttled?

A. HPI is required for core cooling and can be throttled when low pressure injection through DHV-5 or 6 has been established for 20 minutes.

B. HPI is required for core cooling and can be throttled when heat removal through the "A" OTSG is established.

C. HPI is required to compensate for RCS contraction and can be throttled when the pressurizer level exceeds 40 inches.

✓D. HPI is required to compensate for RCS contraction and can be throttled when adequate subcooling margin is recovered.

Reasons:

A. & B. High pressure injection is required to compensate for RCS contraction due to the overcooling.

C. HPI cannot be throttled unless adequate subcooling margin is recovered.

ROT 5-94 Overview & page 12; 2/3-C15

NRCCP97

13. ROT-4-09 003/ B6/ / / A02AK1.3/ 3.8/ 3.8/ 33/ NNI

Which of the following describes the PZR level control response to a loss of NNI-X power?

✓A. A backup power supply will allow manual operation of MUV-31 following a loss of all NNI-X DC power.

B. A backup power supply will allow automatic operation of MUV-31 following a loss of all NNI-X AC power.

C. A loss of NNI-X AC or DC power will cause MUV-31 to fail closed. MUV-24 will be used for PZR level control.

D. A loss of NNI-X AC or DC power will cause the valve controller to swap to NNI-Y for control power.

Reasons:

B. The backup power supply will only allow for manual operation.

C. MUV-31 will fail as is on a loss of power. MUV-24 is available for level control but should not be needed.

D. The level input signal will swap to the NNI-Y input, however control power can only be supplied by NNI-X or the backup power supply.

ROT 4-09 Section 2.2.4; 1-C17

Modified Bank ROT 4-51 #51

14. ROT-5-116 002/ B1/ / / 054AK3.03/ 3.8/ 4.0/ 33/ EOP-04

Per EOP-13, Rule 3, if EFW control is in manual during an Inadequate Subcooling Margin condition, flow to the OTSGs should be directed through a single line to each available steam generator. Which of the following is the basis for using only a single line to feed the OTSG(s)?

✓A. Use of a single line results in higher flowrates which place the flow instrumentation in a region of smaller errors.

B. Use of a single line places the control valves in a position where they have more precise flow control.

C. Use of a single line provides fewer parameters for the operator to monitor, thus simplifying manual control.

D. Use of a single line was used in accident analysis involving manual EFW flow and is proceduralized to ensure we are operating within analyzed methods.

Reasons:

B., C. & D. Recent calculations have shown that use of a single line with higher flow rates places the intruments in regions of smaller flow error.

ROT 5-116 Page 8; Rule 3, EFW Control; 1-C25

Bank; ROTs M - T7

15. ROT-5-31 002/B3///E09G2.1.23/3.9/4.0/33/RSP

Step 3.34 of AP-990, Shutdown from Outside the Control Room, requires the performance of Enclosure 2, RSD Panel Log Readings. Natural Circulation is in progress with EFIC controlling OTSG level. The following data is recorded:

- OTSG 'A' Operate Level	91%
- OTSG 'B' Operate Level	92%
- T_{cold}	545°
- T_{hot}	572°
- $T_{incores}$	590°
- RCS Wide Range Pressure	1600 psig

Based on the above readings which of the following describes the condition of the RCS and EFIC level control?

✓A. Adequate Subcooling Margin does not exist. EFIC is controlling at the required level.

B. Adequate Subcooling Margin does not exist. EFIC should be controlling level at the Natural Circulation setpoint due to RCPs being secured.

C. Adequate Subcooling Margin does exist. EFIC is controlling at the required level.

D. Adequate Subcooling Margin does exist. EFIC should be controlling level at the Natural Circulation setpoint due to RCPs being secured.

Reasons:

B. EFIC should control at the ISCM setpoint, not the Nat Circ setpoint.

C. Adequate Subcooling Margin does not exist.

D. Adequate Subcooling Margin does not exist and EFIC should control at the ISCM setpoint, not the Nat Circ setpoint.

AP-990 Step 3.32 and Enclosure 2; EOP-13 Rule 1 and 3; 2/3-C5

NRCM98

16. ROT-4-28 001/ B20/ / / 014A1.04/ 3.5/ 3.6/ 11/ AP-525/TS
The following plant conditions exist at 200 EFPD:

- Group 7 rods begin to move in continuously.
- Rod motion stops when group 7 reaches its in-limit.
- Proper rod sequencing was observed.
- Reactor power has decreased from 100% to 70%.
- Group 8 is at 30% withdrawn.

What core operating limit has been exceeded?

A. Quadrant power tilt limit.

✓B. Regulating rod insertion limits.

C. Axial power imbalance limit.

D. Axial power shaping rod insertion limits.

Reasons:

A. & C. With Group 7 inserting with proper rod sequencing and no rod misalignment there will be no quadrant power tilt or axial power imbalance concerns.

D. Prior to 640 EFPD the APSRs may be positioned as necessary.

AP-525 Steps 3.6, 3.7 & 3.8; OP-103D Curve 1 & 5; COLR; 2/3-C38

Bank ROT 5-67 #1; NRC 11-93; CP FPC final

17. ROT-4-25 004/ B7/ / / 072A2.02/ 2.8/ 2.9/ 11/ RAD MON

The following plant conditions exist:

- RCS temperature is 220° F.
- RM-A6 has been declared inoperable due to a blocked sample line in the ductwork of AHF-3B.

Which of the following action(s), if any, could be taken to ensure compliance with Technical Specifications?

A. No actions are required.

B. Start AHF-3A within 6 hours and repair the sample line within 30 days.

C. Start the back-up sample pump on RM-A6 and perform SP-317 every 24 hours.

✓D. Perform SP-317 every 24 hours and repair the sample line within 30 days.

Reasons:

A. If temperature was below 200° F then this choice is correct.

B. Starting AHF-3A will not return RM-A6 to operable status unless the sample line valve lineup is also changed.

C. Starting the backup sample pump will not return RM-A6 to operable status unless the sample line valve lineup is changed and AHF-3A is started.

TS 3.4.14; ROT 4-25 page 18; 2/3-C48

NEW

18. ROT-3-20 001/ B1/ / / 09G2.4.47/ 3.4/ 3.9/ 33/ LOCA

With the plant at 60% power which of the following sets of conditions could indicate a small break LOCA inside the Reactor Building?

A. T_{ave} is constant.
RCS pressure is decreasing.
RB sump level is constant.

B. T_{ave} is decreasing.
RCS pressure is decreasing.
RB pressure is constant.

✓C. T_{ave} is constant.
RCS pressure is constant.
RB fan high condensate alarms are illuminated.

D. T_{ave} is decreasing.
RCS pressure is decreasing.
RB temperature is constant.

Reasons:

A. RB sump level should increase.

B. RB pressure should increase.

D. RB temperature should increase.

ROT 3-20 Section 4.0; 1-C19

Bank ROT 3-20 #8; NRC 11-93; CP FPC final; ROTs M Final

19. ROT-4-54 001/B13///005A2.02/3.5/3.7/33/OP/AP-404

The following plant conditions exist:

- Refueling operations are in progress.
- RC-132-PT, 0 to 600# pressure transmitter fails high.
- "A" DH train is in operation.

Based on these conditions which of the following action(s) should be performed?

A. Enter TS 3.3.1 and perform required actions.

✓B. No actions are required other than initiating the required paperwork for repair of the transmitter.

C. Secure DHP-1A due to DHV-3 receiving a close signal. Enter AP-404 and perform required actions.

D. Secure DHP-1A due to DHV-4 receiving a close signal. Enter AP-404 and perform required actions.

Reasons:

A. This transmitter is not listed on Table 3.3.1-1. The student should be able to determine this due to the PT range given in the stem and due to the plant being in Mode 6.

C. & D. Per OP-404 anytime the vessel head is removed ACI must be bypassed. This transmitter will send a close signal to DHV-4 however the signal will not reach the valve. DHP-1A does not need to be secured so entry into AP-404 is not required.

OP-404 Step 3.2.13; ROT 4-9 Step 2.4.6; ROT 4-54 Step 1.4.4; 2/3-S21

NEW

20. ROT-5-61 001/A2///026AA2.01/2.9/3.5/33/SW

The following plant conditions exist:

- The nuclear services surge tank is decreasing in level.
- 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 system leak annunciators in alarm.

Where is the location of the SW leak?

A. The reactor coolant drain tank.

✓B. The industrial cooling system.

C. The primary sample cooler.

D. The inservice reactor coolant pump seal return cooler.

Reasons:

A. No leak annunciators in alarm will rule this tank out.

C. The SW would not leak out of this cooler; RCS will leak into the SW system.

D. MUT level would increase or the auxiliary building sump level would increase.

AP-330 Step 3.7; 2/3-S4

NEW

21. ROT-4-69 001/B7///051AA2.02/3.9/4.1/33/VACUUM
The following plant conditions exist:

- The plant is at 50% power.
- Condenser vacuum is 25 in-HgA and steady.
- Low pressure turbine exhaust temperature is 258° F.

Based on these conditions which of the following action(s) should be taken?

A. Restore vacuum to > 26.5 in-HgA within five minutes or trip the turbine.

B. Immediately reduce power to < 30% and trip the main turbine within five minutes.

✓C. Trip the main turbine immediately.

D. Initiate hood spray.

Reasons:

A. If reactor power was less than 30% then this would be the correct action to take, based on vacuum only.

B. If vacuum was < 24.5 in-HgA then this would be the correct action to take, based on vacuum only.

D. Vacuum is adequate for this power level however with low pressure turbine exhaust temperature > 250° F OP-607 requires the main turbine to be tripped immediately.

OP-607 Section 4.5; 2/3-S5

NRCM98

22. ROT-4-55 001/F3///026K1.02/4.1/4.1/33/BS/DC

The following plant conditions exist:

- RB pressure is 32 psig.
- RCS pressure 900 psig.
- Adequate subcooling margin does exist.
- A 480V OCLO has occurred on the 'B' bus.

Which of the following describes *some* of the actions that should be taken for these conditions?

✓A. BSP-1B and MUP-1C should be secured.

B. RWP-2B and RWP-3B should be secured.

C. BSP-1B, MUP-1B and RWP-3B should be secured.

D. DHP-1B, MUP-1C, BSP-1B and RWP-3B should be secured.

Reasons:

B. RWP-2B is cooled by SW and should be left running.

C. MUP-1B is cooled by SW and should be left running.

D. DHP-1B will not be running for these conditions.

ROT 4-55 Figure 1; ROT 4-13 Table II; ROT 4-90 Section 2.2.5.2; OP-700A Enclosure 9; 2/3-C41

NEW

23. ROT-4-09 002/B6///016K3.03/3.0/3.1/33/NNI

The following plant conditions exist:

- The plant is at 100% power.
- The turbine is selected to the "A" steam header pressure transmitter for control.

Which statement below describes the expected ICS/SASS response to a low failure of the selected "A" turbine header pressure transmitter coincident with a reactor trip?

✓A. SASS will transfer the "A" header input to the turbine and bypass valves to the unaffected transmitter. No ICS upset will occur.

B. SASS will transfer the "A" header input to the turbine to the unaffected transmitter. The bypass valves will fail closed.

C. SASS will transfer the "A" header input to the bypass valves to the unaffected transmitter and transfer the turbine to the "B" steam header pressure transmitter for control.

D. SASS will transfer the "A" header input to the turbine to the unaffected transmitter. The bypass valves will fail open.

Reasons:

B. The bypass valve's input should also transfer to the unaffected transmitter.

C. Manual operator action is required to transfer turbine control to the "B" steam header pressure transmitter.

D. The bypass valve's input should also transfer to the unaffected transmitter. If the transfer didn't happen the bypass valves would fail closed, not open.

ROT 4-9 Figure 25; 1-C51

Modified Bank ROT 4-09 #8; ROTs J -T8; ROTs M - T5A

24. ROT-5-116 001/ A1/ / / E14EA2.1/ 3.4/ 4.0/ 55/ EOP
The following plant conditions exist:

- The "A" OTSG has blown down to 6" on the EFIC Low Range instrument due to a failed open MSSV. This valve has now been reseated and gagged closed.
- Main feedwater pumps are the only available source of feedwater.
- Feedwater temperature is 160° F.

As the SSOD which of the following actions should be performed?

A. Feed the "A" OTSG via the EFW nozzles at 450 to 600 gpm.

B. Feed the "A" OTSG via the MFW nozzles at 450 to 600 gpm.

C. Feed the "A" OTSG via the EFW nozzles at $< .15 \times 10^6$ lbm/hr.

✓D. Feed the "A" OTSG via the MFW nozzles at $< .15 \times 10^6$ lbm/hr.

Reasons:

A. At temperatures > 150° F the MFW nozzles should be used with a flow rate of < .15 x 106 lbm/min.

B. Flow rate of < .15 x 106 lbm/hr must be maintained.

C. At temperatures > 150° F the MFW nozzles should be used.

EOP-14 Enclosure 3; EOP-4 Table 3; 2/3-S11

NRCM98

25. ROT-4-60 002/ B18/ / / 15AK3.03/ 3.7/ 4.0/ 33/ RCP

The following plant conditions exist:

- The plant is at 100% power.
- Seal injection flow has been lost.
- RCP-1B vibrations are in the "action" range on one monitor and in the "alert" range on another monitor.
- Cooling water leaving RCP-1B is 190° F.
- Thrust bearing temperatures for RCP-1B are 190° F.

Which of the following actions are required to be taken for the above conditions?

A. The Reactor Coolant pump must be secured after reducing power to 95%.

B. Notify Engineering and continue to monitor the pump.

C. Start both lift oil pumps for RCP-1B and notify engineering.

✓D. Trip RCP-1B immediately.

Reasons:

A. This is the correct action for the high vibration concern; however the high cooling water temperature response overrides this action.

B. This is the correct action if the high vibration reading were on different parameters; however the high cooling water temperature response overrides this action.

C. This is the correct action for thrust bearing temperatures greater than 185° F; however the high cooling water temperature response overrides this action.

OP-302 Steps 3.2.11, 3.2.14, 3.2.15, 3.2.16 & 4.8.4; 1-C3

NEW

26. ROT-4-56 001/B1/ROT-4-13//103K4.06/3.1/3.7/33/SW

The plant was operating at 100% power when a steam leak on the "A" steam generator occurred in the reactor building (RB). The following conditions exist:

- Reactor building pressure is 5 psig.
- Reactor coolant temperature (T_C) 490°F.
- RCS pressure 1400 psig and increasing.
- Pressurizer level is 10 inches.
- "A" steam generator is isolated.
- "B" steam generator is being fed from emergency feedwater and steamed through the atmospheric dump valve.

In this situation the nuclear services closed cycle cooling (SW) system is providing cooling water to:

✓A. Reactor coolant pumps and reactor building main fan assemblies.

B. Reactor coolant pumps and control rod drive mechanisms.

C. Reactor coolant drain tank and reactor building main fan assemblies.

D. Reactor coolant drain tank and control rod drive mechanisms.

Reasons:

B. CRDs have SW isolated on RBIC. Reactor coolant pumps are not isolated because a low level in the the SW surge tank does not exist.

C. RCDT has SW isolated on RBIC.

D. Both RCDT and CRDs have SW isolated on RBIC.

ROT 4-13 Table 6; ROT 4-56 Section 1.1; 1-C59

Bank ROT 4-56 #63; NRC 6-97; ROTs M - 5B

27. ROT-5-98 001/ B3/ / / E09EK1.2/ 3.7/ 4.0/ 33/ NAT CIRC

EOP-09, Natural Circulation Cooldown, contains a table which provides limits on natural circulation cooldown rates.

For RCS pressure maintained above the Natural Circulation curve of Figure 1 & 2 in the EOP, the cooldown rate limit is ≤ 25° F per 1/2 hour.

Which of the following describes the reason for this limit?

A. To limit thermal stress in the OTSG.

✓B. To prevent/limit voiding in the reactor vessel head region.

C. To prevent water hammer in the EFW lines.

D. To conserve EFT-2 inventory.

Reasons:

A. & C. Other operational limits are used to control these parameters.

D. Slower C/D rates will have minimal affect or may even increase EFW required.

EOP-9 Table 1; ROT 5-98 Overview; 1-C4

Bank; ROTs J - T10A

28. ROT-4-89 001/ B6/ / / 010K2.01/ 3.0/ 3.4/ 33/ ELECT
With the plant operating at 65% power a 'Sudden Pressure' relay actuates on the Startup Transformer.

Based on the above which of the following electrical line-ups could be used to supply power to the 'A' Train PZR heaters?

A. MTDG-1; 4160V Rx Aux Bus 3; 480V Rx Aux Bus 3A.

✓B. EDG-1A; ES 4160V Bus 3A; ES 480V Bus 3A; 480V Rx Aux Bus 3A.

C. BEST; ES 4160V Bus 3A; ES 480V Bus 3A; 480V Rx Aux Bus 3A.

D. EDG-1B; ES 4160V Bus 3B; 480V Plant Aux Bus; 480V Rx Aux Bus 3A.

Reasons:

A. 4160V Rx Aux Bus 3 cannot feed 480V Rx Aux Bus 3A.

C. The BEST has been lost due to the relay actuation associated with the Startup Transformer.

D. This used to be a viable option until the removal of the feed to 480V Rx Aux Bus 3A.

ROT 4-89 Figure 9; ROT 4-88 Section 2.8; AP-770 Enclosure 4; 2/3-C50

NEW

29. ROT-4-14 002/ B1/ / / 035A3.01/ 4.0/ 3.9/ 33/ ICS

The following plant conditions exist at 100% power:

'A' OTSG Level	80%	'B' OTSG Level	80%
'A' MFW Flow	5.4 E6 lbm/hr	'B' MFW Flow	5.4 E6 lbm/hr

Core ΔT 44 °F

A problem develops with RCP-1C and the decision is made to run the plant back and secure the pump. At 80% power RCP-1C trips and an ICS runback occurs to 75% power. Which of the following describes the approximate expected plant parameters, as compared to the above values, after the plant stabilizes at 75% power?

✓A.

'A' OTSG Level	unchanged
'B' OTSG Level	50% of original
'A' MFW Flow	unchanged
'B' MFW Flow	50% of original
Core ΔT	44 °F

B.

'A' OTSG Level	unchanged
'B' OTSG Level	50% of original
'A' MFW Flow	unchanged
'B' MFW Flow	50% of original
Core ΔT	33 °F

C.

'A' OTSG Level	75% of original
'B' OTSG Level	50% of original
'A' MFW Flow	75% of original
'B' MFW Flow	50% of original
Core ΔT	44 °F

D.

'A' OTSG Level	75% of original
'B' OTSG Level	50% of original
'A' MFW Flow	75% of original
'B' MFW Flow	50% of original
Core ΔT	33 °F

29. ROT-4-14 002/ B1/ / / 035A3.01/ 4.0/ 3.9/ 33/ ICS

Reasons:

B. Core ΔT will remain at 44 °F for these conditions.

C. The 'A' OTSG is still removing the same amount of energy therefore level and flow will remain at the same value.

D. The 'A' OTSG is still removing the same amount of energy therefore level and flow will remain at the same value. Core ΔT will remain at 44 °F.

ROT 4-14 Section 7.2.3; OP-103A Curve 6; 2/3-C54

NEW

30. ROT-4-25 003/ B6/ / / 060AA1.02/ 2.9/ 3.1/ 33/ RM

During a waste gas release, with a normal "B" side ventilation lineup, RM-A2, Auxiliary Building Purge Exhaust Radiation Monitor, goes into high alarm. Which of the following groups of fans trip?

A. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-14A and 14C, Auxiliary Building Exhaust Fans.
AHF-30, Chem Lab Supply Fan.

B. AHF-10, Fuel Handling Area Fan.
AHF-14B and AHF-14D, Auxiliary Building Exhaust Fans.
AHF-9B, Penetration Cooling Fan.
AHF-34A, Hot Machine Shop Welding Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

C. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-44B, Chemistry Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

✓D. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-34A, Hot Machine Shop Welding Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

Reasons:

A., B. & C. A high alarm on RM-A2 will trip the following fans: AHF-10, AHF-11B, AHF-9B, AHF-34A, and AHF-30.

ROT 4-25 Table 4; 1-C28

NRCCP97

31. ROT-5-104 001/ B1/ / / 002K5.08/ 3.4/ 3.9/ 33/ OP-210
OP-210, Reactor Startup, requires pressurizer level to be maintained within the limits of OP-103A Curve 5, Pressurizer Level vs Tave whenever the reactor is critical.

Which of the following is the reason for this requirement?

A. To maintain pressurizer level during a plant runback.

B. To prevent uncovering the pressurizer heaters.

C. To prevent excessive differential temperature across the spray valve.

✓D. To maintain a steam bubble in the pressurizer after a reactor trip.

Reasons:

A. Even though a runback reduces reactor power T_{ave} should remain at ≈579° which will cause little or no decrease in PZR level.

B. If PZR level was below the recommended levels this could occur however it is not the reason for this limit and precaution.

C. If PZR level is not within the limits of this curve there will be little or no effect on spray valve delta T.

OP-210 Step 3.2.3; 1-S15

Bank; ROT 5-104 #16; NRC 5-93; ROTs M - T7

32. ROT-5-96 001/ B4/ / / 024AK3.02/ 4.2/ 4.4/ 33/ EOP-2

The plant has experienced a reactor trip. While completing the follow-up actions of EOP-2, Vital Safety System Verification, you observe that control rod 1 in group 1 and control rod 3 in group 6 do not have their in-limit or 0% lights energized. API shows both control rods at about 20% withdrawn. Which of the following should be performed?

A. Open breakers 3305 and 3312.

✓B. Start boration using a boric acid storage tank and associated pump.

C. Start boration from a reactor coolant bleed tank with a concentration greater than reactor coolant.

D. Depress "HPI Manual Actuation" on Train A and B.

Reasons:

A. This action is not required unless a CRD group is not fully inserted.

C. This is not an accepted method of emergency boration.

D. This action is only required if the NIs indicate the Rx is not shutdown.

EOP-2 Step 3.3; 1-C6

Bank; NRC 6-97; ROTs M Final

33. ROT-4-06 003/ B4/ / / 063K3.02/ 3.5/ 3.7/ 33/ EDG
DPDP-1A is de-energized due to an internal fault on the bus coincident with a Loss of Offsite Power.

Based on these conditions which of the following describes the status of EDG-1A and the EFIC system?

A. EDG-1A will start and load on the bus; the 'A' and 'C' EFIC cabinet will lose power.

B. EDG-1A will start and come up to speed but will not energize the bus; the 'A' and 'C' EFIC cabinet will ***not*** lose power.

C. EDG-1A will start and load on the bus; the 'A' train EFIC control valves will fail full open.

✓D. EDG-1A will start and come up to speed but will not energize the bus; the 'B' train EFIC block valves will fail as is.

Reasons:

A. EDG-1A cannot load on the bus due to loss of field flashing.

B. The EFIC cabinet will lose power due to the loss of both of the dual input inverter power supplies.

C. EDG-1A cannot load on the bus due to loss of field flashing.

ROT 4-06 Section 1.2.7; ROT 4-64 Section 2.4; 2/3-C45

NEW

34. ROT-4-09 001/ B1/ ROT 5-01/ / 027AK3.02/ 2.9/ 3.0/ 11/ NNI/TS
The following plant conditions exist:

- Plant is at 100% power.
- RC-1-LT1 is selected for PZR level control.
- RC-1-LIR-1 and LIR-3 indicate 215" and steady.

The control room operator observes RC-1-LIR-1 decrease to 155" at ≈ 15" per minute. RC-1-LIR-3 is steady and normal makeup flow is unchanged.

Based on the above which of the following is the probable cause of these indications and the proper operator response?

A. RC-1-LT1 has failed. Swap to the alternate source per procedure and return the transmitter to operable status within 30 days.

B. RC-1-LT1 has failed. SASS will automatically transfer to the alternate source. Initiate repair efforts and return the transmitter to operable status within 72 hours.

✓C. Temperature input to RC-1-LIR-1 has failed. Swap to the alternate source per procedure and return the transmitter to operable status within 30 days.

D. Temperature input to RC-1-LIR-1 has failed. SASS will automatically transfer to the alternate source. Initiate repair efforts and return the transmitter to operable status within 72 hours.

Reasons:

A. If RC-1-LT1 failed the recorder would indicate 0" or off-scale high.

B. If RC-1-LT1 failed the recorder would indicate 0" or off-scale high. The rate of change is too slow for SASS to automatically transfer. TS allows 30 days for repair of the transmitter.

D. A failure of the temperature input will cause the recorder to indicate ≈ 160" at this power level however the rate of change is too slow for SASS to automatically transfer. TS allows 30 days for repair of the transmitter.

34. ROT-4-09 001/ B1/ ROT 5-01/ / 027AK3.02/ 2.9/ 3.0/ 11/ NNI/TS
TS 3.3.17 Condition A; ROT 4-09 Section 2.1.4 & Figure 5; 2/3-C27

NEW

35. ROT-5-01 003/A3///G2.1.4/2.3/3.4/55/TS

The following plant conditions exist:

- The plant is in Mode 3.
- One of the two available PPOs assigned to the Auxiliary Building slips and severely sprains his ankle while performing a walkdown of the Reactor Building.
- The PPO is contaminated and is escorted to the hospital by both available Health Physics technicians.

Which of the following describes the appropriate response, relating to shift staffing, for this situation?

A. No action is required. Minimum staffing levels are still met.

B. If it is two hours or less until shift turnover is scheduled to occur no action is required.

C. Another PPO should be called in immediately and should arrive within two hours.

✓D. Another HP technician should be called in immediately and should arrive within two hours.

Reasons:

A. A minimum of one HP technician is required when fuel is in the reactor.

B. Efforts must be made immediately to replace the HP technician within two hours.

C. Only one PPO is required to meet staffing levels.

TS 5.2.2; AI-500 Section 4.6; 1-S23

NRCM98

36. ROT-5-94 001/ B3/ / / E05EK2.1/ 3.8/ 4.0/ 44/ EOP-5

A step in EOP-05, Excessive Heat Transfer, states:

> IF at any time ES systems have,
> OR should have actuated,
> THEN ensure ES equipment is properly aligned.

If reactor coolant pressure is 1350 psig which of the following indications and associated operator responses is in compliance with this step?

A. The decay heat inlet valve to the reactor coolant system, DHV-5, has a green ES status light and the control board operator rotates the valve's switch to open it.

B. The "B" Building Spray Pump, BSP-1B, has an amber status light and the control board operator rotates the pump's control handle to start it.

C. High pressure injection valve, MUV-23, has a green status light and the control board operator rotates the valve's switch to open it.

✓D. The "A" Decay Heat Closed Cycle Cooling Pump, DCP-1A, has an amber status light and the control board operator rotates the pump's control handle to start it.

Reasons:

A. Pressure is too high for an LPI actuation to open DHV-5. A green light indicates it has opened inappropriately.

B. An HPI actuation will only give a permit for BSP-1B to start. The amber light was correct and the pump should not be started.

C. A green status light indicates the valve is already open. There is no need to manipulate the switch.

ROT 4-13 Table II; 2/3-C8

NRCCP97; NRCM98

37. ROT-4-52 001/ B19/ / / 004K1.15/ 3.8/ 4.0/ 33/ MU
The following plant conditions exist:

- RCS pressure has decreased to 1450 psig.
- Reactor building pressure is 1 psig.
- Makeup Tank outlet check valve, MUV-65, has seated.

Which of the following describes the Makeup Tank level response and cause for the change?

✓A. Increases because of RCP Controlled Bleed Off return flow.

B. Decreases because of high pressure injection flow into the reactor core.

C. Increases because of Makeup pump recirc return flow.

D. Decreases because letdown flow is isolated.

Reasons:

B. & D. BWST level head pressure is greater than MUT level head pressure making it the suction source for HPI flow.

C. Recirc valves are closed due to the HPI actuation at 1500 psig.

ROT 4-52 Section 4.4; 2/3-C35

Bank; NRC 11-93; ROTs J - T10A

38. ROT-4-26 002/ B1/ / / 036AK1.03/ 4.0/ 4.3/ 33/ FUEL HAND
While placing a fuel assembly into the core the following is observed:

- Count rate doubles on the source range instruments.
- RM-G16, Radiation Monitor for the RB Fuel Handling Bridge, is in alarm.
- Bubbles are emerging from the core.

Which of the following could have caused the above conditions?

✓A. A fuel assembly has been damaged.

B. The reactor has gone critical.

C. The fuel assembly has been placed in the incorrect location.

D. The decay heat removal train was alternated.

Reasons:

B. One doubling of the count rate is insufficient for criticality.

C. This should not cause RM-G16 to alarm or bubbles to emerge from the core.

D. This should not cause RM-G16 to alarm or the count rate to double.

FP-203 Section 4.7.1; 1-C31

NEW

39. ROT-5-14 001/ B6/ / / G2.1.2/ 4.0/ 4.0/ 33/ AI-505
What is the policy for CR-3 Nuclear Operations for bypassing automatic safety system actuations? (10 CFR 50.54 X/Y has not been invoked)

A. Reactor Operators have the authority to immediately bypass inadvertent Safety System Actuations. Informing the Procedure Director is not required.

B. Reactor Operators have the authority to bypass automatic Safety System Actuations as required but must immediately inform the Procedure Director afterwards.

C. Reactor Operators must obtain approval from the Procedure Director prior to bypassing automatic Safety System Actuations for which there is no procedural guidance.

✓D. Reactor Operators must obtain concurrance from the Procedure Director prior to bypassing automatic Safety System Actuations as directed by approved plant procedures.

Reasons:

A., B. & C. Per AI-505 the PROCEDURE DIRECTOR's CONCURRENCE must be obtained prior to bypassing a safety system during all phases of operation, including during the performance of EOP-13, EOP Rules.

Safety systems may be bypassed when directed by EVENT PROCEDURES and the PROCEDURE DIRECTOR has determined it is appropriate based on current plant conditions.

AI-505 Step 4.4; 1-C63

Bank ROT 5-14 #20; ROTs J - T5; NRC 5-93; ROTs M - T7

40. ROT-5-01 010/ B9/ / / 076AA1.04/ 3.2/ 3.4/ 11/ TS

The plant is at 100% full power when the letdown radiation monitor, RM-L1, fails high. Chemistry is notified and, after sampling, returns with the following data:

- Dose equivalent I-131 is 0.02 μCi/gm.
- Reactor coolant gross specific activity is 150/E-bar μCi/gm.

What technical specification action, if any, should be taken?

✓A. Be in Mode 3 with Tave < 500° F in six hours.

B. Verify dose equivalent I-131 within acceptable region and restore within 48 hours.

C. Verify gross specific activity within acceptable region and restore within 48 hours.

D. No technical specification action applies for these conditions.

Reasons:

B. Dose equivalent I-131 is within its technical specification limit.

C. Gross specific activity does not have an acceptable region, it is either within limit or not.

D. Gross specific activity is outside its technical specification limit.

TS 3.4.15; 2/3-C16

NRCCP97

41. ROT-4-87 001/ B9/ / / 061AA1.01/ 3.6/ 3.6/ 33/ CC VENT

Which of the following conditions best describes the configuration of selected Control Complex Ventilation system components after a RMA-5 Gas Actuation has occurred?

A. AHD-2C & 2E will be open.

✓B. The CC Normal Duty Supply Fans (AHF-17A/B) will trip.

C. The CC Ventilation system will be in the recirculation mode with a Normal Duty Supply fan (AHF-17A/B) running.

D. The selected Control Access Area Exhaust Fan (AHF-20A/B) will be running in fast speed.

Reasons:

A. These dampers will close.

C. The dampers will be aligned to the recirculation mode but the 17 fans will trip due to the RM-A5 actuation.

D. The 20 fans will remain running if in slow speed but will trip if in fast speed.

ROT 4-87 Section 1.1 & Figure 3; 1-C29

Bank ROT 4-87 #7

42. ROT-4-14 001/ B1/ / / 056K1.03/ 2.6/ 2.6/ 33/ CD CONTROL
Which of the following describes the direct signal that decreases condensate flow demand on a loss of one MFW pump at 80% power?

A. A signal from the deaerator high level interlock.

B. A runback signal from the ULD sub-section of the ICS.

C. A signal that compares existing FW flow, CD flow and hotwell level.

✓D. A signal that compares existing FW flow, CD flow and deaerator level.

Reasons:

A. This interlock will trip all running CDPs, not lower CD demand.

B. A runback will be in effect however there is no direct signal to condensate to lower demand.

C. FW flow and CD flow are compared to modifiy condensate demand. Hotwell level will increase but this will only modify the position of CDV-88, not actual CD demand.

ROT 4-14 Section 3.6.2 & Figure 9; OP-603 Step 3.1.6; 1-C42

NEW

43. ROT-5-01 004/B9///G2.1.11/3.0/3.8/55/TS

The following plant conditions exist:

- The plant is in Mode 3.
- The diesel fuel storage tank readings are as follows:

EDG "A" - 8' 2"
EDG "B" - 7' 1"

Which of the following describes the required action(s) for this situation?

A. Restore fuel oil to within limits in 48 hours.

B. Verify combined stored fuel oil level > 45,834 gallons within 1 hour.

C. Both EDGs are inoperable; restore one to operable status in 2 hours.

✓D. Immediately declare the "B" EDG inoperable and restore to operable status within 72 hours.

Reasons:

A. Only the second requirement of Condition B is met.

B. Condition A is not met with the storage tank levels given.

C. The "A" EDG remains operable.

TS 3.8.1 & 3.8.3; OP-103F pages 36 & 37; 2/3-S24

NRCM98

44. ROT-5-69 001/B3///067G2.4.27/3.0/3.5/33/AP-880

One of the followup actions in AP-880, Fire Protection, directs the operator to ensure RB fans are aligned for SW cooling if the fire is in the auxiliary building. Which of the following describes reason for performing this action?

A. The CI common supply and return valves could fail to the mid-position compromising the integrity of the SW system.

B. The CI common supply and return valves could fail closed resulting in a loss of cooling water to the RB fans and RCDT coolers.

C. The CI common supply and return valves could fail open resulting in increased condensation in the motor coolers of the RB fans.

✓D. The CI common supply and return valves could fail closed resulting in a loss of cooling water to the RB fans.

Reasons:

A., B. & C. The CI valves fail closed if a fire damages their control circuits resulting in a loss of cooling to the RB fans.

AP-880; 1-C13

Bank ROT 5-69 #1; ROTs J - T7, T9 & T10B; ROTs K - T2

45. ROT-5-34 003/ A4/ / / 034A2.01/ 3.6/ 4.4/ 55/ EM

A new fuel assembly was being positioned at the new fuel elevator for placement in the Spent Fuel Pool. A failure occurred with the lifting cable and the assembly fell into the SF pool and may have possibly hit another fuel assembly. As a precaution the Fuel Handling Area was evacuated. Control room operators noticed an increase in RM-A2 and local RMGs but none went above the "Warning" setpoint. Which of the following Emergency Classifications, if any, should be entered?

A. An Unusual Event should be entered.

✓B. An Alert should be entered.

C. A Site Area Emergency should be entered.

D. No Emergency Classification should be entered. The NSM should inform the MNPO and DNPO to determine additional actions to be taken.

Reasons:

A., C. & D. EM-202 states that if any release of radiation is evident, no matter how small, an Alert Classification will be entered.

EM-202 Enclosure 1 pages 10 & 15; 1-S18

NRCM98

46. ROT-5-01 008/ B9/ / / 015G2.1.12/ 2.9/ 4.0/ 11/ TS/COLR

The plant is operating in Mode 1 with 250 EFPD. The plant computer is Out-of-Service while in Mode 1. Power Range NIs are as follows:

NI-5 = 90.6%	NI-7 = 95.7%
NI-6 = 90.0%	NI-8 = 91.7%

Which of the following is the required RPS Overpower Trip setpoint for these conditions?

A. $\leq$ 92.00%

B. $\leq$ 95.88%

C. $\leq$ 96.90%

✓D. $\leq$ 100.78%

Reasons:

A., B. & C. The calculated QPT is + 4.02%. The maximum for the given conditions is 1.96%. TS 3.2.4 Condition A requires a 2% setpoint reduction for each 1% over the steady state limit. 104.9% - 4.12% = 100.78%.

TS 3.2.4; COLR; 2/3-S13

Bank ROT 5-01 #94

47. ROT-4-13 002/B6///013A4.01/4.5/4.8/33/ESAS

The following plant conditions exist:

- A LOOP has occurred.
- A steam leak in containment is in progress.
- RB pressure is 12 psig.
- RCS pressure is 600 psig.

Based on the above conditions which of the following describes the status of EFP-1, DHP-1A, DHV-5 and BSV-3?

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

Reasons:

A. EFP-1 and DHP-1A will not be running simultaneously with a LOOP. At this RCS pressure DHP-1A is only armed, but is not running.

C. EFP-1 will be running due to the EF block being actuated from the HPI/RBIC signal. BSV-3 would be open due to the RBIC signal.

D. EFP-1 will be running due to the EF block being actuated from the HPI/RBIC signal. At this RCS pressure DHP-1A is only armed, but is not running. DHV-5 would be open due to the RBIC signal.

47. ROT-4-13 002/ B6/ / / 013A4.01/ 4.5/ 4.8/ 33/ ESAS
ROT 4-15 Section 4.4.2 & 4.4.3; ROT 4-13 Tables 4 & 6; 2/3-C37

NEW

48. ROT-4-13 001/ B2/ / / 006A4.07/ 4.4/ 4.4/ 33/ ES

The following plant conditions exist:

- A controlled plant shutdown is in progress.
- RCS pressure is 250 psig.
- RCS temperature is 200° F.
- An RCS leak occurs and you elect to manually actuate LPI.

Based on the above conditions what would be the expected status of DHP-1A & 1B?

✓A. Neither DHP will start.

B. Both DHPs will start immediately.

C. Both DHPs will start 15 seconds following the manual actuation in their normal block loading sequence.

D. The "B" DHP will start 15 seconds following the manual actuation in its normal block loading sequence. The "A" DHP will not start until five seconds later if EFP-1 is running.

Reasons:

B. & C. Due to the given conditions the student must realize that both HPI and LPI have been bypassed. A manual initiation of the LPI actuation system will not start the decay heat pumps unless the HPI SEAL IN is present (Block 4 Loaded). These pumps will have to be started using the manual start switches or by actuating the HPI system.

D. The second portion of the distractor refers to an interlock in effect only if a LOOP is present and would trip EFP-1, not delay the start of DHP-1A.

ROT 4-13 Section 1.2.4, Table II & IV; 2/3-C49

NEW

49. ROT-4-91 001/B5///057AA1.01/3.7/3.7/11/VITAL/TS

The following plant conditions exist:

- The plant is in Mode 1.
- A failure in the 'A' inverter has caused its transfer switches to automatically swap to the alternate power supplies.
- Operations manually bypasses the inverter and transfer switches to assist troubleshooting activities.
- Electricians replace a circuit board and report that the inverter is functioning properly and ready to supply the vital buses.

Prior to re-alignment of the inverter and transfer switches which of the following describes the operability condition for this equipment?

A. The vital buses and inverter are *operable.*

B. The vital buses and inverter are *inoperable.*

✓C. The vital buses are operable but the inverter is inoperable until the transfer switches are placed back in service.

D. The inverter is operable but the vital buses are inoperable until the transfer switches are placed back in service.

Reasons:

A. The inverter is not operable until it is supplying the vital buses.

B. The vital buses are operable because they are energized to their proper voltages.

D. The inverter is not operable until it is supplying the vital buses.

TS 3.8.7 & 3.8.9; 1-C11

NEW

50. ROT-5-91 002/ F1/F2/ / / 2.4.35/ 3.5/ 3.5/ 33/ EOP-3
With LPI established at > 1400 gpm in both lines a step in EOP-3, Inadequate Subcooling Margin, instructs the PPO to unlock and close the CFT isolation valve breakers. Where are these breakers located and what is the purpose for this action?

A. ES MCC 3A & 3B; to allow the control room operators to open the valves to provide an additional source of makeup to the RCS.

B. ES MCC 3A & 3B; to allow the control room operators to close the valves to prevent nitrogen injection into the RCS after the tanks are emptied.

C. ES MCC 3AB; to allow the control room operators to open the valves to provide an additional source of makeup to the RCS.

✓D. ES MCC 3AB; to allow the control room operators to close the valves to prevent nitrogen injection into the RCS after the tanks are emptied.

Reasons:

A. Breakers are located on ES MCC 3AB. With LPI flow > 1400 gpm the CFTs have already emptied into the RCS.

B. Breakers are located on ES MCC 3AB.

C. With LPI flow > 1400 gpm the CFTs have already emptied into the RCS.

EOP-3 Step 3.37; ROT 5-91 Page 34; 1-C70

NEW

51. ROT-5-114 001/A2///002A2.01/4.3/4.4/44/AP-520

The following plant conditions exist:

- The plant is in Mode 3.
- RCS pressure is 2155 psig.
- RCS temperature is 534° F.
- MUV-31 has increased from 65% to 95% open.
- PZR level, after an initial decrease, is being maintained at setpoint.
- A Security Officer has called the control room to report water dripping from the ventilation ductwork in the Seawater Room.

Based on the above which of the following describes the EOP/AP that should be entered and probable plant conditions?

A. Entry Conditions for EOP-2, Vital System Status Verification, are met due to excessive RCS leakage.

B. Entry Conditions for EOP-5, Excessive Heat Transfer, are met. The PZR level decrease is due to the decrease in RCS temperature.

C. Entry Conditions for EOP-8, LOCA Cooldown, are met. The PZR level decrease is due to an RCS leak into the SW system.

✓D. Entry Conditions for AP-520, Loss of RCS Coolant or Pressure, are met. The PZR level decrease is due to an RCS leak into the SW system.

Reasons:

A. AP-520 Entry Conditions are met.

B. RCS temperature is normal for these plant conditions.

C. EOP-8 is only entered if directed to by another procedure.

ROT 5-114 Overview; AP-520 pages 1, 29 & 33; 2/3-S16

NRCM98

52. ROT-5-61 002/ B1/ / / 022A2.02/ / 3.2/ 33/ AP-330

Which of the following meets the entry conditions of AP-330, Loss of Nuclear Services Cooling ?

A. Power is lost to the "A" Emergency SW pump while SWP-1C is out of service.

✓B. A piping leak in the SW system results in reduced flow to components; numerous components have high temperature alarms and the temperatures are increasing .

C. Loss of make-up capabilities to the SW surge tank coupled with normal system leakage have resulted in the tank level decreasing to 8 feet.

D. A partially plugged CRD filter has resulted in a low flow auto start of the back-up SW booster pump and a high delta-P condition on the cooling line to the CRDs.

Reasons:

A., C. & D. 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.

AP-330; 1-S14

Bank

53. ROT-5-38 001/ B6/ / / G2.1.1/ / 3.8/ 33/ OI-07
During operation at 100% power a SASS monitoring channel is cycling in and out of alarm. Which of the following is the correct action which should be taken for this condition?

✓A. Open the associated annunciator alarm link per OI-07 and generate a work request.

B. Monitor the affected channel to determine the most valid indication and select that indicator using the control board (or cabinet) switch.

C. Monitor the affected channel to determine the most valid indication, select that indicator using the control board (or cabinet) switch and bypass the affected channel.

D. Bypass the affected channel and generate a work request to increase the "SASS MISMATCH" alarm setpoint.

Reasons:

B. & C. These actions would be taken if the alarm was in constantly.

D. A work request would be generated to repair the transmitter, not change the alarm setpoint.

OI-07 Step 4.2.1; OP-501 Step 4.7; 1-S22

Bank ROT 4-09 #58

54. ROT-4-06 004/B9///064G2.1.8/3.8/3.6/33/EDG

A step in SP-354A, Monthly Test of EDG-1A, requires the PPO to ensure that the Speed Droop is set to '60' and the Unit-Parallel switch to 'Parallel'. Where would you direct the PPO to go to perform these functions and why are they necessary?

A. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

✓B. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

C. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.

D. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.

Reasons:

A. Speed droop switch is located on the engine governor.

C. Speed droop switch is located on the engine governor. Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

D. Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

ROT 4-06 Section 4.6; SP-354A Step 4.4; 1-C57

NEW

55. ROT-4-12 001/ B3/ / / 012A3.01/ 3.8/ 3.9/ 33/ RPS

All power is lost to VBDP-4. Which of the following describes the response of the Reactor Protection System (RPS) and associated Control Rod Drive (CRD) interface?

✓A. RPS channel "B" will trip, and the "B" CRDM breaker will open.

B. RPS channel "A" will trip, and the "A" CRDM breaker will open.

C. RPS channel "B" will not trip, but the "B" CRDM breaker will open.

D. RPS channel "A" will not trip, but the "A" CRDM breaker will open.

Reasons:

B. VBDP-4 supplies the "B" RPS channel and would have no affect on the "A" RPS channel.

C. The loss of power to VBDP-4 would cause the "B" RPS channel to trip and along with it the "B" CRDM breaker.

D. VBDP-4 supplies the "B" RPS channel and would have no affect on the "A" RPS channel.

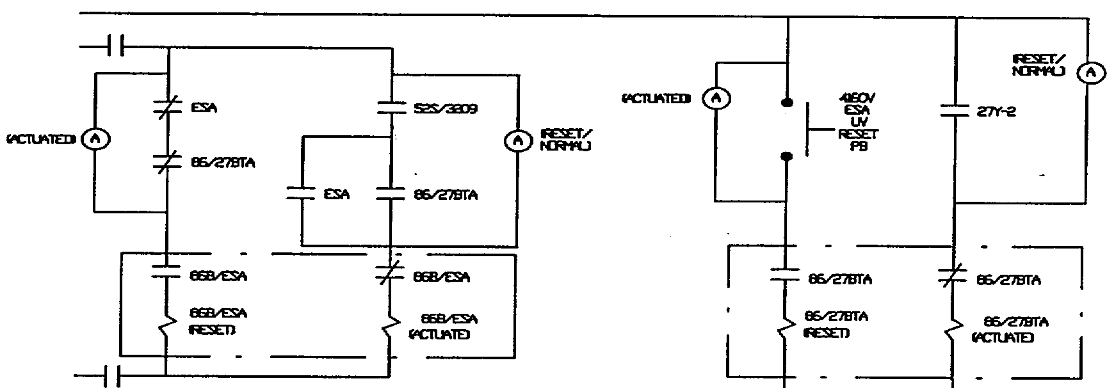
ROT 4-12 Section 1.3.1 & Figure 8; 1-S17

NRCCP97

56. ROT-2-20 001/ G3/ ROT-4-90/ / 062K4.01/ 2.6/ 3.2/ 77/ PRINTS

The following plant conditions exist:

- Unit is operating at 100% full power.
- A fault on the Offsite Power transformer de-energizes the "A" ES 4160V bus.
- After the "A" Emergency Diesel generator loads on the bus the "A" ES 4160V Undervoltage Lockout is actuated.



ES 4160 UV LOCKOUT CONTROL SCHEME

Using the above drawing which of the following will extinguish the "Actuated" lamp and illuminate the "Reset/Normal" lamp?

✓A. The undervoltage condition clears and the "Reset" pushbutton is depressed.

B. Breaker 3209 is opened and the "Reset" pushbutton is depressed.

C. The HPI actuation clears and the "Reset" pushbutton is depressed.

D. The HPI actuation clears, breaker 3209 is opened and the "Reset" pushbutton is depressed.

Reasons:

B., C. & D. The undervoltage condition must clear prior to any other action.

56. ROT-2-20 001/ G3/ ROT-4-90/ / 062K4.01/ 2.6/ 3.2/ 77/ PRINTS
ROT 4-90 pages 20 and 21; 2/3-S19

NRCCP97

57. ROT-4-60 004/ B6/ / / 007G2.4.46/ 3.5/ 3.6/ 33/ PORV

SP-379, PORV Exercise Test, is in progress with the following initial plant conditions:

- RCDT pressure is 2 psig.
- RCDT temperature is 90° F.
- RCDT level is 100".
- Tailpipe temperature is 100° F.
- RCS pressure is 700 psig.
- PZR level is 90".

Immediately after the PORV is cycled which of the following sets of conditions indicate that the stroke test was successful and the PORV is closed?

✓A. 'PORV Safety Valve Open' alarm is annunciated.
Tailpipe temperature is 320° F.
RCS pressure is 650 psig.

B. 'PORV Safety Valve Open' alarm is annunciated.
Tailpipe temperature is 220° F.
RCS pressure is 650 psig.

C. 'PORV Safety Valve Open' alarm is out.
Tailpipe temperature is 320° F.
RCDT temperature is 93° F.

D. 'PORV Safety Valve Open' alarm is out.
Tailpipe temperature is 220° F.
RCDT level is 103".

57. ROT-4-60 004/ B6/ / / 007G2.4.46/ 3.5/ 3.6/ 33/ PORV

Reasons:

B. Using the Mollier diagram temperature should equal 320° F. Using steam tables for 17 psia temperature would equal 220° F.

C. The 'PORV Safety Valve Open' alarm requires reset manually in the 4160V ES switchgear room. It this alarm was not in immediately after the PORV stroked then either the test failed or their is an alarm problem.

D. The 'PORV Safety Valve Open' alarm requires reset manually in the 4160V ES switchgear room. It this alarm was not in immediately after the PORV stroked then either the test failed or their is an alarm problem. Using the Mollier diagram temperature should equal 320° F. Using steam tables for 17 psia temperature would equal 220° F.

AR-501 EP 1959; SP-379 Step 4.6; 2/3-C60

NEW

58. ROT-4-91 003/ F2/ / / 058AA1.03/ 3.1/ 3.3/ 33/ VITAL PWR

Due to a switching error both the 'B' and 'D' battery charger's output breakers have been opened. What is the expected status light indication on the 'B' vital bus inverter for this condition?

✓A.	Normal Source Available	ON
	Battery Source Available	ON
	Normal Source Supplying Load	ON
	Battery Supplying Load	OFF
	In Sync	ON
B.	Normal Source Available	ON
	Battery Source Available	OFF
	Normal Source Supplying Load	ON
	Battery Supplying Load	OFF
	In Sync	OFF
C.	Normal Source Available	OFF
	Battery Source Available	ON
	Normal Source Supplying Load	OFF
	Battery Supplying Load	ON
	In Sync	ON
D.	Normal Source Available	ON
	Battery Source Available	OFF
	Normal Source Supplying Load	ON
	Battery Supplying Load	OFF
	In Sync	ON

Reasons:

B., C. & D. Losing the battery chargers supplying the 'B' inverter will not change the normal status indication due to the battery backup. Normal indication is listed in choice 'A'.

ROT 4-91 Sections 2.1 & 2.4.1.2; 2/3-C27

NEW

59. ROT-5-14 002/ B7/ / / G2.4.1/ 4.6/ 4.6/ 33/ AI-505

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 and the flume water level is almost empty.

Based on these conditions which of the following actions, and applicable reasons for these actions, should be performed?

A. Since RWP-1 and RWP-2B are not affected by this flume water level decrease continue with the plant shutdown per applicable OPs and inform maintenance personnel of the problem.

B. Trip the reactor and initiate EFIC due to the loss of CW cooling to the condenser.

C. Trip the reactor due to low PZR level.

✓D. Trip the reactor due to the loss of SW RW flow.

Reasons:

A. This failure will render RWP-1 and RWP-2B inoperable. The reactor should be tripped due to the loss of SW RW flow.

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.

AI-505 Enclosure 1; ROT 4-57 Section 1.4; 2/3-C67

NEW

60. ROT-5-48 001/A2///2.3.6/2.1/3.1/44/WASTE

The NSM/NSS must sign all radioactive liquid release permits prior to the initiation of the release. What is the purpose of this signature?

✓A. It serves to acknowledge and confirm the approval to complete the release.

B. It serves to acknowledge and confirm the appropriate liquid radiation monitor is operating properly.

C. It serves to acknowledge and confirm the estimated volume of fluid to be released.

D. It serves to acknowledge and confirm the estimated amount of radioactivity to be released to the environment.

Reasons:

B. This is done after the signature.

C. Volume of the release is determined by the size of the tank.

D. The signature acknowledges only the completion of the chemistry portion of the permit not the amount of reactivity release.

OP-407A Section 4.3; 1-S28

NRCM98

61. ROT-5-91 001/ G2/ / / 038EK3.06/ 4.2/ 4.5/ 77/ EOP/AP

EOP-06, Steam Generator Tube Rupture, has the following step:

> IF condenser is available,
> THEN notify SPO to
> **CONCURRENTLY PERFORM**
> EOP-14, Enclosure 6, OTSG
> Blowdown Lineup

Why is this step being performed?

A. Provides a means of OTSG pressure control if steaming is not permitted.

B. Provides an alternate means of OTSG pressure control if steaming is permitted.

✓C. Provides a path for OTSG inventory control if steaming is not permitted or is inadequate to keep up with the leak rate.

D. Provides a path for OTSG inventory control if steaming is permitted and is adequate to keep up with the leak rate.

Reasons:

A. & B. The blowdown lineup is not used for pressure control.

D. If steaming is adequate to maintain OTSG level then blowdown is not required.

EOP-6 Steps 3.3 & 3.36; 1-C24

Bank ROT 5-91 #13

62. ROT-4-26 001/B1///G2.2.29/1.6/3.8/33/FH
During refueling operations the following events occur:

- The main bridge operator is placing a fuel assembly into the core.
- The "Underload Limit" light is flashing in and out.
- The spotter is giving instructions to the bridge operator on the use and direction of the inching motor.

Which of the following is the Refueling Area Supervisor's responsibility in this situation?

✓A. Approve all further actions prior to them taking place.

B. Assume the role of the spotter and give directions.

C. Obtain permission from the Refueling Engineer in the control room to continue.

D. Initiate a "Stop Work" order for a significant fuel handling event.

Reasons:

B. The Refueling Area Supervisor shall not assume the duties of the spotter.

C. Only the Refueling Area Supervisor has this authority.

D. This does not meet the criteria for a significant fuel handling event.

FP-203 Section 3.4.33; 1-S26

NRCCP97

63. ROT-4-14 004/B1///G2.2.2/3.5/3.5/33/ICS

The following plant conditions exist:

- Plant is operating ≈ 20% power.
- SUCV position ≈ 95% open.
- LLCV position ≈ 5% open.

I & C technicians have requested that the 'B' train SUCV and LLCV hand/auto stations be taken to hand in order to record some data on the proportional/integral module supplying the input to these stations. Permission is received and these stations are placed in manual. After the technicians are finished, with no problems noted, preparations are made to return these stations to automatic.

Which of the following describes the appropriate actions to return these stations to automatic?

A. Place the SUCV in auto first, then place the LLCV in auto.

✓B. Place the LLCV in auto first, then place the SUCV in auto.

C. Open the SUCV to 100% to allow the LLCV full control. Place the LLCV in auto first and then the SUCV.

D. Close the LLCV to allow the SUCV full control. Place the SUCV in auto first and then the LLCV.

Reasons:

A. The LLBV must be open at this point. The SUCV cannot be placed in automatic first if the LLBV is open.

C. The SUCV and LLCV are operating as designed. The operator should not manipulate control valve position unnecessarily.

D. The SUCV and LLCV are operating as designed. The operator should not manipulate control valve position unnecessarily. The SUCV cannot be placed in automatic first if the LLBV is open.

63. ROT-4-14 004/ B1/ / / G2.2.2/ 3.5/ 3.5/ 33/ ICS
OP-504 Step 4.5; ROT 4-14 Section 7.1.7; 2/3-C64

Bank ROT 4-14 #110

64. ROT-5-97 001/B6///074EA1.12/4.1/4.4/33/ICC

EOP-3, Inadequate Subcooling Margin, has been entered due to a LOOP/LOCA event. Which of the following sets of conditions would require entry into EOP-7, Inadequate Core Cooling?

A. RCS pressure; 1965 psig
T_{hot}; 660° F
T_{incore}; 650° F
T_{cold}; 630° F

✓B. RCS pressure; 1875 psig
T_{hot}; 660° F
T_{incore}; 650° F
T_{cold}; 630° F

C. RCS pressure; 1705 psig
T_{hot}; 640° F
T_{incore}; 630° F
T_{cold}; 625° F

D. RCS pressure; 900 psig
T_{hot}; 550° F
T_{incore}; 552° F
T_{cold}; 540° F

64. ROT-5-97 001/ B6/ / / 074EA1.12/ 4.1/ 4.4/ 33/ ICC

Reasons:

Per EOP-3 you must be > 20° F superheat based on T_{incore} for entry into EOP-7. Absolute pressure values must be used with the steam tables.

A. T_{hot}; 26° F T_{incore}; 16° F

C. T_{hot}; 25° F T_{incore}; 15° F

D. T_{hot}; 16° F T_{incore}; >20° F if absolute values are not used.

EOP-3 Step 3.19; Steam Tables; 2/3-C14

NEW

65. ROT-4-15 001/ B10/ / / 061K5.01/ 3.6/ 3.9/ 33/ EFIC

Which of the following describes the reason for varying the rate of OTSG level increase in proportion to OTSG pressure when EFW is actuated?

A. To maintain steam pressure above a pre-determined value.

B. To assist the EFW overfill logic in controlling OTSG level.

C. To prevent excessive thermal shocking of the OTSG tube sheets.

✓D. To minimize RCS cooldown.

Reasons:

A., B. & C. The main reason to control EFW flow based on OTSG pressure is to minimize RCS cooldown.

ROT 4-15 Section 4.3.2; 1-C44

Bank ROT 4-15 #62

66. ROT-5-107 001/ B4/ / / 005AA2.03/ 3.5/ 4.4/ 33/ EOP-2

SP-333, Control Rod Excercises, is in progress with reactor power at 90%. While swapping to the auxiliary power supply for Group 4 a malfunction occurs and control rods 4-3 and 4-4 drop to 70% withdrawn and remain there. Which of the following action(s) should be taken.

✓A. Trip the reactor and enter EOP-2, Vital System Status Verification.

B. Reduce reactor power to 60% using AP-510, Rapid Power Reduction, and verify SDM limits are not exceeded.

C. Reduce reactor power to 60% using AP-545, Plant Runback, and verify SDM limits are not exceeded.

D. Reduce reactor power to 60% using OP-204, Power Operations, and verify SDM limits are not exceeded.

Reasons:

B., C. & D. Per AI-505 the operator should trip the reactor.

AI-505 Enclosure 1; 2/3-S3

NRCM98

67. ROT-4-60 003/ B10/ / / 003K6.14/ 2.6/ 2.9/ 33/ RCP

The following plant conditions exist:

- Plant is at 28% power.
- Preparations are in progress to re-start RCP-1A due to a spurious trip.

Which of the following will electrically prevent RCP-1A from being started? (consider only the effect on RCP interlocks for each failure)

✓A. Selected wide range T_{cold} signal input failed low.

B. Selected narrow range T_{cold} signal input failed low.

C. Common controlled bleed-off valve, MUV-253, closed.

D. Selected reactor power signal input failed low.

Reasons:

B. Narrow range scale is 520° F to 620° F. Interlock setpoint is > 465° F.

C. Only individual CBO valve open is required for pump start.

D. Only a high failure will prevent pump start.

OP-302 Step 3.1.12; ROT 4-9 Section 2.6.2; 2/3-C34

NEW

68. ROT-4-90 002/ B1/ / / 1013K2.01/ 3.6/ 3.8/ 33/ BUS POWER

With the plant at 100% power which of the following power sources could feed the 'B' ES 4160V bus?

A. Unit 3 Startup transformer, Offsite Power transformer, Backup ES transformer or the Unit Auxiliary transformer.

✓B. Offsite Power transformer, Backup ES transformer, EDG-1B or the Unit Auxiliary transformer.

C. Unit 3 Startup transformer, Offsite Power transformer, Backup ES transformer or EDG-1B

D. Offsite Power transformer, Backup ES transformer, MTDG-1 or EDG-1B.

Reasons:

A. & C. The Startup transformer is no longer able to feed the ES buses.

D. MTDG-1 can only feed 4160V Rx Aux Bus 3A.

ROT 4-90 Figure 17; 1-C36

NEW

69. ROT-4-77 001/ G2/ / / 008K3.01/ 3.4/ 3.5/ 33/ SC

SCP-1A has been in operation for two hours when the open limit switch on its discharge valve malfunctions, indicating the valve is not full open. Which of the following describes the plant response to this failure?

A. SCP-1A will trip, its discharge *and* suction valves will be demanded closed and SCP-1B will auto start 10 seconds later.

✓B. SCP-1A will remain in operation. No auto start signal will be generated for SCP-1B.

C. SCP-1A will trip, its discharge valve will be demanded closed and SCP-1B will auto start 10 seconds later.

D. SCP-1A will remain in operation because its discharge valve full open indication is only required for pump start.

Reasons:

A. The discharge valve must reach its full closed position to trip the pump. The suction valve will remain open even if the pump is demanded to trip.

C. The discharge valve must reach its full closed position to trip the pump.

D. The discharge valve must be full closed to start the pump.

ROT 4-77 Sections 2.1 & 2.2; 1-C61

NEW

70. ROT-4-90 001/ B7/ / / 055EA2.06/ 3.7/ 4.1/ 33/ EDG

The following plant conditions exist:

- A LOOP has occurred.
- 'A' EDG did not start due to an electrical lockout.
- 'B' EDG initially started and loaded on the bus and then the output breaker tripped open for no apparent reason. The EDG engine remained at 900 rpm.

Which of the following describes the electrical lockouts, at a minimum, which must be reset if both EDGs are to be loaded on the ES buses?

✓A. 'A' EDG - 86DG, generator differential current lockout
'B' EDG - 4160V undervoltage lockout

B. 'A' EDG - 4160V undervoltage lockout
'B' EDG - 4160V undervoltage lockout

C. 'A' EDG - 4160V undervoltage lockout
'B' EDG - 86DG, generator differential current lockout

D. 'A' EDG - 86DG, generator differential current lockout
'B' EDG - 86DG, generator differential current lockout

Reasons:

B. The 'A' EDG undervoltage lockout will not prevent the engine from starting.

C. The 'A' EDG undervoltage lockout will not prevent the engine from starting. The 'B' EDG engine would have shutdown if this lockout actuated.

D. The 'B' EDG engine would have shutdown if this lockout actuated.

ROT 4-06 Section 1.2.4; ROT 4-90 Section 2.5.5; 2/3-C10

NEW

71. ROT-4-12 003/ B4/ / / G2.4.2/ 4.1/ 4.1/ 33/ RPS/EOP-2

The following plant conditions exist:

PARAMETER	DATA
Rx power	90%
Linear amp power range	top 45 bottom 45
RCS T_{hot}	601
RCS pressure	1955
RCS flow	1.47×10^8 lbm/hr
RB pressure	+0.5 psig
RCP monitor	A 8,300 kw B 7,100 kw C 9,500 kw D 8,000 kw
Turbine control oil	99 psig
MFW control oil	114 psig

Based on the above data which of the following parameter changes will require immediate entry into EOP-2, Vital System Status Verification? (consider each option independently)

A.	Linear amp power range	top 30	bottom 60
✓B.	RCS pressure	1900 psig	
C.	RCP monitor	B 2152 kw	
D.	Turbine control oil	50 psig	

Reasons:

A. For this power level axial imbalance would need to be > 44.

C. Setpoint for loss of an RCP is < 1152 kw.

D. Turbine control oil pressure setpoint is 45 psig.

71. ROT-4-12 003/ B4/ / / G2.4.2/ 4.1/ 4.1/ 33/ RPS/EOP-2
TS Table 3.3.1-1; COLR; 2/3-C68

NEW

72. ROT-5-01 006/A1///069G2.2.26/2.5/3.7/44/TS

The plant is in Mode 6 with Refueling Operations in progress. The Refueling Shift Supervisor has been notified that SP-346, Containment Penetrations Weekly Check During Refueling Operations, has failed due to multiple containment penetrations not in their required status. Which of the statements below describes the minimum required actions?

A. Core alterations may continue but the HP Supervisor must verify that air flow at the RB Hatch is into the RB.

B. Core alterations may continue but the Reactor Building Purge System supply fans must be secured.

C. Immediately suspend all core alterations however movement of irradiated fuel in the fuel transfer canal may continue.

✓D. Immediately suspend all core alterations and movement and irradiated fuel within containment.

Reasons:

A., B. & C. TS 3.9.3 requires all core alterations and movement of irradiated fuel within containment be suspended immediately if one or more containment penetrations are not in their required status.

TS 3.9.3; 1-S7

NRCM98

73. ROT-5-31 001/ B3/ / / 068AA2.07/ 4.1/ 4.3/ 33/ AP-990

The following plant conditions exist:

- The plant is in Mode 3 with RCS pressure at 2150 psig.
- AP-990, Shutdown from Outside the Control Room, has been entered and transfer to the Remote Shutdown Panel is complete.
- MUV-31 has failed.
- The NSS directs that PZR level be maintained at an indicated ≈ 100 inches.

Which of the following actions should be taken and what would be the approximate actual PZR level for these conditions?

A. Open MUV-27 and direct the PPO to open MUV-30, bypass around MUV-31; ≈ 160 inches.

✓B. Use an available HPI valve; ≈ 160 inches.

C. Open MUV-27 and direct the PPO to open MUV-30, bypass around MUV-31; ≈ 40 inches.

D. Use an available HPI valve; ≈ 40 inches.

Reasons:

A. Per step 3.48 an available HPI valve should be used.

C. Per step 3.48 an available HPI valve should be used. Actual level for these conditions should be ≈ 160 inches.

D. Actual level for these conditions should be ≈ 160 inches.

ROT 4-09 Section 2.2.5; AP-990 Step 3.48; ROT 4-16 Section4.3.F; 2/3-S6

NRCM98

74. ROT-5-68 001/ B6/ / / 003AA2.03/ / 3.8/ 33/ AP-545

The following *initial* plant conditions exist at 100 EFPD:

NI-5	100%	Imbalance at 0
NI-6	100%	Rod Index of 282%
NI-7	100%	
NI-8	100%	

Fifteen minutes after an event the following conditions are observed:

NI-5	40%	Imbalance at -10
NI-6	50%	Rod Index of 250%
NI-7	50%	
NI-8	50%	

Which of the following could cause these indications?

✓A. Dropped rod.

B. Stuck rod in the fully withdrawn position.

C. Loss of one reactor coolant pump.

D. Boration event in progress.

Reasons:

B. Dependent on rod position in the core a single NI could indicate higher than the other three, but not lower.

C. & D. All NIs should indicate the same for these events.

AP-545; 2/3-S2

NEW

75. ROT-5-01 001/A1///001AK3.02/3.2/4.3/55/AP/TS

The following plant conditions exist:

- A Continuous Control Rod Motion event was in progress.
- AP-525 was entered and control rod motion was stopped.
- Initial reactor power was 30% with a Rod Index of 180.
- Final reactor power is 60% with a Rod Index of 200.

Based on the above conditions which of the following action(s), if any, should be initiated?

A. No action is required. Rod Index is acceptable for this power level.

✓B. Enter TS and verify F_Q and F^N DH are within limits once every two hours and restore regulating rod groups to within limits in < 24 hours.

C. Enter TS and initiate boration to restore SDM to > 1% Dk/k within 15 minutes and restore regulating rod groups to within restricted operating region in < 2 hours.

D. Enter TS and reduce thermal power to < the thermal power allowed by the regulating rod group insertion limits < 2 hours.

Reasons:

A. Conditions for entry into TS 3.2.1 are met.

C. & D. The rods are in the Restricted Region. These actions are only required if the rods are in the Unacceptable Region.

ROT 5-67 page vi; AP-525; TS 3.2.1 & SR 3.2.5.1; OP-103D Curve 1; 2/3-S1

NRCM98

76. ROT-4-59 001/F4///G2.3.11/3.2/3.2/11/LIQ WAST

You are about to start a release from ECST-A when you notice that there is a work request written on flow recorder WD-101-FR because of erratic indication. The SSOD gives his permission to perform the release with the recorder inoperable provided release rate data is taken every 15 minutes. At the start of the release ECST-A level is at 95%. The level is at 84% 15 minutes later. Which of the following was the release rate during this 15 minute period?

A. ≈ 25 gpm

B. ≈ 47 gpm

✓C. ≈ 62 gpm

D. ≈ 78 gpm

Reasons:

A., B. & D. Using OP-103F Figure 12 the following data is obtained.

If using 'tank volume' figures the answer is 62 gpm.
If using 'usable volume' figures the answer is 64 gpm.

Enclosure 4 of OP-407A uses 'tank volume' however the operator is not required to memorize this information. The selection of answers is sufficiently spaced to allow the correct choice with either set of figures used.

OP-103F Figure 12; 2/3-C66

Bank ROT 4-59 #26

77. ROT-5-100 001/ B3/ / / 055EK3.02/ 4.3/ 4.6/ 33/ EOP-12

A step in EOP-12, Station Blackout, directs the operator to actuate MS line isolation on both OTSGs.

Which of the following is the reason for this step?

✓A. To help control cooldown by minimizing the length of steam line available for steam control problems.

B. To prevent OTSG dry out due to the loss of main feedwater.

C. To maintain greater than 100 psig in the OTSGs due to the impact of the loss of power on turbine bypass valves.

D. To ensure OTSGs are isolated due to the impact of the loss of power on the MS line isolation logic.

Reasons:

B., C. & D. Even with RCS inventory losses minimized the crew must not permit any unnecessary cooldown of the RCS. Contraction from the cooldown could lead to emptying the Pressurizer and a saturated RCS (lack of makeup capability). This step eliminates possible sources of continued cooldown from the secondary plant.

ROT 5-100 Page 9; 1-C9

Bank ROT 5-100 #17; NRC 96; NRC 5-93; CP FPC final; ROTs M - T7

78. ROT-4-25 002/ B6/ / / 071A3.03/ 3.6/ 3.8/ 88/ RM

A small leak has just occurred in the Waste Gas Decay Tank area. Which of the following describes the *first* radiation monitor that should detect this leak and the automatic actuations that should occur?

A. RM-A4; trips AHF-10

✓B. RM-A3; trips AHF-11A/B and closes AHD-29 & 36.

C. RM-A3; trips AHF-11A/B, closes WDV-393, 394, & 395 (recycle isolation valves) and closes WDV-439 (common waste gas isolation).

D. RM-A11; closes WDV-393, 394, & 395 (recycle isolation valves) and closes WDV-439 (common waste gas isolation).

Reasons:

A. If RM-A4 trips then this action would occur. However RM-A3 will detect the gas leak first.

C. If RM-A3 trips it will not close the recycle valves or the common waste gas isolation valve.

D. If RM-A11 trips then these actions would occur. RM-A11 is not in service unless a waste gas release is in progress and will only trip if the preset release values are exceeded.

ROT 4-25 Table 4; 1-C47

NEW

79. ROT-5-61 003/ B6/ / / 062AK3.03/ 4.0/ 4.2/ 33/ SW

The following plant conditions exist:

- The plant is at 32% power.
- MUP-1B, SWP-1A, and RWP-2A are running.
- A failure in the 230KV switchyard caused the OPT feed from the switchyard to trip open but its normal feeder breaker to the ES bus did not open.

What is the appropriate operator response to this situation?

A. Trip the reactor and secure SW cooled components.

B. Ensure MUP-1B, SWP-1A and RWP-2A are still in operation.

C. Ensure SWP-1B and RWP-2B start; transfer MUP-1A to DC then start DCP-1A, RWP-3A; start MUP-1A.

✓D. Ensure SWP-1B and RWP-2B start; start DCP-1B, RWP-3B; align the makeup system to start MUP-1C; start MUP-1C.

Reasons:

A. The 'B' ES bus is still energized and can supply SW and RW cooling so the reactor is not required to be tripped.

B. & C. The 'A' ES bus is de-energized due to the loss of the OPT and the EDG being unable to load on the bus.

AP-330 Steps 3.2 & 3.15; ROT 4-88 Section 2.7; ROT 4-90 Section 2.1.3.1.n; 2/3-C12

NEW

80. ROT-4-57 001/ F2/ / / 025AK2.01/ 2.9/ 2.9/ 33/ RW

The plant is in Mode 5 with the 'A' DH train in service under steady state conditions. The control room operators observe a steady increase in RCS temperature. Which of the following describes a possible reason for this increase?

✓A. An increase in RWP-3A discharge pressure.

B. A decrease in the ΔT across the tube side of DCHE-1A.

C. RWV-150 has failed open and is raising the temperature in the raw water pit.

D. The temperature feedback loop for the DC control valves is malfunctioning and decreasing the DC flow through the DHHE.

Reasons:

B. A decreased ΔT is indicative of a clean heat exchanger.

C. The failure of this valve will only raise the temperature in the 'B' raw water pit.

D. A recent MAR has removed the temperature feedback loop for these valves.

ROT 4-57 Section 4.1; 2/3-C21

NEW

81. ROT-4-25 001/ B1/ / / 068K6.10/ 2.5/ 2.9/ 33/ RAD MON

The following plant conditions exist:

- The plant is in Mode 6 with refueling operations in progress.
- The 'A' DH Train is in service.
- A malfunction occurs in the Radiation Monitoring Panel which renders RM-L1, RM-L6 & RM-L7 inoperable.
- Control room operators notice a slow decreasing trend in refueling canal water level.

Which of the following combination of indications could be used to determine the reason for the decrease in refueling canal water level?

A. If the leak is into the SW system; RM-L3 would increase and SW surge tank level would increase.

✓B. If the leak is into the DC system; RM-L5 would increase and DC surge tank level would increase.

C. If the leak is into the SF system; RM-L5 would increase and DC surge tank level would remain constant.

D. If the leak is into the DC system; RM-L3 would increase and DC surge tank level would increase.

Reasons:

A. With refueling in progress RCS pressure cannot be above SW pressure.

C. RM-L5 will not detect a leak into the SF system.

D. RM-L3 will not detect a leak into the DC system.

ROT 4-25 Table 3; 2/3-C46

NEW

82. ROT-4-60 001/ B20/ / / 003A2.01/ 3.5/ 3.9/ 55/ RCP

The plant is operating at 100% full power with the following RCP seal data:

RCP SEAL STAGE PRESSURE (psig)

Time	2nd Stage RCP-1A	3rd Stage RCP-1A	2nd Stage RCP-1B	3rd Stage RCP-1B	2nd Stage RCP-1C	3rd Stage RCP-1C	2nd Stage RCP-1D	3rd Stage RCP-1D
0900	1300	700	1400	800	1550	900	1425	725
0910	1325	725	1375	825	1575	925	1425	775
0920	1300	700	1400	800	1550	950	1400	775
0930	1325	725	1400	800	1575	1035	1450	800
0940	1350	725	1400	800	1575	1125	1450	800
Dumpster clicks per minute at 0940.	3		2		3		2	

Based on the above data which of the following describes the proper course of action?

A. Immediately trip RCP-1C and allow the ICS to run back the plant.

B. Reduce power to < 72% per AP-510, Rapid Power Reduction, and trip RCP-1C.

✓C. Reduce power to < 72% per OP-204, Power Operations, and trip RCP-1C.

D. RCPs are all within expected leakage for the operating condition. Total RCS leakage should be verified by performance of SP-317.

Reasons:

A., B. & D. RCP-1C total seal leakage is 2.55 gpm and increasing gradually. Per OP-302, RCP Operation, the correct action is to reduce power to < 72% per OP-204, Power Operations, and trip RCP-1C.

82. ROT-4-60 001/ B20/ / / 003A2.01/ 3.5/ 3.9/ 55/ RCP
OP-302 Section 4.7.2 and Enclosures 3 & 4; 2/3-S12

NRCM98

83. ROT-4-69 002/ B8/ / / 055K3.01/ 2.5/ 2.7/ 33/ CONDENSER

The plant is operating at 60% 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 ΔT is 3° F.
- "A" Air Removal Pump, ARP-1A, has tripped.
- "B" Air Removal Pump, ARP-1B, has failed to auto-start.

Which 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. The main turbine is within procedural limits; condenser vacuum will continue to degrade.

D. The main turbine is within procedural limits; condenser vacuum will stabilize at a slightly lower value.

Reasons:

A. For this power level a turbine trip is not required unless condenser vacuum exceeds 5.5" Hg absolute.

B. For this power level a turbine trip is not required unless condenser vacuum exceeds 5.5" Hg absolute. Vacuum will continue to degrade after a turbine trip.

D. Vacuum will continue to degrade under these conditions.

83. ROT-4-69 002/ B8/ / / 055K3.01/ 2.5/ 2.7/ 33/ CONDENSER
OP-607 Step 3.2.4; 2/3-C56

Bank ROT 4-69 #31; NRC 96; ROTs K - Final 97; ROTs M - T5A

84. ROT-5-01 009/ B5/ / / 015A4.02/ 3.9/ 3.9/ 33/ TS/COLR

At 1600 the incore neutron flux detection system is declared inoperable. Power Range NIs indicate the following:

NI-5 = 85.0%	NI-7 = 95.0%
NI-6 = 89.5%	NI-8 = 93.5%

Which of the following is the calculated limiting Quadrant Power Tilt from the above NI readings?

A. + 6.3%

B. - 1.4%

✓C. + 4.7%

D. - 4.7%

A., B. & D.

$$QPT = 100\left(\frac{\textit{power in any core quadrant}}{\textit{average power of all quadrants}} - 1\right)$$

Using 95% with an average power of 90.75% the QPT is equal to +4.7%.

TS Definition; 2/3-C39

NEW

85. ROT-5-99 001/ B3/ / / 025G2.1.20/ 4.3/ 4.2/ 11/ AP-404

The following plant conditions exist:

- The plant is in Mode 5.
- The operating decay heat pump, DHP-1A, trips on overload.
- The standby decay heat pump, DHP-1B, is started, cavitates and trips.
- Reactor coolant level is 131'.
- Reactor coolant temperature is 93° F.
- Upper hand holds on the steam generator are removed.

Based on these conditions which of the following methods should be used to restore core heat removal?

A. Establish decay heat removal with DHP-1A.

✓B. Establish high pressure injection.

C. Establish steam generator heat removal.

D. Establish decay heat removal using spent fuel cooling.

Reasons:

A. DHP-1A should not be started until the reason for DHP-1B cavitation is corrected.

C. The RCS is not filled and OTSG integrity does not exist.

D. Due to seismic concerns spent fuel cooling is not to be used for decay heat removal.

AP-404 Steps 3.2 thru 3.15; 2/3-C22

Bank ROT 5-99 #14; ROT 5-78 B6 & B16; NRC 6-97

86. ROT-5-72 001/ B4/ / / 033A1.01/ 2.7/ 3.3/ 33/ AP-1080

Twenty minutes prior to completion of defueling activities the Spent Fuel (SF) pool level was 158 feet. Defueling has now been completed and the following plant conditions exist:

- Spent Fuel (SF) pool level is 156 feet and decreasing.
- The SF pool low level annunciator is in alarm.
- The transfer tube valves are open.
- The auxiliary building sump level is increasing.
- All other building sumps are stable.
- SFP-1B is operating; SFP-1A is secured.
- Reactor building pressure is 1 psig.

Which of the following could stop the decrease in Spent Fuel pool level?

A. Close the transfer tube valves.

✓B. Secure SFP-1B.

C. Transfer SF heat exchangers.

D. Secure the reactor building purge.

Reasons:

A. The leak is in the AB. Closing the transfer tube valves would only prevent the transfer canal level from decreasing.

C. If the heat exchanger had a leak then SW would be leaking into the SF system.

D. The purge may cause the pressure to lower in the reactor building, which would lower SF pool level slightly, but would not cause the AB sump level to increase.

ROT 5-72 Overview; AP-1080 Steps 3.7 thru 3.24; 2/3-C52

NRCCP97

87. ROT-5-68 002/ B4/ / / 059G2.4.49/ 4.0/ 4.0/ 33/ MFW/AP-545

The following plant conditions exist:

- Plant is at 70% power during three RCP operation.
- MFW Booster pump 1A suction valve receives a false signal and strokes 10% in the closed direction and then stops.

Which of the following describes the required operator actions for this condition?

✓A. Reduce power to 45%.

B. Manually trip one MFWP and reduce power to 45%.

C. Reduce power to 55% and manually trip MFW Booster pump 1A.

D. There will be sufficient flow through the valve since it is still 90% open. Troubleshooting efforts should be initiated immediately.

Reasons:

B. The plant must be above 75% power before the requirement to trip a MFWP is in effect.

C. With 3 RCP operation power must be reduced to 45%. The MFWBP would have automatically tripped as soon as the suction valve left its full open position.

D. The MFWBP would have automatically tripped as soon as the suction valve left its full open position.

AP-545 Steps 2.0 & 3.6; OP-605 Step 3.1.1; 2/3-C43

NEW

88. ROT-4-06 002/ B1/ / / E08EK2.1/ 3.7/ 3.9/ 33/ EDG/LOCA

EOP-8, LOCA Cooldown, is in progress. HPI and LPI actuated as designed and recovery efforts are in progress. The NSS directs you to shutdown the EDGs. Which of the following methods should be used to shutdown an EDG in this situation?

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.

D. The diesel is not loaded and ES must be bypassed or reset to secure the engine from the control room.

ROT 4-06 Sections 4.10.1 & 4.10.2; 1-C20

NEW

89. ROT-5-72 002/ B3/ / / 034K1.02/ 2.5/ 3.2/ 33/ AP-1080

The following plant conditions exist:

- Plant is in Mode 6 with refueling activities in progress.
- An RCS leak results in a decrease in refueling canal level.
- AP-1080, Refueling Canal Level Lowering, is entered.

A step in AP-1080 states:

> IF irradiated fuel is suspended form Main Fuel Handling Bridge, THEN notify bridge operator to place fuel in Rx vessel.
>
> IF irradiated fuel can NOT be placed in the Rx vessel, THEN notify bridge operator to place the fuel in an available upender and lower.

The primary concern addressed by this step is to:

A. Place the bridge in a condition where the operator can leave.

B. Place the bridge in the location where it will receive the least radiation exposure.

C. Place the fuel assembly in a location where it can be transferred to the spent fuel pool and the gates closed

✓D. Place the fuel assembly in a location where uncovery is least likely and shielding is maximized.

Reasons:

A., B. & C. This step assumes that level is lowering at a slow enough rate to allow the operator to move the fuel to a safe position without endangering personnel. Placing the assembly in an upender and lowering will ensure that the assembly is in the deepest part of the canal and should remain covered under all credible circumstances.

ROT 5-72 Overview; 1-C53

Bank ROT 5-72 #1

90. ROT-5-01 005/A1///G2.2.22/3.4/4.1/55/TS/RCS

During three RCP operation (RCP-1D secured) the following readings are recorded:

- RCS total flow	107×10^6 1bm/hr			
- RCS T_{hot}	"A" loop	605° F	"B" Loop	605° F
- RCS pressure	"A" loop	2055 psig	"B" Loop	2090 psig

Based on the above conditions what action(s), if any, are required to be taken?

A. No action required. All parameters are within limits with only three RCPs in operation.

B. A DNBR Safety Limit has been exceeded. Be in Mode 3 within one hour.

C. One DNB parameter is not within limits. Restore the parameter to within limits in two hours.

✓D. Two DNB parameters are not within limits. Restore the parameters to within limits in two hours.

Reasons:

A. & C. Two DNB parameters are not within limits.

B. The DNBR safety limit has not been exceeded per 2.1.1-1.

TS 3.4.1; TS Figure 2.1.1-1; 2/3-S25

NRCM98

91. ROT-4-15 002/B3///039K4.05/3.7/3.7/11/MSLI

During normal full power operation a circuit failure occurs which results in the "SV1/SV2 Test" white indicating light for MSV-411 to illuminate. Using this indication only which of the following choices best describes the status of the MSIV air supply system?

A. SV1 and/or SV2 have de-energized, MSIV-411 should close.

✓B. SV1 and/or SV2 have energized, MSIV-411 should close.

C. SV1 and/or SV2 have de-energized, MSIV-411 should not reposition.

D. SV1 and/or SV2 have energized, MSIV-411 should not reposition.

Reasons:

A. SV1 and/or SV2 have energized.

C. SV1 and/or SV2 have energized. MSV-411 should close.

D. MSV-411 should close.

SP-332 Steps 3.2.1, 3.2.7 & Figure 1; 1-C55

Bank ROT 4-15 #69

92. ROT-4-51 001/B2///017K4.01/3.4/3.7/33/INCORE

The "A" Saturation Monitor has been selected to "Incore" for its temperature input. Incore temperature input is 600° F and RCS pressure is 500 psia. Which of the following statements describes the temperature input signal and the status of core cooling which should be indicated by this Saturation Monitor?

A. The average of the 6 selected incore thermocouples indicate that subcooling margin has been lost but the core is being adequately cooled.

B. The highest of the 6 selected incore thermocouples indicate that subcooling margin has been lost but the core is being adequately cooled.

C. The average of the 6 selected incore thermocouples indicate that an inadequate core cooling event is in progress.

✓D. The highest of the 6 selected incore thermocouples indicate that an inadequate core cooling event is in progress.

Reasons:

A. The input is the highest of the 6 selected incores. For this pressure and temperature the core is not adequately being cooled.

B. For this pressure and temperature the core is not adequately being cooled.

C. The input is the highest of the 6 selected incores.

ROT 4-51 Section 2.4; 2/3-C40

NEW

93. ROT-3-03 001/B8///011EK1.01/4.1/4.4/33/NAT CIRC

Following a large break loss of coolant accident reactor coolant system pressure is 435 psig. Steam generator pressure is 140 psig. What should the hot and cold leg temperatures be if boiler-condenser heat transfer has been established?

A. T_h is 468° F; T_c is 428° F.

B. T_h is 456° F; T_c is 428° F.

✓C. T_h is 456° F; T_c is 360° F.

D. T_h is 448° F; T_c is 360° F.

Reasons:

T_{hot} should be saturation temperature for RCS pressure; T_{cold} should be saturation temperature for OTSG pressure.

A. T_h is superheated.

B. T_c is not coupled to the OTSG.

D. T_h is subcooled.

ROT 3-03 Section 4.0; 2/3-C2

Bank ROT 3-03 #38; NRC 6-97; ROTs M - T7

94. ROT-2-16 001/B8///062A2.15//3.2/33/ELECTRICAL

Preparations are in progress for closing the main generator output breaker. Which of the following conditions will cause a sudden large and possibly damaging mechanical torque to be exerted on the generator?

A. Generator is supplying a higher voltage than the grid.

B. Generator is supplying a lower voltage than the grid.

C. Generator frequency is 61 hertz.

✓D. Generator voltage is out of phase with the grid.

Reasons:

A. & B. With voltage amplitude not exactly matched there will be VAR flow into or out of the generator but this will only increase current slightly. There will be no mechanical torque applied.

C. With frequency slightly higher than the grid the generator will pick up real load and slow down. Current will increase but no damage will occur.

ROT 2-16 Section 7-19;1-S20

Modified Bank; ROT 2-16 #21

95. ROT-5-34 005/A1///G2.4.44/2.1/4.0/55/E-PLAN

Thirty (30) minutes after an event the plant conditions are as follows:

- RCS pressure is 600 psig and slowly decreasing.
- RCS temperature (incores) is 850° F and slowly increasing.
- RM-G29 is 27,000 R/hr.
- RM-G30 is 28,000 R/hr.
- MUP-1A and MUP-1B are running.
- Both BSPs are running.
- A release is underway.

Determine the correct Protective Action Recommendations for the conditions listed above.

A. No Protective Action Recommendations are required.

B. 0-2 miles, Evacuate 360°; 2-5 miles, Evacuate downwind sectors and shelter remaining sectors; 5-10 miles, Shelter downwind sectors.

C. 0-2 miles, Evacuate 360°; 2-5 miles, Evacuate 360°; 5-10 miles, Shelter 360°.

✓D. 0-2 miles, Evacuate 360°; 2-5 miles, Evacuate 360°; 5-10 miles, Evacuate 360°.

Reasons:

A., B. & C. Pressure and temperature conditions indicate Region 3 however RM-G29/30 readings indicate Region 4. With a release underway evacuation 0-10 miles is required.

EM-202 Enclosure 8; EOP-7 Figure 1; 2/3-S29

NRCM98

96. ROT-4-62 001/ B1/ / / 011EK2.02/ 2.6/ 2.7/ 33/ BS/LOCA

The ES Actuation System has failed to properly operate following a large break LOCA.

The following plant conditions exist:

- RCS pressure is 300 psig.
- Reactor Building pressure indicates 30 psig.
- No ES actuations have occurred.
- Health Physics reports detection of a severe containment radiation leak directly to the environment through a crack surrounding a penetration.

Which of the following actions would be the preferred method to reduce the radiation leakage to the environment?

A. Align both LPI/HPI suction from the RB sump and initiate flow.

B. Align RB purge using both supply and exhaust fans and initiate flow.

C. Start two RB fans in slow speed and initiate cooling.

✓D. Start two RB spray pumps and initiate cooling.

Reasons:

A. No advantage.

B. & C. Both of these actions will help reduce pressure however two RB spray pumps will reduce pressure much more rapidly.

EOP-13 Rule 1; 1-C1

Bank; NRC 5-93 & 11-93; ROTs J - T10B; ROTs M - T5A; ROTs M - 5B

97. ROT-4-81 001/G2///055AA1.02/2.6/2.8/33/IA

The following sequence of events have occurred:

- Instrument Air (IA) pressure drops to 70 psig.
- The air leak is then isolated.
- Air pressure recovers to 115 psig.

Which of the following describes the response of IAV-30 and required operator action(s), if any, to this sequence of events?

A. IAV-30 will close and automatically open when IA pressure increases above 80 psig.

B. IAV-30 will open and automatically close when IA pressure increases above 80 psig.

✓C. IAV-30 will close and must be manually reset and opened when IA pressure increases above 80 psig.

D. IAV-30 will open and must be manually reset and closed when IA pressure increases above 80 psig.

Reasons:

A. IAV-30 will not automatically open.

B. & D. IAV-30 closes at less than 80 psig.

ROT 4-81 Section 2.7; OP-411 Steps 3.1.7 & 4.1.6; 1-C30

NEW

98. ROT-5-01 007/B9///032AA2.04/3.1/3.5/55/TS
The following plant conditions exist:

- A reactor startup is in progress.
- The reactor is critical at 8 E-10 amps on both intermediate range instruments.
- NI-2 fails low.

Based on these conditions determine if SR/IR overlap could have been verified and the TS action(s) associated with the NI failure?

A. Adequate SR/IR overlap could not be determined prior to this failure. Immediately decrease power to ≤ 5 E-10 amps.

B. Adequate SR/IR overlap could not be determined prior to this failure. Restore channel to operable status prior to increasing thermal power.

C. Adequate SR/IR overlap could be determined prior to this failure. Restore channel to operable prior to entry into Mode 1.

✓D. Adequate SR/IR overlap could be determined prior to this failure. Restore channel to operable status prior to increasing thermal power.

Reasons:

A. Power level was adequate to determine proper overlap. Power does not have to be decreased, only maintained at current level until NI-2 is returned to operable status.

B. Power level was adequate to determine proper overlap.

C. This would be correct for an IR failure.

TS 3.3.9; ROT 4-10 Section 1.2.A & 2.2.F; 2/3-S10

NEW

99. ROT-5-116 003/ B6/ / / E04EK1.3/ 4.0/ 4.0/ 33/ EOP-13

The following plant conditions exist:

- During a plant heatup a Loss of Offsite Power occurred.
- EOP-02, Vital System Status Verification, immediate actions have been completed.
- Due to EFIC control problems EOP-4, Inadequate Heat Transfer, was entered and HPI/PORV cooling was established.

Ten minutes into the event the following plant conditions exist:

- AFW is established and feeding both OTSGs.
- HPI/PORV cooling has been secured.
- Subcooling margin is now 70° F and increasing (based on T_{incore}).
- PZR level is off scale high.
- T_{incore} is decreasing at 20° F per 1/2 hour.
- RCS pressure and temperature is above and to the left of the Nat Circ curve.

Which of the following describes the actions that should be taken in this situation and why is it being done?

A. HPI may be throttled because cooldown limits have been exceeded.

B. HPI must be throttled to restore PZR level since adequate subcooling margin exists.

C. HPI may be throttled when T_{cold} reaches 380° F to ensure NDT limits are not exceeded.

✓D. HPI must be throttled to minimize SCM because PTS guidelines are applicable.

Reasons:

A. Cooldown limits have not been exceeded. If limits were exceeded and T_{cold} was below 380° F then HPI must be throttled per Rule 4.

B. There is no HPI throttling criteria based on PZR level.

C. If cooldown limits were exceeded then HPI must be throttled for this condition. Cooldown limits have not been exceeded.

99. ROT-5-116 003/ B6/ / / E04EK1.3/ 4.0/ 4.0/ 33/ EOP-13
EOP-13 Rules 2 & 4; 2/3-C26

NEW

100. ROT-4-28 002/B17///001A3.05/3.5/3.5/33/CRD

The following plant conditions exist:

- A power increase is in progress.
- Group 7 rods are at 45% withdrawn when rod 7-4 sticks in place.
- PI panel indication is selected to RPI.

As the power increase continues which of the following indications could be used to determine that rod 7-4 is no longer moving?

A. Individual control rod position indication on PI panel.

B. Individual control rod position indication on plant computer.

C. Group average indication on MCB or plant computer.

✓D. Individual control rod amber fault light illuminates.

Reason:

A. & B. With RPI selected neither the PI panel or plant computer will indicate actual rod position, only rod position as a function of field rotation.

C. The group average cannot determine which particular rod is not moving.

ROT 4-28 Section 1.4.8; 2/3-C33

NEW

50-302

CRYSTAL RIVER 99-301 -- FEBRUARY 1999
INITIAL SUBMITTAL -- SIMULATOR
SCENARIOS (4 in book 1)

DISTRIBTION CODE
A070

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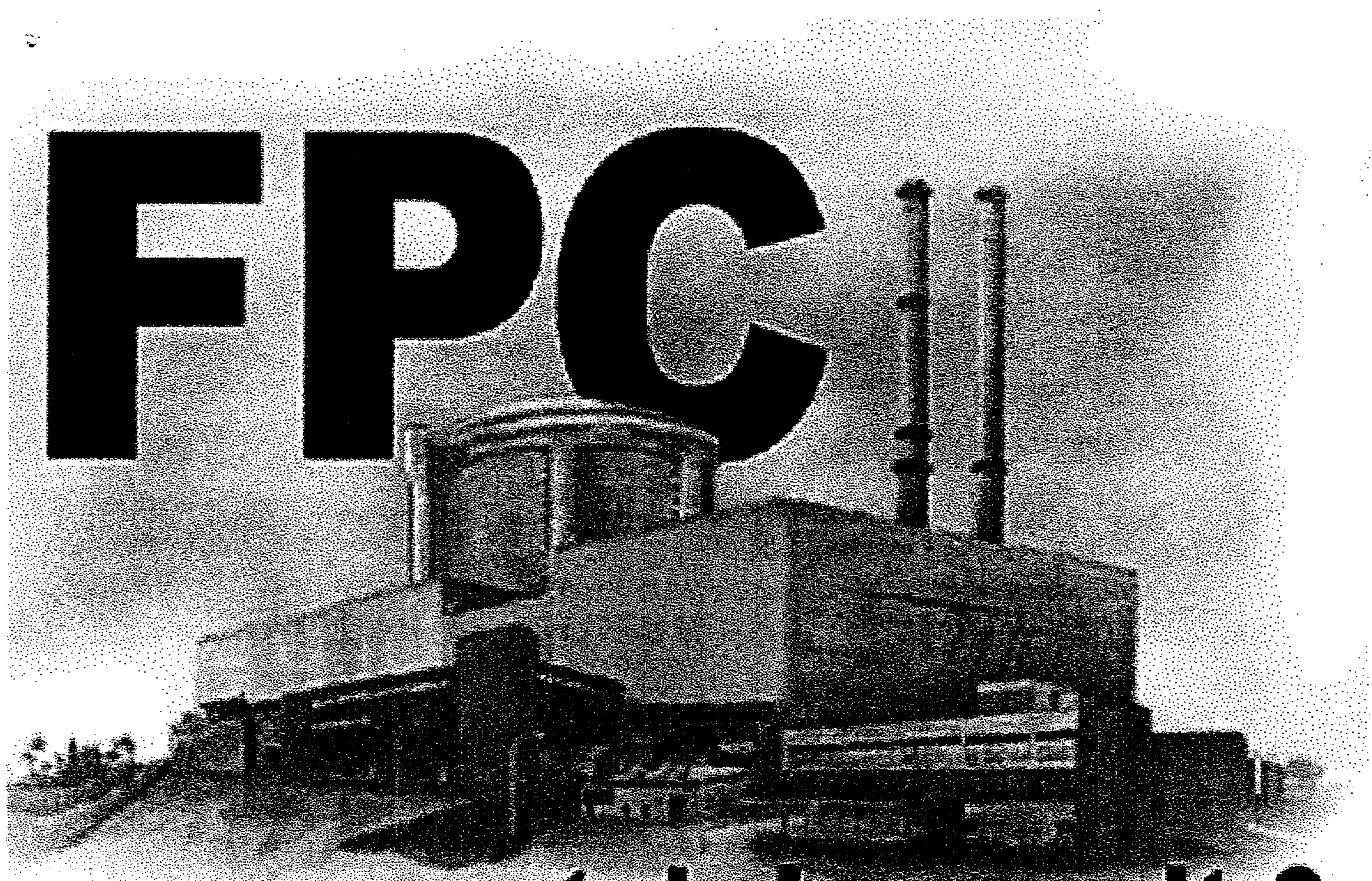


crystal river unit 3

1999

Operating Examination

Simulator Scenarios

Book One

OPERATING EXAMINATION SCENARIO OUTLINE

Facility: Crystal River Unit 3 **Scenario Number:** 1 **Operating Test Number:** 1

Examiners: ____________ **Operators:** ____________

Objectives:

1. Evaluate SRO candidates ability to manage shift resources and exercise command and control during normal and emergency conditions.
2. Evaluate SRO candidates ability to implement emergency and abnormal operating procedures.
3. Evaluate SRO candidates ability to interpret and apply Tech Specs associated with inoperable ES instrumentation and an inoperable Safety Rod.
4. Evaluate RO candidates ability to diagnose faulty ES pressure signal and place ES channel in a tripped condition IAW OP-507.
5. Evaluate RO/SRO candidates ability to diagnose and respond to a circulating water pump shaft failure.
6. Evaluate RO/SRO candidates ability to diagnose and respond to a dropped control rod and ICS runback failure. Actions IAW AP-545.
7. Evaluate RO/SRO candidates ability to diagnose and respond to a Pressurizer level instrument failure.
8. Evaluate RO/SRO candidates ability to diagnose and respond to a Pressurizer steam space leak (Small Break re-pressurizing LOCA) with an HPI pump failure.
9. Evaluate RO/SRO candidates ability to diagnose and respond to a loss of ASCM with both SPDS displays failed. Action IAW EOP-03 and Rule #1.
10. Evaluate RO/SRO candidates ability to diagnose and respond to a leak down stream of an HPI injection valve. Action IAW EOP-03.
11. Evaluate RO/SRO candidates ability to diagnose and respond to a loss of all HPI.

Initial Condition: 100% power, ICS in full automatic

Turnover Information: Demin water transfer pump WTP-6B is out of service for motor/pump realignment. WTP-6B is scheduled for return to service in 10 hours. EFP-2 is OOS and red tagged to mechanical maintenance for governor replacement. The plant is six hours into a 72 hour action statement based on TS 3.7.5(D). EFP-2 is scheduled to be released for post maintenance testing in 4 hours. MUP-1A is tagged to electrical maintenance to replace fuses in the DC start circuits. MUP-1A will be released from maintenance in two hours. SWP-1A is running while engineering performs an analysis of anomalous vibration readings taken during the last SP.

During the previous shift Breaker 1661 tripped - cause unknown. A line crew is in the 500 KV switchyard troubleshooting the breaker. Breaker 1661, MOS 1661N, and MOS 1661S are currently OPEN and red tagged to the dispatcher.

Event No.	Event type	Malf. No.	Event Description
1	(I) - BOP/SRO		ES channel 2 pressure transmitter (RC-3A-PT4) fails mid scale **(MALF)** . SRO evaluates and applies TS 3.3.5(A). ES Channel 2 is placed in "Tripped' condition IAW OP-507.
2	(C) - BOP/SRO (N) - ALL		CWP-1B degradation/Shaft failure **(MALF)**. Respond IAW AR-601 and OP-604. Shutdown faulty CWP Motor and reduce power to <85% IAW AP-510 or OP-204.
3	(C) - OAC/SRO (N) - BOP/SRO (R) -OAC		Control rod GP-1/Rod 2 drops **(MALF)**. ICS fails to runback **(MALF)**. SRO directs RO response IAW AP-545. SRO directs manual power reduction in response to ICS failure. SRO evaluates and applies TS 3.1.4(A) and 3.1.5(A).
4	(I) - ALL		Pressurizer level transmitter RC-1-LT1 fails high **(MALF)**. OAC establishes manual control of Pressurizer level. BOP selects operable instrument IAW OP-501.
5	(C) - ALL		Small Pressurizer steam space leak develops at Pressurizer level tap **(MALF)**. RCS pressure control cannot be maintained. SRO enters AP-520 and directs RO response. SRO should direct a manual reactor trip based on inability to maintain RCS pressure IAW AP-520.
6	(I) - OAC/SRO		When SRO directs a manual trip the Manual Reactor Trip Push-Button does not work. In addition RPS Channels A, B, and C will fail to actuate on "Low" and "Variable Low" RCS pressure **(MALF)**. RO diagnose failure of Rx Trip Push-Button and inform the SRO. SRO directs manual reactor trip using breakers 3305 and 3312 **(CT#1)**.
7	(MT) - ALL (C) - BOP/SRO (I) - ALL		When the reactor is trip, both SPDS displays go blank **(MALF)**. OAC/BOP will have to use the digital SCM monitor displays to determine when ASCM is lost. The SRO enters EOP-03 and directs RCPs shutdown within 2 minutes **(CT#2)**. HPI actuates and MUP-1C fails to auto start **(MALF)**. Once all HPI valves are open, flow for MUV-25 line reads 75 GPM higher than remain lines due to a passive leak down steam of valve **(MALF)**. SRO directs BOP to bypass/reset ES and close MUV-25 IAW EOP-03. **(CT#3)**
8	(MT) - All		MUP-1B shaft seizes **(MALF)**. SRO directs RO's IAW EOP-03 guidance for loss of all HPI capability **(CT#4)**
Scenario Duration		120 minutes	**Exercise Termination**: Plant is stable with cooing established by primary to secondary heat transfer. HPI recovery actions underway.

*(N)ormal evolution, (R)eactivity manipulation, (I)instrument failure, (C)omponent failure, (M)ajor transient

Narrative Summary:

About 3 minutes after shift turnover, RCS pressure transmitter RCA-3A-PT4 fails mid scale. RO's diagnose the failure and notify the SRO. The SRO evaluates and applies TS 3.3.5(A). SRO directs the BOP to place ES channel 2 in TRIP condition IAW OP-507, Section 4.1.2(C).

After ES channel 2 has been tripped, the crew will receive several alarms indicating problems with CWP-1B. The RO's should dispatch the SPO to evaluate. After about 2 minutes CWP-1B shaft fails. The SRO should direct the BOP to stop CWP-1B motor to minimize damage, and direct the OAC to reduce reactor power to <85% IAW AP-510 or OP-204.

When the plant is stable, Safety Rod 1-2 falls into the core. The OAC will diagnose the condition and the SRO will enter AP-545. ICS will fail to runback. OAC should diagnose the ICS failure. The SRO directs the OAC to manually reduce power. When the plant is $\leq$60% power the SRO evaluates and applies TS Actions 3.1.4(A) and 3.1.5(A).

Following the manual runback, Pressurizer level transmitter (RC-1-LT1) slowly fails high. The RO's diagnose the failure and notify the SRO. OAC will manually control Pressurizer level until operable instrument is selected. SRO directs BOP to select and operable instrument IAW OP-501.

When the alternate Pressurizer level instrument has been selected, a Pressurizer steam space leak slowly develops to the point where RCS pressure begins to degrade. The SRO enters AP-520 and directs RO response. The SRO should direct a manual reactor trip when RCS pressure reduction cannot be controlled IAW AP-520. The RPS "Low" and "Variable Low" pressure trips will fail to actuate in 3 of 4 RPS channels, preventing an automatic reactor trip on low pressure. The Manual Rx Trip Push-Button does not work. The SRO should direct the OAC to trip the reactor by opening Breakers 3305 and 3312. **(CT#1).**

Following the reactor trip, both SPDS displays go blank, RCS pressure continues to degrade, ASCM is lost, and HPI actuates. The RO's/SRO have to use the digital SCM monitors to determine when ASCM has been lost. RCP's are shutdown within 2 minutes IAW EOP-13 Rule 1 and EOP-03 **(CT#2)**. HPI and RBI&C are manually actuated IAW EOP-13 Rule 1. MUP-1C fails to start and the HPI flow for MUV-25 reads 75 GPM higher than the other lines. The SRO directs the BOP to attempt to manually start MUP-1C. The SRO directs the BOP to Bypass/Reset ES, close MUV-25 **(CT#3)**, and have MUV-25 power removed IAW EOP-03 guidance.

After MUV-25 has been closed and de-powered, the running HPI pump will suffer a shaft seizure. The SRO will recognize a total loss of HPI capability, cycles back to beginning of EOP-03, and direct the RO's to establish a maximum rate cooldown IAW with the EOP-03 guidance for total loss of HPI capability **(CT#4)**.

The exercise may be terminated when maximum primary to secondary heat transfer has been established and actions are in progress for recovering HPI flow capability.

Procedures to be used during this scenario:

OP-501	OP- 507	OP-604	OP-204
AP-510	AP-520	AP-545	
EOP-02	EOP-03		
Rule 1	Rule 2	Rule 3	Rule 4

Target Quantitative Attributes - Scenario 1	Actual Attributes
1. Total Malfunctions (5-8)	10
2. Malfunctions after EOP entry (1-2)	4
3. Abnormal Events (2-4)	2
4. Major Transients (1-2)	2
5. EOP's entered requiring substantive actions (1-2)	2
6. EOP contingencies requiring substantive actions (0-2)	3
7. Critical Tasks (2-3)	4

Op-Test No: N-1	Scenario No: 1	Event No: 1	Page 1 of 3

Initiation Cue: Examiner Initiated **Annunciator Alarms:** A-1-2 and D-1-2
Termination Cue: ES Channel 2 tripped IAW OP-507
Event Description: RC-3A-PT4 (wide range pressure to ES Channel 2 pressure) fails mid scale **(MALF)**. ES Channel RC2 (HPI) actuates but RC5 (LPI) does not actuate. RO's verify a spurious actuation and diagnose instrument failure. The SRO evaluates and enters TS 3.3.5(A). SRO directs RO's to place ES Channel 2 in tripped condition IAW OP-507, section 4.2.

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnose spurious actuation/RC-3A-PT4 failure • Ann Alarms ◆ A-1-2 "LOAD SEQUENCE BLOCK 2 ACTUATION A ◆ D-1-2 "LOAD SEQUENCE BLOCK 2 ACTUATION B ◆ A-1-3 "LOAD SEQUENCE BLOCK 3 ACTUATION A ◆ D-1-3 "LOAD SEQUENCE BLOCK 3 ACTUATION B ◆ A-1-4 "LOAD SEQUENCE BLOCK 4 ACTUATION A ◆ D-1-4 "LOAD SEQUENCE BLOCK 4 ACTUATION B ◆ A-1-5 "LOAD SEQUENCE BLOCK 5 ACTUATION A ◆ D-1-5 "LOAD SEQUENCE BLOCK 5 ACTUATION B ◆ A-1-6 "LOAD SEQUENCE BLOCK 6 ACTUATION A ◆ D-1-2 "LOAD SEQUENCE BLOCK 6 ACTUATION B • ES Channel 2 (RC2) Trip "A" & "B" Blue lamp Lit • HPI Channel 2, Blocks 1-6, "A" & "B" Blue Lamps Lit ◆ RC2 GP#1 BL#1 ◆ RC2 GP#2 BL#1 ◆ RC2 GP#3 BL#2 ◆ RC2 GP#3 BL#3 ◆ RC2 GP#3 BL#4 ◆ RC2 GP#3 BL#5 ◆ RC2 GP#3 BL#6 • RCS pressure stable • ES Channel 2 pressure buffer amp. failed mid-scale Verify ES components not responding to spurious Channel 2 actuation. Checks AR-301, AR-303, and AR-304 for alarms.

Op-Test No: N-1	Scenario No: 1	Event No: 1	Page 2 of 3

Initiation Cue: Examiner Initiated **Annunciator Alarms:** A-1-2 and D-1-2
Termination Cue: ES Channel 2 tripped IAW OP-507
Event Description: RC-3A-PT4 (wide range pressure to ES Channel 2 pressure) fails mid scale **(MALF)**. ES Channel RC2 (HPI) actuates but RC5 (LPI) does not actuate. RO's verify a spurious actuation and diagnose instrument failure. The SRO evaluates and enters TS 3.3.5(A). SRO directs RO's to place ES Channel 2 in tripped condition IAW OP-507, section 4.2.

Time	Position	Applicant's Actions or Behavior
	SRO	Verify spurious ES channel actuation. Ensure the RO's verify RCS pressure stable and that ES equipment is not responding to failure. Assist the RO's in diagnostics of ES Channel 2 pressure buffer amp. failure. Reviews Tech Specifications 3.3.5 (A) and declares ES Channel 2 in-operable. • Directs the BOP to place ES Channel 2 in "Tripped" condition per OP-507 for RC2 and RC5. Provides PEER check of BOP actions

Op-Test No: N-1	Scenario No: 1	Event No: 1	Page 3 of 3

Initiation Cue: Examiner Initiated **Annunciator Alarms:** A-1-2 and D-1-2
Termination Cue: ES Channel 2 tripped IAW OP-507
Event Description: RC-3A-PT4 (wide range pressure to ES Channel 2 pressure) fails mid scale **(MALF).** ES Channel RC2 (HPI) actuates but RC5 (LPI) does not actuate. RO's verify a spurious actuation and diagnose instrument failure. The SRO evaluates and enters TS 3.3.5(A). SRO directs RO's to place ES Channel 2 in tripped condition IAW OP-507, section 4.2.

Time	Position	Applicant's Actions or Behavior
	BOP	When directed by SRO, places ES Channel 2 (RC2/RC5) in tripped condition IAW OP-507, section 4.1. • Category 1 evolution • Select Channel 2 pressure test module to "Test-Operate" Position. • Verify proper ANN Alarm event points are in for ES Channel 2 tripped. ◆ 1020 LOADING SEQUENCE BLOCK 2 ACTUATION "A" ◆ 1021 LOADING SEQUENCE BLOCK 3 ACTUATION "A" ◆ 1022 LOADING SEQUENCE BLOCK 4 ACTUATION "A" ◆ 0851 LOADING SEQUENCE BLOCK 5 ACTUATION "A" ◆ 0852 LOADING SEQUENCE BLOCK 6 ACTUATION "A" ◆ 1023 LOADING SEQUENCE BLOCK 2 ACTUATION "B" ◆ 1025 LOADING SEQUENCE BLOCK 3 ACTUATION "B" ◆ 1026 LOADING SEQUENCE BLOCK 4 ACTUATION "B" ◆ 0853 LOADING SEQUENCE BLOCK 5 ACTUATION "B" ◆ 1019 LOADING SEQUENCE BLOCK 6 ACTUATION "B" ◆ 1029 LOADING SEQUENCE BLOCK EFP-1 ACTUATION "A" • Verify proper MCB status lights for ES Channel 2 RC2 & RC5 tripped on "A" and "B" sides. ◆ RC2 GP#1 BL#1 ◆ RC2 GP#2 BL#1 ◆ RC2 GP#3 BL#2 ◆ RC2 GP#3 BL#3 ◆ RC2 GP#3 BL#4 ◆ RC2 GP#3 BL#5 ◆ RC2 GP#3 BL#6 ◆ RC5 GP1 ◆ RC5 GP2
	OAC	Monitor Reactor and RCS during OP-507 actions.

Op-Test No: N-2	Scenario No: 1	Event No: 2	Page 1 of 1

Initiation Cue: Examiner Initiated **Annunciator Alarm:** M-3-3
Termination Cue: Plant power stabilized at < 85%.
Event Description: CWP-1B lube water flow degradation/Shaft failure **(MALF)**. Annunciator Alarm M-3-3 "CWP Low Lube Flow" (Event Point 0128 for CWP-1B)followed by Annunciator Alarm M-1-3 "CWP Vibration High" 1 minute later. If CWP-1B is not shutdown by the crew it's shaft will shear 45 seconds later. If the CWP-1B shaft shear occurs, ANN Alarm M-2-3 "CWP Discharge Pressure High/Low" will alarm. The RO's diagnose the failure and notify the SRO. SRO directs CWP-1B be shutdown. SRO directs power reduction to less than <85% IAW OP-604. AP-510 or OP-204 can be used for the power reduction.

Time	Position	Applicant's Actions or Behavior
	BOP/OAC	Diagnose CWP-1B lube water flow/Shaft failure. • ANN Alarm M-3-3 "CWP Lube Flow Low" alarm ◆ Event Point 0128 "CWP-1B Lube Water Flow Low • ANN Alarm M-1-3 "CWP Vibrations High" alarm (1 min. after M-3-3) • Low current reading CWP-1B (1 min. 45 sec after M-3-3) • ANN Alarm M-2-3 "CWP Discharge Pressure High/Low" alarm (2 min. after M-3-3) ◆ Event Point 0127 "CWP-1B Discharge Pressure Low" Check AR-601 for alarms Notify SRO of CWP-1B lube water problems Direct SPO to check out CWP-1B
	SRO	Ensures RO's check AR-601 for alarm guidance Direct BOP to shutdown CWP-1B Directs OAC to reduce power to <85% IAW OP-604. • Direct use of OP-204 or AP-510 • Specify rate of power reduction
	BOP	Shuts down CWP-1B Respond to ANN Alarms Notifies Dispatcher of power reduction
	OAC	Provide PEER check of BOP actions Reduce power IAW SRO directions • AP-510 or OP-204 • Set ICS rate to SRO direction • Reduce ULD to SRO direction Notify SRO when power < 85%

Op-Test No: N-1	Scenario No: 1	Event No: 3	Page 1 of 2

Initiation Cue: Examiner Initiated **Annunciator Alarms:** J-2-4, K-4-2, K-6-2
Termination Cue: Plant Runback to ≤ 60% and Technical Specification Evaluated
Event Description: Safety Rod 1-2 drops into the core **(MALF)** and ICS fails to automatically runback to ≤60% **(MALF)**. OAC does the immediate actions of AP-545 and diagnoses ICS is not running the plant back. OAC notifies the SRO of dropped rod and failure of ICS. SRO enters AP-545 and directs OAC to take SG/RX Bailey station to hand and perform plant runback to ≤60% IAW AP-545. Once the plant is ≤60% power, SRO evaluates and applies TS 3.1.4(A) and 3.1.5(A).

Time	Position	Applicant's Actions or Behavior
	OAC	Diagnose symptoms associated with a dropped rod. • ANN Alarm J-2-4 "CRD Asymmetric Alarm" • ANN Alarm K-4-2 "Asymmetric Rod Runback" • ANN Alarm K-6-2 "Unit Master In Track" • Group 1, Rod 2 position indication • Assy Rod lights on rod position panel and Diamond panel • Green In-limit Lamp for Rod 1-2 lit on PI Panel • Group 1 In-limit Lamp lit on Diamond Panel • Step decrease in reactor power • ICS FW cross-limit from reactor (K-3-3) Notifies SRO of dropped control rod
	SRO	Enters AP-545 and directs the OAC response to assy rod runback. Directs BOP to notify plant personnel
	OAC	Performs immediate actions of AP-545 • Diagnoses failure of ICS to run back Notifies SRO of ICS failure and need to manually reduce power.
	SRO	Direct OAC to reduce reactor power to ≤ 60% IAW AP-545. • Place SG/RX Bailey in hand and reduce reactor power to ≤ 60% • Monitor RCS pressure and Tave
	OAC	Establish manual control of ICS and reduces reactor power IAW SRO direction. • SG/RX Bailey to hand • Slowly lower SG/RX Bailey while monitoring ◆ RCS pressure ◆ RCS Tave ◆ Power Imbalance

Op-Test No: N-1	Scenario No: 1	Event No: 3	Page 2 of 2

Initiation Cue: Examiner Initiated **Annunciator Alarms:** J-2-4, K-4-2, K-6-2
Termination Cue: Plant Runback to $\leq$ 60% and Technical Specification Evaluated
Event Description: Safety Rod 1-2 drops into the core **(MALF)** and ICS fails to automatically runback to $\leq$60% **(MALF)**. OAC does the immediate actions of AP-545 and diagnoses ICS is not running the plant back. OAC notifies the SRO of dropped rod and failure of ICS. SRO enters AP-545 and directs OAC to take SG/RX Bailey station to hand and perform plant runback to $\leq$60% IAW AP-545. Once the plant is $\leq$60% power, SRO evaluates and applies TS 3.1.4(A) and 3.1.5(A).

Time	Position	Applicant's Actions or Behavior
	SRO	Monitors OAC actions during manual power reduction. When power is $\leq$60%, verify: • Plant stable • QPT within limits • Imbalance within limits • Rod index within limits • Thermal power $\leq$60%
	BOP	Monitors balance of plant during runback. Provide PEER checks of OAC actions. Respond to balance of plant ANN Alarms.
	SRO	Refers to and enters TS 3.1.4(A) and 3.1.5 (A)

Op-Test No: N-1	Scenario No: 1	Event No: 4	Page 1 of 2

Initiation Cue: Examiner Initiated **Annunciator Alarms:** K-3-2
Termination Cue: Alternate Pressurizer level instrument selected and Pressurizer Level control is back in AUTO.
Event Description: Pressurizer level instrument RC-1-LT1 fails high **(MALF)** The controlling Pressurizer level slowly fail high. Annunciator Alarm K-3-2 SASS Mismatch" comes in but failure rate is too slow for SASS to auto transfer. OAC notifies the SRO of the failure. SRO directs alternate signal source selection IAW OP-501. SRO evaluates TS and enters 3.3.17(A) for Post Accident Monitoring.

Time	Position	Applicant's Actions or Behavior
	OAC	Diagnose RC-1-LT1 instrument failure • ANN Alarm K-3-2 "SASS Mismatch" ◆ Event Point 0785 "Pressurizer Level Mismatch" • RC-1-LIR1 recorder indicates increasing level • RC-1-LIR3 recorder indicates stable level • ANN Alarm I-7-1 "Pressurizer Level High" ◆ Event Point 1372 "Reactor Coolant Pressurizer Level High" ◆ Event Point 1371 "Reactor Coolant Pressurizer Level High-High Reviews AR-501 and AR-503 for alarms Notifies the SRO of Controlling Pressurizer level instrument failure.
	SRO	Ensures RO's check AR-501 and AR-501 for alarm guidance. Direct OAC to control Pressurizer level in hand. Directs BOP to swap review OP-501 and select alternate instrument for Pressurizer level control. Reviews and enters TS 3.3.17(A) for PAM
	BOP	Select alternate instrument IAW OP-501 • Checks RC-1-LIR3 reading • Select RC-1-MS to LT3-Y position
	OAC	Acknowledges following alarms clearing: • I-7-1 "Pressurizer Level High ◆ Event Point 1371 "Reactor Coolant Pressurizer Level High-High" ◆ Event Point 1372 "Reactor Coolant Pressurizer Level High"

Op-Test No: N-1	Scenario No: 1	Event No: 4	Page 2 of 2

Initiation Cue: Examiner Initiated **Annunciator Alarms:** K-3-2
Termination Cue: Alternate Pressurizer level instrument selected and Pressurizer Level control is back in AUTO.
Event Description: Pressurizer level instrument RC-1-LT1 fails high **(MALF)** The controlling Pressurizer level slowly fail high. Annunciator Alarm K-3-2 SASS Mismatch" comes in but failure rate is too slow for SASS to auto transfer. OAC notifies the SRO of the failure. SRO directs alternate signal source selection IAW OP-501. SRO evaluates TS and enters 3.3.17(A) for Post Accident Monitoring.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs OAC to return Pressurizer level control to auto.
	OAC	Returns Pressurizer level control to auto • Selects M/V on MUV-31 • Adjust MUV-31 setpoint to put M/V on "Carrot" • Selects Position on MUV-31 • Selects MUV-31 to "Auto"

Op-Test No: N-1	Scenario No: 1	Event No: 5	Page 1 of 1

Initiation Cue: Examiner Initiated **Annunciator Alarm:** J-4-2
Termination Cue: SRO has directed that the Rx be tripped IAW AP-520.

Event Description: Small Pressurizer steam space leak develops on Pressurizer level tap **(MALF)**. RCS pressure begins to slowly degrade. RO's diagnose uncontrolled pressure reduction and notify the SRO. SRO enters AP-520 and directs RO's response to uncontrolled pressure reduction. After taking action of AP-520 to isolate possible leak locations, the SRO should direct Reactor Trip IAW AP-520.

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnose uncontrolled pressure reduction. • RCS pressure low and decreasing • Pressurizer heaters indicate full demand • ANN Alarm J-4-2 "RCS Pressure Low" (2055#) • RCS temperatures stable • Pressurizer level decreasing slightly Notifies the SRO of uncontrolled pressure reduction.
	SRO	Enters AP-520 and provides direction for uncontrolled pressure reduction • BOP sent to check Pressurizer heater amp meters on back of panel. • OAC directed to isolate spray line • OAC directed to Isolate PORV Directs OAC/BOP to monitor pressure trend following isolation When RCS pressure continues to decrease, directs OAC to trip Rx.
	BOP	Checks the Pressurizer amp meters on rear of panel. Report meter reading to SRO Assist OAC in monitoring RCS pressure Provide PEER checking of OAC actions
	OAC	Isolates Spray line IAW SRO direction. • Close RCV-13 • Close RCV-14 Isolate PORV IAW SRO direction • Close RCV-11 • Select Closed PORV Monitor RCS pressure following isolation. Notify SRO of continued pressure reduction. Depress Rx trip push-button when directed by SRO. (Button doesn't work.)

Op-Test No: N-1 Scenario No: 1 Event No: 6 Page 1 of 1

Initiation Cue: Rx Trip Push-Button fail to trip Rx.
Termination Cue: Rx Tripped and EOP-02 immediate actions completed.
Event Description: The Rx Trip Push-Button is failed. Channels "A", "B", and "C" setpoints are miss-calibrated so they do not trip on low pressure **(MALF)**. OAC diagnoses failure of Rx Trip Push-Button and informs the SRO. SRO directs OAC to manually trip the reactor by opening bkrs 3305/3312 **(CT#1)** and perform immediate actions of EOP-02.

Time	Position	Applicant's Actions or Behavior
	OAC	Diagnoses Rx Trip Push-Button failure Informs SRO of failure.
	SRO	Directs OAC to open breakers 3305 and 3312 **(CT#1)**.
	OAC	Trips the reactor by opening breaker 3305 and 3312 **(CT#1)**. Performs and verbalizes immediate actions of EOP-02 • Rx Trip Push Button Depressed • Groups 1 thru 7 verified in core • NI's indicate Rx is shutdown • Turbine Trip Push Button Depressed • TV's and GV's verified closed Notifies SRO of completion of EOP-02 immediate actions.
	BOP	Scans panel for alarms Monitors EFW if EFIC actuates on low level • EOP-13, Rule 3
	SRO	Enters EOP-02 and performs verification of EOP-02 immediate actions.
	OAC	Re-perform immediate actions of EOP-02 under SRO direction. • Rx Trip Push Button Depressed • Groups 1 thru 7 verified in core • NI's indicate Rx is shutdown • Turbine Trip Push Button Depressed • TV's and GV's verified closed

Op-Test No: N-1	Scenario No: 1	Event No: 7	Page 1 of 3

Initiation Cue: RCS Pressure <1500 and ASCM lost **Cue:** HPI actuation and SCM <50
Termination Cue: MUV-25 closed and de-powered.
Event Description: Following reactor trip, both SPDS displays go blank. RCS pressure continues to decrease and ASCM is lost. OAC/BOP diagnose the loss of ASCM using the digital SCM monitors and carry out action of EOP-13, Rule 1. SRO enters EOP-03 upon loss of ASCM and directs RCPs shutdown within 2 minutes **(CT#2)**. HPI actuates and MUP-1C fails to auto start **(MALF)**. HPI low range flow indications for MUV-25 read 75 gpm higher than the other three lines due to a passive leak down steam of the valve **(MALF)**. SRO directs BOP to Bypass/Reset ES and close MUV-25 IAW EOP-03

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Report failure of SPDS to SRO Diagnoses a loss of ASCM. • SCM monitors indicate < 50° with RCS pressure < 1500# Notifies the SRO of loss of ASCM Perform action of EOP-13, Rule 1 • Stop all RCP's within 2 minutes of loss of ASCM • Depress yellow "HPI MAN ACT" push button on Train "A" and "B". • Depress yellow "RB ISO MAN ACTUATION" push button on Train "A" and "B". Reports failure of MUP-1C to the SRO May report abnormal flow indication on MUV-25 narrow range flow. Notify SRO of EFIC actuation. (May have actuated earlier on OTSG low level but will be actuated be loss of all RCP's)
	SRO	Transitions to EOP-03 Ensures RCP's are shutdown within 2 minutes of loss of ASCM. Directs RO's actions IAW EOP-03. Should direct BOP to attempt start MUP-1C but does not get bogged down in MUP-1C recovery attempts. Should continue to progress through first 19 follow-up steps of EOP-03. Directs OAC to control EFW IAW EOP-13, Rule-3

Op-Test No: N-1 Scenario No: 1 Event No: 7 Page 2 of 3

Initiation Cue: RCS Pressure <1500 and ASCM lost **Cue:** HPI actuation and SCM <50
Termination Cue: MUV-25 closed and de-powered.
Event Description: Following reactor trip, both SPDS displays go blank. RCS pressure continues to decrease and ASCM is lost. OAC/BOP diagnose the loss of ASCM using the digital SCM monitors and carry out action of EOP-13, Rule 1. SRO enters EOP-03 upon loss of ASCM and directs RCPs shutdown within 2 minutes **(CT#2)**. HPI actuates and MUP-1C fails to auto start **(MALF)**. HPI low range flow indications for MUV-25 reads 75 gpm higher than the other three lines due to a leak down steam of the valve **(MALF)**. SRO directs BOP to Bypass/Reset ES and close MUV-25 IAW EOP-03

Time	Position	Applicant's Actions or Behavior
	BOP	Attempts to start MUP-1C when it fails to auto start. Notifies SRO of MUP-1C failed start attempt. When providing HPI flow data to SRO for step 3.6, notes abnormally high reading on MU-23-FI9 and cross checks its indications with MU-23-FI5-1. Notifies SRO that flow on MUV-25 line is higher than other three lines.
	OAC	Control EFIC IAW EOP-13, Rule-3 • <u>IF</u> OTSG level are <u>NOT</u> progressing towards the "ISCM" setpoint, <u>THEN</u> take manual control. ♦ EFW flow required for manual control: ◊ >280 gpm in 1 line to each OTSG.
	SRO	After review of HPI flow indications, should direct BOP to bypass/reset ES, close MUV-25, and have its power removed.

Op-Test No: N-1 Scenario No: 1 Event No: 7 Page 3 of 3

Initiation Cue: RCS Pressure <1500 and ASCM lost **Cue:** HPI actuation and SCM <50
Termination Cue: MUV-25 closed and de-powered.
Event Description: Following reactor trip, both SPDS displays go blank. RCS pressure continues to decrease and ASCM is lost. OAC/BOP diagnose the loss of ASCM using the digital SCM monitors and carry out action of EOP-13, Rule 1. SRO enters EOP-03 upon loss of ASCM and directs RCPs shutdown within 2 minutes **(CT#2)**. HPI actuates and MUP-1C fails to auto start **(MALF)**. HPI low range flow indications for MUV-25 reads 75 gpm higher than the other three lines due to a leak down steam of the valve **(MALF)**. SRO directs BOP to Bypass/Reset ES and close MUV-25 IAW EOP-03

Time	Position	Applicant's Actions or Behavior

	BOP	Obtain concurrence to bypass/rest ES
		
		Bypass/Reset ES
		• Depress black "HPI MAN TEST RESET" push buttons for Train "A" and "B"
		• Depress black "RB ISO MAN TEST RESET" push buttons for Train "A" and "B"
		• Bypass HPI automatic actuation
		    ◆ Select HPI Bypass for Trains "A" and "B"
		• Bypass/Enable RB Isolation automatic actuation if in.
		    ◆ IF RB >4#, Bypass RB Isolation for Trains "A" and "B"
		    ◆ IF RB <4#, Reset/Enable <u>OR</u> Bypass RB Isolation for Trains "A" and "B"
		
		Close MUV-25.
		
		Direct the PPO to remove power from MUV-25. (May select power off to MUV-25 and 26 on the main control board until PPO has removed power at the breaker.)

Op-Test No: N-1	Scenario No: 1	Event No: 8	Page 1 of 1

Initiation Cue: Examiner Initiated **Annunciator Alarm:** B-6-1
Termination Cue: Max Rate Cooldown Started IAW EOP-03.
Event Description: MUP-1B shaft seizure **(MALF)**. BOP diagnoses loss of MUP-1B, total loss of HPI capability. SRO cycles to start of EOP-03 and provides guidance for loss of all HPI capability. SRO directs OAC to establish and maintain maximum rate cooldown.

Time	Position	Applicant's Actions or Behavior
	BOP	Diagnoses loss of all HPI capability. • ANN Alarm B-6-1 "MU PP B TRIP" • HPI flows drop to 0 • RCS pressure decreasing • SCM decreasing Notifies SRO of MUP-1B failure and no HPI flow
	SRO	Cycles to start of EOP-03 IAW EOP-03 step 3.4 directs OAC to establish and maintain maximum possible cooldown rate. • Full open all ADV's and TBV's Should direct BOP to bypass " EFIC OTSG ISOL" when OTSG pressure < 725
	OAC	Establish and maintain maximum possible cooldown rate. • Full open all ADV's and TBV's
	BOP	Bypass EFIC OTSG ISOL when OTSG pressure < 725 • Depress "<725 PSI STM GEN PRESS ACT BYPASS" push buttons for all 4 EFIC channels.

Examination Setup/Execution
Scenario 1

Scenario Setup

1. [ ] Initialize the simulator to 100% power and UNFREEZE the simulator.
2. [ ] In the "NRCEXAM" directory of LESSON PLAN, start lesson plan # 1
3. [ ] Trigger Lesson Plan Setup Step

4. Perform the following actions.

- [ ] Place WTP-6B in Pull-To-Lock
- [ ] Start SWP-1A and Shutdown SWP-1C
- [ ] Open Output Breaker 1661
- [ ] Open MOS 1661N
- [ ] Open MOS 1661S
- [ ] Close MSV-55
- [ ] Close MSV-56

5. Place the following Red Tags on the main control panel:

- [ ] ASV-5
- [ ] ASV-204
- [ ] MSV-55
- [ ] MSV-56
- [ ] WTP-6B
- [ ] BKR 1661
- [ ] MOS 1661N
- [ ] MOS 1661S
- [ ] MUP-1A

6. Ensure clean copies of the following "consumable" procedures are in the control room procedure books.

- [ ] EOP-02
- [ ] EOP-03
- [ ] AP-520
- [ ] AP-545
- [ ] OP-501
- [ ] OP-604
- [ ] OP-507

7. [ ] Advance all MCB recorders and remove line printer printouts and ensure ON-LINE.
8. [ ] Ensure all grease pencil marks on indicators and recorders are removed.
9. [ ] Ensure Batch Controller is Reset.
10. [ ] Ensure SPDS screens are Reset.
11. [ ] Review Turnover Sheet and ensure the simulator setup agrees with Turnover.
12. [ ] FREEZE the simulator and notify the lead examiner that simulator is ready to begin.

Scenario Execute

1 **When notified by the lead examiner**, UNFREEZE the simulator.

2 **ES CHANNEL 2 PRESSURE FAILS TO 1250#**

When notified by the lead examiner, TRIGGER Lesson Plan Step #1 "Event 1 - ES Channel 2 Press Fails Mid-Scale (RC-3A-PT4)"

3 **CWP-1B FLUSH WATER PROBLEM/SHAFT SHEAR**

When notified by the lead examiner, TRIGGER Lesson Plan Step #2 "Event 2 - CWP-1B Shaft Failure"

3.1 If TBO sent to check CWP-1B, wait five (5) minutes then report that there is steam coming out of upper packing area on the pump shaft.

3.2 If TBO sent to put SCHX-1B in service, TRIGGER Lesson Plan Step #11 "Open SCHX-1B Inlet and Outlet Valves (SCV-7 & 8)"

3.3 If TBO directed to take SCHX-1A out of service, TRIGGER Lesson Plan Step #12 "Close SCV-6 on SCHX-1A"

3.4 If TBO directed to close ARV-46, TRIGGER Lesson Plan Step #13 "Close ARV-46"

4 **DROPPED ROD 1-2 NO ICS RUNBACK**

When notified by the lead examiner, TRIGGER Lesson Plan Step #3 "Event 3 - Dropped Rod 1-2 No ICS Runback"

4.1 If TBO sent to check on ASV-27 operation when <80%, wait 2 minutes then report AS swap to MS has occurred and ASV-27 controlling normally.

5 **PZR LEVEL INST FAILS HIGH (RC-1-LT1)**

When notified by the lead examiner, TRIGGER Lesson Plan Step #4 "Event 4 - PZR Level Inst Fails High (RC-1-LT1)"

6 **PZR STEAM SPACE LEAK**

When notified by the lead examiner, TRIGGER Lesson Plan Step #5 "Event 5 - PZR Steam Space Leak"

6.1 When TBO directed to do EOP-14 enclosure #1, TRIGGER Lesson Plan Step #14 "EOP-14 enclosure #1 actions"

Do not report completion of actions for at least 5 minutes.

6.2 RCS pressure will continue to decrease post trip and result in a loss of ASCM.

6.3 When PPO directed to perform EOP-14 enclosure #2, TRIGGER Lesson Plan Step #15 "EOP-14 enclosure #2 actions"

When 15 minutes have passed, call the control room as the PPO and ask which H_2 analizer to line up and which sample point is to be used.

7 **MUP-1B SHAFT SEIZURE**

If notified by the lead examiner, TRIGGER Lesson Plan Step #8 "Event 8 - MUP-1B Shaft Seizure"

EXAM N-1
TURNOVER

A. Initial conditions:

1. Time in core life - 247 EFPD
2. Rx power and power history - 100% for > 7 days
3. Boron concentration - 1025 PPMB
4. Xenon - Equilibrium
5. RCS Activity - Fuel 0.0005 uCi/ml

B. Tech. Spec. action requirement(s) in effect: 3.7.5(D) EFP-2 red tagged to mechanical maintenance for governor replacement. 6 hours into 72 hour action statement. EFP-2 is scheduled to be released for post maintenance testing in 4 hours.

C. Clearances in effect:

1. EFP-2 for governor replacement
2. WTP-6B (Demin Water Transfer Pump) for motor/pump realignment
3. MUP-1A to electrical maintenance to replace control power fuses. MUP-1A will be returned to service in two hours.
4. Breaker 1661, MOS 1661S, and MOS 1661N to Dispatcher. Breaker 1661 tripped on previous shift (cause unknown). Line crew in 500 KV switchyard trouble shooting the breaker.

D. Significant problems/abnormalities:

1. SWP-1A is running while engineering performs an analysis of anomalous vibration reading taken during last SP. Vibrations were within allowable limits but had increased from previous SP.

E. Evolution's/maintenance for the on-coming shift: Perform post maintenance test of EFP-1 and MUP-1A when released from maintenance.

F. Units 1 and 2 status: On-Line

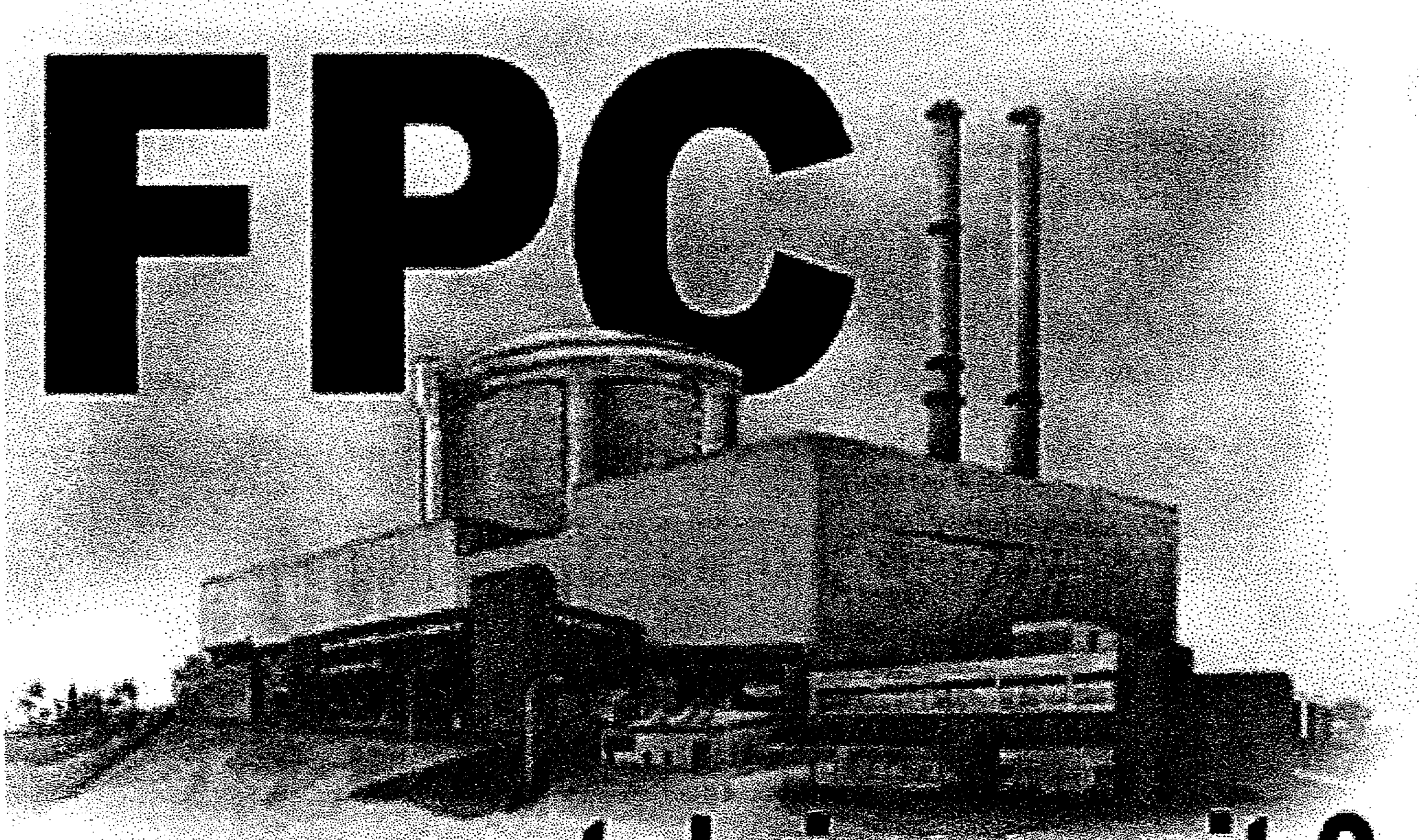
G. Units 4 and 5 status: On-Line

H. SSOD - Instruct the RO's to walk down the main control board and provide you with the following data:

1. RCS Average Temperature __________
2. RCS Pressure __________
3. Pressurizer Level __________
4. Make-up Tank Level __________
5. Turbine Load __________
6. Turbine Reference __________

NOTE: If full implementation of the emergency plan is not required for this exam.

FPC



crystal river unit 3

1999

Operating Examination

Simulator Scenarios

Book One

OPERATING EXAMINATION SCENARIO OUTLINE

Facility: Crystal River Unit 3 **Scenario Number:** 2 **Operating Test Number:** 1

Examiners: ______________________ **Operators:** ______________________

Objectives:

1. Evaluate SRO candidates ability to manage shift resources and exercise command and control during normal and emergency conditions.
2. Evaluate SRO candidates ability to implement emergency and abnormal operating procedures.
3. Evaluate SRO candidates ability to interpret and apply Tech Specs associated with an inoperable EFIC channel and an inoperable SWP.
4. Evaluate RO candidates ability to place a main feedwater pump to automatic control. Actions IAW OP-504.
5. Evaluate RO/SRO candidates ability to perform a Plant/Turbine startup. Actions IAW OP-203.
6. Evaluate RO candidates ability to diagnose and respond to a RCP seal injection total flow instrument failure. Actions IAW SRO direction.
7. Evaluate RO/SRO candidates response to a "B" ES 4160 bus undervoltage. Actions IAW AP-770.
8. Evaluate RO candidates response to a loss of SWP-1A. Actions IAW AR-303.
9. Evaluate RO/SRO candidates response to an OTSG SU Level transmitter failure. Actions IAW SRO direction and OP-501 (SASS).
10. Evaluate RO/SRO candidates response to a SG Tube rupture. Actions IAW EOP-06.
11. Evaluate RO/SRO candidates ability to diagnose and respond to a post trip over cooling transient.

Initial Condition: Plant startup in progress. Reactor power at 10%, Turbine ready to roll.

Turnover Information: Demin water transfer pump WTP-6B is out of service for motor/pump realignment. WTP-6B is scheduled for return to service in 10 hours. EFP-2 is OOS and red tagged to mechanical maintenance for governor repair. EFP-2 was taken OOS after entry to Mode 1. The plant is one hour into a 72 hour action statement based on TS 3.7.5. (D) for EFP-2. EFP-2 is scheduled to be released for post maintenance testing in 4 hours. MUP-1A is tagged to electrical maintenance to replace fuses in the DC start circuits. MUP-1A will be returned to service in two hours. SWP-1A is running while engineering performs an analysis of anomalous vibration readings taken during the last SP.

During the previous shift, Breaker 1661 developed a quench gas leak. A line crew is in the 500 KV switchyard trouble shooting the breaker. Breaker 1661, MOS 1661N, and MOS 1661S are currently OPEN and red tagged to Dispatcher.

During the power escalation, FWP-2A was selected to manual due to minor speed oscillations. I&C identified a noisy DP signal as the source of the oscillation. Repairs and post maintenance testing are complete. FWP-2A ready to be restored to automatic.

Event No.	Event Type*	Malf. No.	Event Description
1	(N) - OAC/SRO		Transfer FWP-2A H/A station to ICS Auto control IAW OP-504
2	(N) - ALL (R) - OAC		Manually increase reactor power and commence the main turbine startup IAW OP-203, Sections 4.2 and 4.3.
3	(I) - OAC/SRO		EFIC OTSG "B" Pressure transmitter fail high **(MALF).** "B" OTSG ADV (MSV-26) opens in response to the failed signal. SRO directs OAC to manually close MSV-26 **(CT#1).** SRO evaluates and applies TS 3.3.11(A) and 3.3.11(C).
4	(I) - BOP/SRO		RCP Seal injection total flow transmitter fails high **(MALF).**
5	(C) - BOP/SRO		Breaker 3206 trips **(MALF).** "B" ES 4160 Bus dead. "B" EDG starts and loads. Response IAW AP-770.
6	(C) - BOP/SRO (N) - BOP/SRO		SWP-1A shaft shear **(MALF).** SWP-1B fails to auto start **(MALF).** Letdown isolates on high temperature due to loss of SW flow. SRO directs the BOP to start SWP-1B **(CT#2).** SRO evaluates and applies TS 3.3.7(A). SRO directs BOP in recovery of Letdown IAW EOP-14 enclosure 4 or OP-402.
7	(I) - OAC/SRO		"A" OTSG SU level transmitter fail low **(MALF).** "A" OTSG overfeed. Actions IAW OP-501. **(OPTIONAL)** SU level transmitter input transferred to good instrument IAW OP-501.
8	(C) - ALL (R) - OAC		"B" OTSG 60 GPM tube leak **(MALF).** Actions IAW EOP-06.
9	(MT) - ALL		When reactor is tripped per EOP-06 "A" TBV H/A station transfers to Hand resulting in an post trip overcooling event **(MALF).** SRO directs actions to terminate overcooling event **(CT#3).** Actions IAW AI-505 or EOP-05.
10	(MT) - ALL		"B" OTSG tube leak rate increases to >400 GPM **(OPTIONAL)** Actions IAW EOP-06.
Scenario Duration		120 minutes	**Exercise Termination:** Post trip overcooling event terminated. RCS pressure stabilized. Plant cooldown and de-pressurization in progress in accordance with EOP-06.

*(N)ormal evolution, (R)eactivity manipulation, (I)instrument failure, (C)omponent failure, (M)ajor transient

Narrative Summary:

The crew reviews L&P associated with the plant startup. The SRO directs the OAC to transfer FWP-2A to ICS automatic control. The OAC places FWP-2A in auto IAW OP-504, section 4.7. The SRO then directs the crew to continue the plant startup IAW with OP-203. The OAC increases reactor power, the BOP performs the turbine startup IAW OP-203 and SRO direction.

When turbine is at 400 RPM, "B" EFIC Channel OTSG pressure transmitter for "B" OTSG (MS-111-PT) fails high. "B" OTSG ADV (MSV-26) opens in response to the failed signal. "B" OTSG pressure decreases. RO's diagnose instrument failure and improper "B" ADV response. OAC selects "B" ADV to manual and closed **(CT#1)**. SRO evaluates and applies TS 3.3.11(A) and 3.3.14(A) and directs the RO's to have EFIC channel "B" placed in a "Bypassed" condition IAW OP-450. (TS require channel be "Bypassed" or "Tripped" within one hour. It is expected that the crew will "Bypass" the channel).

When the EFIC channel has been "Bypassed" the RCP seal injection total flow transmitter (MU-27-DPT) slowly fails high. Indicated RCP total seal injection flow increases, individual RCP seal flows decrease as control system responds to failed instrument. RO's diagnose failure and establish manual control of seal injection.

When seal injection flow control has been stabilized, breaker 3206 trips and the "B" ES 4160 bus and 480 busses loses power. EDG-1B auto starts and re-energizes the ES busses. SRO enters AP-770 and directs BOP/OAC response to the transient. RO's verify vital equipment operation, establish RB cooling, and prepare to transfer the "B" ES 4160 bus to an off-site power source IAW AP-770 and SRO direction.

Before the 4160 bus is transferred to an off-site power source, SWP-1A shaft shears. SWP-1B fails to auto start resulting in a loss of SW system flows. Crew receives numerous SW related alarms. Letdown high temperature interlock actuates isolating letdown flow to the MUT. RO's diagnose the SWP-1A shaft failure and manually start SWP-1B **(CT#2)** following EOP-13, Rule 5 guidance for large pump starts with EDG on line. Crew verifies SW cooling restored and BOP restores letdown flow IAW EOP-14 enclosure 4 and SRO direction. SRO should evaluate and enter TS 3.7.7(A) if time permits.

<u>OPTIONAL</u> - When letdown flow has been restored the SU level transmitter on the "A" OTSG (SP-1A-LT5) fails low. The instrument rate of output change results in a SASS mismatch but no automatic transfer. "A" OTSG FW flow, EFIC "A" OTSG levels increase, and RCS temperature decreases. RO's diagnose the SU level instrument failure and establish manual control of "A" loop main feedwater flow. SRO directs RO's to select operable SU level IAW OP-501, section 4.7 and to restore "A" loop feedwater controls to auto IAW OP-504.

When the plant is stable, a 60 GPM tube leak develops on the "B" OTSG. RO's diagnose leak, identify the affected OTSG and notify SRO that leak rate is >1 GPM. SRO enters EOP-06 and directs RO response to the tube leak transient. When the reactor is tripped IAW EOP-06 the "A" OTSG TBV H/A station transfers to hand resulting in a post trip overcooling transient. RO's may diagnose TBV in manual and establish manual control IAW AI-505. (If the cause of the overcooling is not readily identified, the SRO will transition to EOP-05 and direct RO's response. RO's will isolate "A" OTSG IAW EOP-05 and terminate the overcooling **(CT#3)**. When the overcooling is terminated the SRO will work through EOP-05 if entered and transition back to EOP-06.

<u>OPTIONAL</u> - *If the crew terminates the post trip overcooling event without transitioning to EOP-05 the examination team may elect to use event 11.* When the post trip overcooling has been terminated and RCS temperature control is established the "B" OTSG leak rate increases to >400 GPM. The RO's diagnose the increased leak rate an notify the SRO. The SRO directs the RO's to maintain RCS inventory by the use of additional HPI valves and pumps. RO's recover and control Pressurizer level IAW EOP-06 and continue plant cooldown and de-pressurization.

Procedures to be used during this scenario:

OP-203	OP-504	OP-501	OP-450
AP-510	AP-770		
EOP-06	EOP-05		
Rule 5			
EOP-14, enc.4			

Target Quantitative Attributes - Scenario 1	Actual Attributes
1. Total Malfunctions (5-8)	8
2. Malfunctions after EOP entry (1-2)	1
3. Abnormal Events (2-4)	2
4. Major Transients (1-2)	1
5. EOP's entered requiring substantive actions (1-2)	2
6. EOP contingencies requiring substantive actions (0-2)	1
7. Critical Tasks (2-3)	3

Op-Test No: N-2	Scenario No: 2	Event No: 1 Page 1 of 1

Initiation Cue: Turnover Sheet
Termination Cue: FWP-2A H/A station in Auto.
Event Description: Transfer FWP-2A H/A station to ICS Auto control IAW OP-504

Time	Position	Applicant's Actions or Behavior
	SRO	Direct the OAC to place the "A" FWP in "Auto" IAW OP-504 • Reads the 2 notes at the beginning of section 4.7 ◆ Main FW pumps should not be transferred to AUTO simultaneously. ◆ Tripping of Main FW pump will inhibit AUTO operation. • Select M/V on both "A" and "B" FW pump Bailey stations. • Adjust pressure to 80 psid using raise/lower toggle • Monitor OTSG levels, FW flows, and FW control valves. • Select position on "A" FW pump Bailey station. • Select "A" FW pump Bailey station to auto. • Monitor FW flow and FW pump speed and go back to Hand if large change occurs.
	OAC	Places the "A" FW pump Bailey control station in "Auto" IAW OP-504. • Select M/V on both "A" and "B" FW pump Bailey stations. • Adjust pressure to 80 psid using raise/lower toggle • Monitor OTSG levels, FW flows, and FW control valves. • Select position on "A" FW pump Bailey station. • Select "A" FW pump Bailey station to auto. • Monitor FW flow and FW pump speed and go back to Hand if large change occurs.
	BOP	Monitors balance of plant systems and alarms. Provides PEER checks for OAC actions

Op-Test No: N-1	Scenario No: 2	Event No: 2	Page 1 of 5

Initiation Cue: Turnover Sheet
Termination Cue: Rx power about 16% and Turbine at 400 RPM
Event Description: Manually increase reactor power and commence the main turbine startup IAW OP-203, Sections 4.2 and 4.3.

Time	Position	Applicant's Actions or Behavior
	SRO	Direct actions of OP-203 to continue the plant startup and Turbine Startup Initial conditions checks. • OAC ◆ Directed to continue power increase to 16% while BOP does Turbine Generator Startup. ◆ Perform SP-422 to monitor heatup rate (<20°F/HR). ◆ < 10%/HR power increase rate (L&P 3.2.1) ◆ Provide SRO reactivity management • BOP ◆ Initial Conditions checked ◊ Turbine on turning gear checked ◊ Turbine drains checked open (TDV-1 thru TDV-10) ◊ Supervisory Instrumentation checked ◊ MOS-1873 checked closed ◊ Turbine oil pump alignment checked ◊ Correct operation of Emergency Bearing Oil Pumps checked ⇒ TBP-2 held in stop ⇒ Auto start of TBP-3 checked ⇒ TBP-2 started ⇒ TBP-3 shutdown ◊ EHC verified in operation ◊ Turbine control panel status lights and valve positions checked ◊ Transformer Fan/Pumps in AUTO (SPO) ◊ Generator H_2 checked ◊ Cooling water to H_2 coolers checked

Op-Test No: N-1 Scenario No: 2 Event No: 2

Initiation Cue: Turnover Sheet
Termination Cue: Rx power about 16% and Turbine at 400 RPM
Event Description: Manually increase reactor power and commence the main turbine startup IAW OP-203, Sections 4.2 and 4.3.

Time	Position	Applicant's Actions or Behavior
	OAC	Takes SP-422 initial data to monitor heatup during power increase (Limit 20°/hour). Commences to withdraw control rods IAW OI-01 guidelines to increase power (Limit < 10%/hour) ◆ Announce the start and completion of each control rod manipulation. ◆ Wait for SRO acknowledgment of the intention to move rods before rods are moved.

	BOP	Performs the initial conditions check for the Turbine Startup as directed by SRO.
		
		• Turbine on turning gear checked
		• Turbine drains checked open (TDV-1 thru TDV-10)
		• Supervisory Instrumentation checked
		• MOS-1873 checked closed
		• Turbine oil pump alignment checked
		• Correct operation of Emergency Bearing Oil Pumps checked
		    ◆ TBP-2 held in stop
		    ◆ Auto start of TBP-3 checked
		    ◆ TBP-2 started
		    ◆ TBP-3 shutdown
		• EHC verified in operation
		• Turbine control panel status lights and valve positions checked
		• Calls SPO to ensure Transformer Fan/Pumps in AUTO
		• Generator H_2 checked
		• Calls SPO to ensure cooling water to H_2 coolers

Op-Test No: N-1	Scenario No: 2	Event No: 2	Page 3 of 5

Initiation Cue: Turnover Sheet
Termination Cue: Rx power about 16% and Turbine at 400 RPM
Event Description: Manually increase reactor power and commence the main turbine startup IAW OP-203, Sections 4.2 and 4.3.

Time	Position	Applicant's Actions or Behavior
	SRO	Direct the BOP in the Turbine Generator Startup to 400 RPM • Adjust Acceleration Rate Controller IAW OP-103A (initial metal temp 240° max. of 180 RPM/min.) • Reset Lockout Relays ◆ "TURB 3 STOP VLV LOCKOUT" switch to off ◆ "86 TURB/1" lockout reset ◆ "86 TURB/2" lockout reset ◆ "PRI TRIP LO/OT RESET" push button depressed ◆ "ALTNT TRIP LO/OT RESET" push button depressed ◆ "UNIT TRIP PRI LOCKOUT-86/UTPX" reset ◆ "UNIT TRIP PRI LOCKOUT-86/UTPY" reset ◆ "UNIT TRIP PRI LOCKOUT-86/UTAX" reset ◆ "UNIT TRIP PRI LOCKOUT-86/UTAY" reset • Valve position limits reduced to 0% • SPO directed to reset the turbine locally • Turbine verified reset • Operator Auto selected • Valve position limit adjusted to 100% and GV positions checked • Turbine tripped • Actions starting from * above re-performed • Turbine role up to 400 RPM ◆ Speed/Load setter adjusted to 400 RPM ◆ "GO" depressed ◆ Ensure turning gear disengages

Op-Test No: N-1	Scenario No: 2	Event No: 2	Page 4 of 5

Initiation Cue: Turnover Sheet
Termination Cue: Rx power about 16% and Turbine at 400 RPM
Event Description: Manually increase reactor power and commence the main turbine startup IAW OP-203, Sections 4.2 and 4.3.

Time	Position	Applicant's Actions or Behavior
	BOP	Performs Turbine Startup to 400 RPM as directed by SRO. • Checks HP Turbine First Stage temperature (about 240°) • Checks OP-103A curve 2 or 3 to determine rollup rate • Adjust Acceleration Rate Controller IAW OP-103A (initial metal temp 240° max. of 180 RPM/min.) • Reset Lockout Relays (Rear of electrical panel) ◆ "TURB 3 STOP VLV LOCKOUT" switched to off ◆ "86 TURB/1" lockout reset ◆ "86 TURB/2" lockout reset ◆ "PRI TRIP LO/OT RESET" push button depressed ◆ "ALTNT TRIP LO/OT RESET" push button depressed ◆ "UNIT TRIP PRI LOCKOUT-86/UTPX" reset ◆ "UNIT TRIP PRI LOCKOUT-86/UTPY" reset ◆ "UNIT TRIP PRI LOCKOUT-86/UTAX" reset ◆ "UNIT TRIP PRI LOCKOUT-86/UTAY" reset • Reduce Valve position limit to 0% • Direct SPO to reset the turbine locally • Verify Turbine reset and checks Intercept and Reheat Stop Valves open • Selects Operator Auto (if needed) • Adjust valve position limit to 100% and check GV positions correct • Depress Turbine Trip push button and verifies all valves closed • Actions starting from * above re-performed • Turbine role up to 400 RPM ◆ Speed/Load setter adjusted to 400 RPM ◆ "GO" depressed ◆ Ensure turning gear disengages

Op-Test No: N-1	Scenario No: 2	Event No: 2	Page 5 of 5

Initiation Cue: Turnover Sheet
Termination Cue: Rx power about 16% and Turbine at 400 RPM
Event Description: Manually increase reactor power and commence the main turbine startup IAW OP-203, Sections 4.2 and 4.3.

Time	Position	Applicant's Actions or Behavior
	SRO	Any where along in events 3 & 4 the SRO may decide that a delay in the performance of OP-203 section 4.3 exists. If the SRO decides that a delay exist, then he should direct the Turbine be shutdown and Rx power reduced to 5 to 10% IAW OP-203 step 4.2.21.
	BOP	If the SRO directs the turbine be shutdown. • Reduces Load/Setter to 0000. • Depresses GO • When Load/Setter reaches 0000 trips the turbine
	OAC	If directed by SRO to reduce power to 5-10 then performs action IAW OI-01 for reactivity control. • Announce intention to move rods and stopping of rod motion. • Waits for SRO concurrence before moving rods.

Op-Test No: N-1	Scenario No: 2	Event No: 3	Page 1 of 1

Initiation Cue: Examiner Initiated **Annunciator Alarm:** K-6-6
Termination Cue: EFIC Channel "B" Bypassed IAW OP-450
Event Description: EFIC OTSG "B" pressure transmitter (MS-111-PT) fails high **(MALF)**. Annunciator Alarm K-6-6 "Atmospheric Dump Valve Not Full Closed" comes in. The RO's diagnose the failure and notify the SRO. SRO directs the BOP to close MSV-26 **(CT#1)**. SRO reviews and enters TS 3.3.11(A) and 3.3.11(C) when informed of MS-111-PT failure.

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnose EFIC pressure transmitter failure. • ANN Alarm K-6-6 "Atmospheric Dump Valve Not Full Closed" • MSV-26 controller increasing demand • MS Safety Valve monitor shows steam escaping from MSV-26 • MS-11-PI1 on PSA panel pegged high • MS-107-PIR in ICS panel pegged high • SP-10A-PIR1 on TGF panel shows actual MS header decreasing • RCS shows indication in increase cooling
	SRO	Directs the BOP to take manual control of MSV-26 and close MSV-26 **(CT#1)**. Directs the OAC to monitor Rx power. When informed of MS-111-PT failure, reviews and enters TS 3.3.11(A) and 3.3.11(C) Directs the BOP to have the "B" EFIC channel Bypassed or Tripped IAW OP-450. Should insure OAC/BOP realize the EFIC functions from "B" EFIC are now affected. (FOGG, Low Pressure actuation, etc.)
	OAC	Monitors Rx power during overcooling event.
	BOP	Selects MSV-26 to hand position and closes MSV-26 **(CT#1)**. Calls the PPO to Bypass or Trip EFIC channel "B" IAW OP-450.
	SRO	Calls NSM to have repair activities started for EFIC pressure transmitter.

Op-Test No: N-2	Scenario No: 2	Event No: 4	Page 1 of 1

Initiation Cue: Examiner Initiated **Annunciator Alarm:** H-5-7
Termination Cue: Seal Injection Flow controlled manually and RCS leak ruled out.
Event Description: RCP total flow transmitter (MU-27-DPT) fails high slowly. ANN Alarm H-5-07 "RC PUMP SEAL FLOWS HIGH/LOW" actuates. The RO's diagnose the failure and inform the SRO. SRO directs the BOP to take manual control of the seal injection control valve and adjust seal flows using the individual seal flow indications.

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnose RCP total flow transmitter (MU-27-DPT) failure. • ANN Alarm H-5-7 "RC PUMP SEAL FLOWS HIGH/LOW" ◆ Event Point 1079 "Total seal flow > 42 gpm" ◆ Event Point 1084 "RCP-1A seal flow < 3 gpm" ◆ Event Point 1085 "RCP-1B seal flow < 3 gpm" ◆ Event Point 1086 "RCP-1C seal flow < 3 gpm" ◆ Event Point 1087 "RCP-1D seal flow < 3 gpm" • Total seal flow on MU-27-FI increasing • Individual RCP seal flow decreasing • Seal controlled demand decreasing • Checks done for possible RCS leak • Rad Monitors checked for increasing trends Informs the SRO of the failure.
	SRO	Directs the OAC to ensure RCS leakage has not increased. Directs the BOP to take manual control of seal injection controller and maintain RCP seal injection using the individual seal flow indications
	OAC	Monitors RCS for possible increase RCS leakage. Should report no increase in RCS leakage to SRO
	BOP	Takes manual control of MUV-16 by placing MU-15-FIC into "Hand" Adjust MU-15-FIC controller to maintain seal injection flow on individual RCP seal flow meters
	SRO	Calls NSM to have repair activities started for seal injection controller.

Op-Test No: N-2	Scenario No: 2	Event No: 5	Page 1 of 2

Initiation: Examiner Initiated **Cue:** Control room lighting reduced
Termination: Crew preparing to place "B" ES Bus on alternate power
Event Description: Power supply breaker to the 4160 V "B" ES bus (BKR 3206) trips open **(MALF)**. The "B" ES buses go dead until the "B" EDG starts and energizes the bus. The SRO enters AP-770 and directs the BOP actions. SRO may review and enter TS 3.8.1(A).

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnose loss of power to B" 4160 ES Bus and EDG "B" start • Control room lighting reduced • "B" ES bus voltage meters indicate) volts • "B" EDG "Crank" light ON, followed by the "Run" light when the EDG loads on the bus • "B" ES bus voltage meters return to normal readings once EDG energizes the "B" bus. Informs the SRO of AP-770 entry conditions met.
	SRO	Directs the OAC to continue to monitor Rx power while directing BOP through AP-770. Enters AP-770 and directs BOP actions. • Ensures at least one ES bus energized and goes to step 3.12. • Verifies Letdown flow • Verifies SW, MUP, and SW RW pumps operating • Verifies ES MCC 3AB energized • Verifies no ES 480 UV lockouts • Verifies IA pressure • Ensures RB cooling ◆ Should stay on CI cooling ◆ Stops AHF-1A in Fast ◆ Starts AHF-1A in Slow ◆ Starts AHF-1B in slow (Must verify EOP-13 Rule 5 used) • Verifies 2 groups Pressurizer heaters energized • Verifies both ES buses energized and goes to step 3.30 • Verifies CC ventilation running • Verifies CC Chillier running • Verifies Non-1E battery charge not needed • Directs BOP to have PPO restore heat tracing • Notify NSM may need to order EDG fuel • Verify SF cooling

Op-Test No: N-2	Scenario No: 2	Event No: 5	Page 2 of 2

Initiation: Examiner Initiated **Cue:** Control room lighting reduced
Termination: Crew preparing to place "B" ES Bus on alternate power
Event Description: Power supply breaker to the 4160 V "B" ES bus (BKR 3206) trips open **(MALF)**. The "B" ES buses go dead until the "B" EDG starts and energizes the bus. The SRO enters AP-770 and directs the BOP actions. SRO may review and enter TS 3.8.1(A).

Time	Position	Applicant's Actions or Behavior
	OAC	Monitors Rx power
	BOP	Under direction of SRO perform AP-770 actions • Ensures at least one ES bus energized. (Both energized) • Verifies Letdown flow. • Verifies SW, MUP, and SW RW pumps operating. • Verifies ES MCC 3AB energized. • Verifies no ES 480 UV lockouts. • Verifies IA pressure > 90 psig. • Ensures RB cooling. ◆ Ensures CI cooling ◆ Stops AHF-1A in Fast ◆ Starts AHF-1A in Slow ◆ Starts AHF-1B in slow (Must verify EOP-13 Rule 5 used) • Verifies 2 groups Pressurizer heaters energized (all groups energized) • Verifies both ES buses energized • Verifies CC ventilation running (Behind ES panel on ventilation panel) • Verifies CC Chillier running (Behind ES panel on ventilation panel) • Verifies Non-1E battery charge not needed • Directs PPO to restore heat tracing • Verify SF cooling
	SRO	Calls NSM to have repair activities started for breaker 3206. May review and enter TS 3.8.1(A)

Op-Test No: N-2	Scenario No: 2	Event No: 6	Page 1 of 3

Initiation: Examiner Initiated **Annunciator Alarms:** I-1-3, I-2-3, I-3-3, I-4-3
Termination: Letdown Recovered
Event Description: SWP-1A shaft shear **(MALF)** and SWP-1B fails to auto start on low pressure **(MALF)**. OAC/BOP diagnose the loss of SW flow. ANN Alarms I-1-3, I-2-3, I-3-3, and I-4-3 (Low cooling water flow to RCP's) actuate. Letdown will isolate on high temperature. OAC/BOP diagnose failure of SWP-1A shaft and failure of SWP-1B to auto start and notify SRO. SRO directs BOP to start SWP-1B after checking EDG loading IAW EOP-13, Rule 5. SRO directs recover of Letdown using EOP-14, enclosure 4.

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnose a loss of SW flow. • ANN Alarm I-1-3 "RC PUMP A CLG WTR FLOW LOW" • ANN Alarm I-2-3 "RC PUMP B CLG WTR FLOW LOW" • ANN Alarm I-3-3 "RC PUMP C CLG WTR FLOW LOW" • ANN Alarm I-4-3 "RC PUMP D CLG WTR FLOW LOW" • ANN Alarm C-2-5 "SW SYSTEM PRESSURE LOW" • ANN Alarm C-1-4 "SW BP A/B FLOW LOW" • ANN Alarm C-1-6 "SW BP AUTO START" • SWP-1A low amp reading • ANN Alarm H-4-4 "LETDOWN TEMP HIGH" • Letdown isolated (MUV-49 closed) Notify the SRO of loss of SW flow

Op-Test No: N-2	Scenario No: 2	Event No: 6	Page 2 of 3

Initiation: Examiner Initiated **Annunciator Alarms:** I-1-3, I-2-3, I-3-3, I-4-3
Termination: Letdown Recovered
Event Description: SWP-1A shaft shear **(MALF)** and SWP-1B fails to auto start on low pressure **(MALF)**. OAC/BOP diagnose the loss of SW flow. ANN Alarms I-1-3, I-2-3, I-3-3, and I-4-3 (Low cooling water flow to RCP's) actuate. Letdown will isolate on high temperature. OAC/BOP diagnose failure of SWP-1A shaft and failure of SWP-1B to auto start and notify SRO. SRO directs BOP to start SWP-1B after checking EDG loading IAW EOP-13, Rule 5. SRO directs recover of Letdown using EOP-14, enclosure 4.

Time	Position	Applicant's Actions or Behavior
	SRO	May enter AP-330 but probably will just direct BOP to attempt to start SWP-1B **(CT#1)** following EOP-13 Rule 5 guidance. Should direct BOP to shutdown SWP-1A and have PPO check it out. Directs BOP action for Letdown recovery IAW EOP-14 enclosure 4 or may direct BOP to perform enclosure 2. • Ensures MUV-49 closed • Directs closure of MUV-50 • Directs closure of MUV-51 • Ensures SW valves for Letdown coolers are open • Ensures Letdown cooler inlet and outlet valves open • Directs Bypassing of Demins ◆ Ensures MUV-124 open ◆ Directs opening of MUV-200 ◆ Ensures MUV-117 open ◆ Directs closure of MUV-116 ◆ Ensure MUV-133 closed • Ensures pre-filter and post-filter in service • Directs Letdown flow be established ◆ Directs MUV-49 High Temp Bypass switch placed in Bypass ◆ Directs MUV-49 be opened ◆ Directs BOP to establish desired flow with MUV-51 ◆ Directs MUV-50 be opened ◆ Directs MUV-51 be throttled to desired flow. • Directs MUV-49 High Temp Bypass switch returned to normal when Letdown temperature < 130°. • Directs demin placed into service ◆ Ensures MUV-124 open ◆ Ensures MUV-117 open ◆ Directs closure of MUV-200 ◆ Ensures MUV-201 closed ◆ Directs closure of MUV-124

Op-Test No: N-2	Scenario No: 2	Event No: 6	Page 3 of 3

Initiation: Examiner Initiated **Annunciator Alarms:** I-1-3, I-2-3, I-3-3, I-4-3
Termination: Letdown Recovered
Event Description: SWP-1A shaft shear **(MALF)** and SWP-1B fails to auto start on low pressure **(MALF)**. OAC/BOP diagnose the loss of SW flow. ANN Alarms I-1-3, I-2-3, I-3-3, and I-4-3 (Low cooling water flow to RCP's) actuate. Letdown will isolate on high temperature. OAC/BOP diagnose failure of SWP-1A shaft and failure of SWP-1B to auto start and notify SRO. SRO directs BOP to start SWP-1B after checking EDG loading IAW EOP-13, Rule 5. SRO directs recover of Letdown using EOP-14, enclosure 4.

Time	Position	Applicant's Actions or Behavior
	BOP	Start SWP-1B **(CT#1)** after ensuring EDG loading margin per EOP-13, Rule 5. Recovers Letdown IAW EOP-14 enclosure 4. • Ensures MUV-49 closed • Closes of MUV-50 • closes of MUV-51 • Ensures SW valves for Letdown coolers are open • Ensures Letdown cooler inlet and outlet valves open • Bypasses of Demins ◆ Ensures MUV-124 open ◆ Open of MUV-200 ◆ Ensures MUV-117 open ◆ Closes of MUV-116 ◆ Ensures MUV-133 closed • Ensures pre-filter and post-filter in service • Establishes Letdown flow ◆ Selects MUV-49 High Temp Bypass switch to Bypass ◆ Opens MUV-49 ◆ Establishes desired flow with MUV-51 ◆ Opens MUV-50 ◆ Throttles MUV-51 to desired flow. • Selects MUV-49 High Temp Bypass switch to normal when Letdown temperature < 130°. • Places demin into service ◆ Ensures MUV-124 open ◆ Ensures MUV-117 open ◆ Closes of MUV-200 ◆ Ensures MUV-201 closed ◆ Closes of MUV-124
	SRO	Calls NSM to have repair activities started for SWP-1A. If allowed time, reviews TS and enter 3.8.1(A)

Op-Test No: N-2 Scenario No: 2 Event No: 7 Page 1 of 1

Initiation: Examiner Initiated **(OPTIONAL)** **Annunciator Alarms:** K-3-2

Termination: Alternate S/U level instrument selected and ICS back in full auto.

Event Description: (OPTIONAL) "A" OTSG SU level transmitter fails low slowly **(MALF)**. ANN Alarm K-3-2 "SASS MISMATCH" actuates. OAC diagnoses instrument failure, FW system overfeed of "A" OTSG, and notifies SRO. SRO directs OAC to take manual control of "A" OTSG FW control valves and stabilize the plant. SRO directs BOP to use OP-501 to select good instrument.

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnoses failing "A" OTSG SU level transmitter • ANN Alarm K-3-2 "SASS MISMATCH" ◆ Event point 0195 "SG SU LEVEL A MISMATCH" • Level indication on SP-1A-LI1 decreasing • "A" SU FW flow on SP-7A-FI increasing • "A" OTSG level increasing • Increasing demand on FWV-40 Bailey control station Notifies SRO of instrument failure and ICS response
	SRO	Directs OAC to take manual control of "A" FW control valves and stabilize the plant. Directs BOP to use OP-501 to select alternate instrument Directs OAC to use OP-504 to return FW control valves to auto
	OAC	Selects FWV-40 and 37 to hand and decrease FW flow to stabilize the plant. Monitors Rx power Once alternate instrument selected, return FW control valves to Auto IAW OP-504. • Selects FWV-40 to M/V and ensures on the "Carrot" • Select FWV-40 to Dem • Selects FWV-40 to "Auto" • Selects FWV-37 to M/V ensures below "Carrot" • Selects FWV-37 to Dem • Selects FWV-37 to Auto
	BOP	Using OP-501 to select alternate instrument • Checks alternate signal reading on computer • Selects SP-1A-MS2 to the LT5-Y position
	SRO	Calls NSM to have repair activities started for SP-1A-LT4.

Op-Test No: N-2	Scenario No: 2	Event No: 8	Page 1 of 2

Initiation: Examiner Initiated **Annunciator Alarms:** H-1-5, H-2-2, H-2-1
Termination: Rx Tripped
Event Description: "B" OTSG develops a 60 GPM tube leak. ANN Alarms H-1-5 "MN STM LINE A/B HIGH RAD MONITOR FAIL", H-2-2 "ATMOSPHERIC MONITOR WARNING", and H-2-1 "ATMOSPHERIC RADIATION HIGH" actuates. OAC/BOP diagnose OTSG tube leak and inform SRO of EOP-6 entry conditions. SRO enters EOP-06 and directs plant shutdown and cooldown.

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnose "B" OTSG tube leak • ANN Alarm H-1-5 "MN STM LINE A/B HIGH RAD MONITOR FAIL" • ANN Alarm H-2-2 "ATMOSPHERIC MONITOR WARNING" ◆ Event point 1739 "RM-A12 Condenser Vacuum Pump Exhaust Warning/Fail" • ANN Alarm H-2-1 "ATMOSPHERIC RADIATION HIGH" ◆ Event point 1738 " RM-A12 Condenser Vacuum Pump Exhaust Level High" • Makeup flow increase • MUT level decrease • Steam line monitor pegged at 100 gpd Determines a leak rate Notifies SRO EOP-06 entry conditions met.
	SRO	Directs the OAC/BOP to quantify the leak rate if not already done by OAC/BOP. Enters EOP-06 and directs OAC/BOP actions • If still > 12% and Turbine not tripped uses AP-510 to reduce power and remove turbine. ◆ Directs OAC to reduce Rx power to <12% ◆ When Rx power <12%, directs BOP to trip Turbine ◆ When Tave < 565, directs BOP reduce MS header pressure setpoint to 46% ◆ Directs OAC to trip RX • If <12% and turbine tripped, should work through EOP-06 to step 3.9 (Guidance of PERFORM AP-510 doesn't really apply since AP-510 exit point is turbine tripped) which directs Rx trip if < 565°. ◆ Directs BOP reduce MS header pressure setpoint to 46% ◆ Directs OAC to trip RX ◆ Remains in EOP-06 • Verifies Rods fully inserted • Verifies NI's indicate Rx shutdown

Op-Test No: N-2	Scenario No: 2	Event No: 8	Page 2 of 2

Initiation: Examiner Initiated **Annunciator Alarms:** H-1-5, H-2-2, H-2-1
Termination: Rx Tripped
Event Description: "B" OTSG develops a 60 GPM tube leak. ANN Alarms H-1-5 "MN STM LINE A/B HIGH RAD MONITOR FAIL", H-2-2 "ATMOSPHERIC MONITOR WARNING", and H-2-1 "ATMOSPHERIC RADIATION HIGH" actuates. OAC/BOP diagnose OTSG tube leak and inform SRO of EOP-6 entry conditions. SRO enters EOP-06 and directs plant shutdown and cooldown.

Time	Position	Applicant's Actions or Behavior
	OAC	If still > 12% and Turbine not tripped • Reduce Rx power to <12% ◆ Announce intention to move rods and stopping of rod motion. ◆ Waits for SRO concurrence before moving rods. • When Rx power <12%, informs the SRO • When directed by SRO, trips the reactor ◆ Verifies all rods fully inserted ◆ Verifies NI's indicate Rx shutdown If already <12% and turbine tripped. • When directed by SRO, trips the reactor ◆ Verifies all rods fully inserted ◆ Verifies NI's indicate Rx shutdown

Op-Test No: N-2 Scenario No: 2 Event No: 9 Page 1 of 1

Initiation: Rx Tripped **Cue:** Rx Tripped

Termination: When SRO transitions from EOP-05 to EOP-06

Event Description: When the reactor is tripped, the "A" TBVs controller shifts to "Hand" and remains at it's pre-trip position. The OAC diagnoses overcooling event and informs the SRO. The OAC may take control of the "A" TBVs and terminate the event IAW AI-505 guidance to isolate system leaks. If the OAC does not terminate the event then the SRO should enter EOP-05 and terminate the overcooling by isolating the "A" OTSG. Once the overcooling event is terminated, the SRO works through EOP-05 until directed to transition back to EOP-06.

Time	Position	Applicant's Actions or Behavior
	OAC	Diagnoses RCS overcooling • Tave decreasing • "A" MS header pressure decreasing Diagnose "A" TBV's causing the overcooling. • "A" TBV's "Hand" lamp lit • "A" TBV's demanded same as pre-trip status May terminate the overcooling by manually reducing demand to "A" TBV's Informs the SRO of the failure
	SRO	If informed of "A" TBV's controller failure, directs OAC to manually control "A" TBV's to stabilize the plant. **(CT#3).** If "A" TBV's controller not caught, transitions to EOP-05 and directs the isolation of "A" OTSG to terminate overcooling **(CT#3)..** If EOP-05 entered, works through EOP-05 to transition step which directs crew back to EOP-06.
	OAC	If directed by SRO, takes manual control of "A" TBV's and stabilizes the plant **(CT#3).** If directed by SRO to isolate MS and MFW to "A" OTSG **(CT#3)..** • Depress the "A" OTSG MS isolation buttons on EFIC panel ◆ Verifies "A" OTSG MSIV's closed • Depress the "A" OTSG MFW isolation buttons on the EFIC panel ◆ Verifies "A" Feedwater block valves closed ◊ "A" MBV ◊ "A" LLBV ◊ "A" SUBV ◆ Verifies FWV-28 (Cross-Tie) closed ◆ Verifies "A" FWP suction valve closed ◆ Verifies both MFWP's tripped

Op-Test No: N-2 Scenario No: 2 Event No: 10 Page 1 of 1

Initiation: Examiner Initiated **(OPTIONAL)**
Termination: Rx Tripped
Event Description:(OPTIONAL) The "B OTSG tube leak increases to 400 gpm. The OAC/BOP diagnose the increase in leak size and informs the SRO. The SRO directs OAC/BOP in establishing second makeup pump and addition makeup to stabilize Pressurizer level.

Time	Position	Applicant's Actions or Behavior
	OAC	Diagnoses OTSG tube leak increase. • Full makeup with MUV-31 • Pressurize level decreasing Informs the SRO of increase leak size.
	SRO	Directs the OAC/BOP increase makeup to stabilize Pressurizer level. • Directs MUV-49 closure • Directs MUV-24 be opened • Directs MUV-73 be opened • Directs DCP-1B, RWP-3B, and MUP-1C started • Directs addition MUV's be opened (MUV-24, 25, & 26)
	OAC/BOP	Establishes addition makeup to stabilize PZR level. • Close MUV-49 • Open MUV-24 • Open MUV-73 • Start DCP-1B • Start RWP-3B • Start MUP-1C • Open additional MUV's (MUV-24, 25, & 26
	SRO	Continue working through EOP-06 until directed to EOP-08

Examination Setup/Execution
Scenario 1

Scenario Setup

1. [ ] Initialize the simulator to 10% power and UNFREEZE the simulator.
2. [ ] In the “NRCEXAM” directory of LESSON PLAN, start lesson plan for exam N-2.
3. [ ] Trigger SETUP step

4. Perform the following setup actions:

- [ ] Start SWP-1A
- [ ] Stop SWP-1C
- [ ] Place WTP-6B in Pull-To-Lock
- [ ] Open MOS 1661N
- [ ] Open MOS 1661S
- [ ] Adjust "A" FWP to establish 40-50 psid across control valves

5. Place the following Red Tags on the main control panel:

- [ ] MSV-55
- [ ] MSV-56
- [ ] ASV-5
- [ ] ASV-204
- [ ] Breaker 1661
- [ ] MOS 1661N
- [ ] MOS 1661S
- [ ] MUP-1A

6. Ensure clean copies of the following “consumable” procedures are in the control room procedure books.

- [ ] OP-501
- [ ] OP-504
- [ ] OP-450
- [ ] EOP-06
- [ ] EOP-05
- [ ] AP-510
- [ ] AP-330

7. [ ] Ensure marked up copy of OP-203 signed off to step 4.2.20 for turnover
8. [ ] Advance all MCB recorders and remove line printer printouts.
9. [ ] Ensure all grease pencil marks on indicators and recorders are removed.
10 [ ] Ensure SPDS screens are acknowledged and on proper screens with history trace reset.
11 [ ] FREEZE the simulator and notify the lead examiner that simulator is ready to begin.

Scenario Execute

1. When notified by the lead examiner, UNFREEZE the simulator.

2. **MAIN TURBINE ROLL UP**

   2.1. When the TBO is called to reset the main turbine, TRIGGER Lesson Plan Step #14 (INSTRUCTOR ACTION: RESET MAIN TURBINE LOCALLY).

   2.2. When the crew trips the turbine, all valves operate properly.

   2.3. To reset the main turbine again, TRIGGER Lesson Plan Step #14 (INSTRUCTOR ACTION: RESET MAIN TURBINE LOCALLY) again.

3. **"B" OTSG PRESSURE TO "B" EFIC FAILS HIGH**

   When notified by the lead examiner, TRIGGER Lesson Plan Step #1 ("B" OTSG pressure to "B" EFIC channel fails high)

   3.1. If TBO called to check on MSV-26 status, wait about 1 minute then report valve Status. (I/F page MS_B)

   3.2. TBO see no problems with MSV-26 operation.

   3.3. BYPASS/TRIP EFIC

   3.3.1. IF CNO directed to "Bypass" "B" EFIC IAW OP-450, TRIGGER Lesson Plan Step #13 (INSTRUCTOR ACTION: BYPASS "B" EFIC CHANNEL).

   Report the "B" EFIC channel Bypassed on the PHONE to the control room (Radio use not allowed in EFIC rooms).

   3.3.2. IF CNO directed to "TRIP" "B" EFIC IAW OP-450, TRIGGER Lesson Plan Step #12 (INSTRUCTOR ACTION: TRIP "B" EFIC CHANNEL).

   Report the "B" EFIC channel Tripped on the PHONE to the control room (Radio use not allowed in EFIC rooms).

4. **RCP TOTAL SEAL FLOW TRANSMITTER SLOW FAILS HIGH**

   When notified by the lead examiner, TRIGGER Lesson Plan Step #2 (MU-27-DPT slowly fails high)

   4.1. IF PPO called to check for leaks in area of seal injection, wait a 2.5 minutes then report that you do not see any leaks.

5. **BREAKER 3206 TRIPS OPEN/EDG-1B START AND ENERGIZES "B" ES BUS**

   When notified by the lead examiner, TRIGGER Lesson Plan Step #3 (Breaker 3206 fails open)

   5.1. PPO should check out EDG-1B operation. Report all conditions "Sat" on the "B" EDG.

   5.2. If anyone sent to check breaker 3206 locally, report breaker indicates open locally and no visible problems.

6. **SWP-1A SHAFT SHEAR AND FAILURE OF SWP-!B AUTO START ON LOW PRESSURE**

When notified by the lead examiner, TRIGGER Lesson Plan Step #4 (SWP-1A shaft shear)

6.1. If PPO sent to check SWP-1A locally

If pump is running, report that SWP-1A is vibrating badly and make loud noise

If pump is not running, report addition seal leakage on pump seals but no other observed problems.

7. **"A" OTSG CONTROLLING SU LEVEL TRANSMITTER FAILS LOW SLOWLY (OPTIONAL EVENT)**

IF notified by the lead examiner, TRIGGER Lesson Plan Step #5 (SP-1A-LT4 fails high slowly)

8. **"B" OTSG 60 GPM TUBE LEAK**

When notified by the lead examiner, TRIGGER Lesson Plan Step #6 ("B" OTSG 60 gpm tube leak).

8.1. When HP for surveys of MS lines, wait about 5 minutes then report there is in increase in radiation level around the "B" MS lines. Contact readings on "B" MS lines is 145-150 mrem/hour.

8.2. When Chemistry called to check for OTSG leakage, wait 25 minutes and report "B" OTSG appears to be leaking.

8.3. When called to do enclosures of EOP-14, use the time line guides supplied by EOP group for these actions.

9. **"A" TBV's GO TO HAND WHEN REACTOR TRIPPED/OVERCOOLING EVENT**

When Rx is tripped, the "A" TBV's will go to hand automatically.

9.1. IF TBO sent to check "A" TBV's, he not see any problems with them.

10. **"B" OTSG TUBE LEAK INCREASES TO 400 GPM (OPTIONAL)**

IF notified by the lead examiner, Trigger Lesson Plan Step #9 ("B" OTSG Tube leak of 400 gpm)

EXAM N-2
TURNOVER

A. Initial conditions:

1. Time in core life - 247 EFPD
2. Rx power and power history - 10% for > 1 hour
3. Boron concentration - 1450 PPMB
4. Xenon - Equilibrium
5. RCS Activity - Fuel 0.0005 uCi/ml

B. Tech. Spec. action requirement(s) in effect: 3.7.5(D) EFP-2 red tagged to mechanical maintenance for governor replacement after Mode 1 was entered. 1 hour into 72 hour action statement. EFP-2 is scheduled to be released for post maintenance testing in 4 hours.

C. Clearances in effect:

1. EFP-2 for governor replacement
2. WTP-6B (Demin Water Transfer Pump) for motor/pump realignment
3. MUP-1A to electrical maintenance to replace control power fuses. MUP-1A will be returned to service in two hours.
4. Breaker 1661, MOS 1661S, and MOS 1661N to Dispatcher. Breaker 1661 developed quench gas leak on previous shift. Line crew in 500 KV switchyard trouble shooting the breaker.

D. Significant problems/abnormalities:

1. SWP-1A is running while engineering performs an analysis of anomalous vibration reading taken during last SP. Vibrations were within allowable limits but had increased from previous SP.

2. During the power escalation, FWP-2A was selected to manual due to minor speed oscillations. I&C identified a noisy DP signal as source of the oscillation. Repairs and post maintenance testing are complete. FWP-2A ready to be restored to automatic.

E. Evolution's/maintenance for the on-coming shift:

1. Perform post maintenance test of EFP-1 and MUP-1A when released from maintenance.

2. Return FWP-2A to automatic operation.

3. Continue with plant startup starting at step 4.2.20 of OP-203. All steps to step 4.2.20 completed. EHC system and Turbine Supervisory instrumentation have been in operation for > 8 hours.

F. Units 1 and 2 status: On-Line

G. Units 4 and 5 status: On-Line

EXAM N-2
TURNOVER

H. SSOD - Instruct the RO's to walk down the main control board and provide you with the following data:

1. RCS Average Temperature ________
2. RCS Pressure ________
3. Pressurizer Level ________
4. Make-up Tank Level ________
5. Turbine Load ________
6. Turbine Reference ________

NOTE: If full implementation of the emergency plan is not required for this exam.

1999

Operating Examination

Simulator Scenarios

Book One

OPERATING EXAMINATION SCENARIO OUTLINE

Facility: Crystal River Unit 3 **Scenario Number:** 3 **Operating Test Number:** 1

Examiners: ______________ **Operators:** ______________

Objectives:

1. Evaluate SRO candidates ability to manage shift resources and exercise command and control during normal and emergency conditions.
2. Evaluate SRO candidates ability to implement emergency and abnormal operating procedures.
3. Evaluate SRO candidates ability to interpret and apply Tech Specs associated with RPS channel instrumentation.
4. Evaluate RO/SRO candidates ability to perform a plant power reduction. Actions IAW AP-510.
5. Evaluate RO candidates ability to diagnose faulty RPS pressure signal and place an RPS channel in "Bypassed" IAW OP-507.
6. Evaluate RO/SRO ability to diagnose and respond to a main feedwater pump failure while in 3 RCP mode of operation. Actions IAW AP-545.
7. Evaluate RO/SRO ability to diagnose and respond to an ICS instrument failure (neutron error).
8. Evaluate RO/SRO ability to diagnose and respond to loss of the plant startup transformer/loss of all main feedwater and failure of EFP-1 to auto start.
9. Evaluate RO/SRO ability to diagnose and respond to a loss of all EFW.
10. Evaluate RO/SRO ability to diagnose and respond to a loss of ALL feedwater.

Initial Condition: 75% Power, 3 RCP operating, ICS in automatic.

Turnover Information: RCP-1C developed a ground fault 4 days ago. Demin water transfer pump WTP-6B is out of service for motor/pump realignment. WTP-6B is scheduled for return to service in 10 hours. EFP-2 is OOS and red tagged to mechanical maintenance for governor replacement. The plant is six hours into 72 hour actions statement based on TS 3.7.5(D). EFP-2 is scheduled to be released for post maintenance testing in 4 hours. MUP-1A is tagged to electrical maintenance to replace fuses in the DC control power circuits. MUP-1A will be release in two hours. SWP-1A is running while engineering performs an analysis of anomalous vibration readings taken during the last SP.

During the previous shift Breaker 1661 tripped - cause unknown. A line crew is in the 500 KV switchyard troubleshooting the breaker. Breaker 1661, MOS 1661N, and MOS 1661S are currently OPEN and red tagged to Dispatcher.

Event No.	Event Type*	Malf. No.	Event Description
1	(I) - ALL		CDP-1B demand fails to 0% **(Malf)** .
2	(N) - ALL		Reduce reactor power to 60% IAW AP-510.
3	(I) - ALL (C) - OAC/SRO		RPS Channel "B" Pressure (RC-3B-PT1) fails high **(Malf)**. RPS channel trips on high pressure. PZR spray and PORV actuate. PZR Spray Valve fails open **(Malf)**. SRO directs OAC to close PZR spray isolation valve. SRO evaluates and enters TS 3.3.1(A). Place RPS Channel "B" in "Bypassed" IAW OP-507. Alternate pressure channel selected for pressure control IAW OP-501.
4	(C) - ALL (R) - OAC		"A" Main Feed Pump oil system failure, Feedwater pump trip **(Malf)**, and ICS automatic runback to 55% power. The crew will have to reduce power to $\leq$ 45% power IAW AP-545.
5	(I) - OAC/SRO		ICS Neutron Error fails to +9 **(Malf)**. SRO directs OAC to take manual control of Rx and Main FW to stabilize the plant.
6	(MT) - ALL (I) - BOP		Loss of Startup Transformer **(Malf)** - Loss of main feedwater - EFIC fails to auto start EFP-1 **(Malf)**. SRO directs BOP to start EFP-1 **(CT#1)**.
7	(MT) - ALL		EFP-1 Shaft Seizure **(Malf)** - Loss of all EFW flow.
8	(N) -All		SRO directs 4160 Rx Aux. bus energized by dedicated EDG and FWP-7 place into service IAW EOP-04. **(CT#2)**
9	(C) - ALL		Loss of FWP-7 **(Malf)** - Loss of all feedwater - SRO directs the establishment of HPI/PORV cooling IAW EOP-04 **(CT#3)** **(OPTIONAL)**
Scenario Duration		120 minutes	**Exercise Termination:** When plant stable with FWP-7 feeding the OTSG's. <u>OR</u> When PORV/HPI cooling established.

*(N)ormal evolution, (R)eactivity manipulation, (I)instrument failure, (C)omponent failure, (M)ajor transient

Narrative Summary:

After shift turnover, CDP-1B's coupling demand fails to 0% and will not respond in manual or automatic. This causes CD flow reduction below amount needed for power operation > 60%. RO's diagnoses the failure and notify the SRO. RO's should direct the SPO to check out CDP-1B operation. SRO enters AP-510 and directs the OAC to reduce power to ≤ 60%.

After the power reduction is completed, RPS Channel "B" Pressure (RC-3B-PT1) fails high slowly. The rate of failure is less than that needed for SASS to transfer automatically. The increasing pressure causes the PZR heaters to go to minimum, the spray valve will open (and fail open), the "B" RPS Channel will trip, and the PORV will open. The RO's should diagnose the failure and notify the SRO. The SRO should direct the OAC to close the PORV (RCV-10) and close the Spray Block Valve (RCV-13). SRO directs the OAC to use alternate instruments to control RCS pressure. SRO directs the BOP to select alternate instrument IAW OP-501. SRO directs the OAC to return Pressurizer Heaters and PORV to Auto. SRO evaluates TS and applies 3.3.1(A) for "B" RPS Channel. The SRO directs the BOP to place the "B" RPS Channel in "Bypass" IAW OP-507. (TS requires channel "Tripped" or "Bypassed". The crew should "Bypass" the channel).

When Pressurizer heaters in auto, PORV in auto, and "B" RPS Channel "Bypassed", the oil system for the "A" MFWP begins to degrade. The "A" MFWP will eventually trip if not shutdown by the crew. The RO's diagnose the problem, inform the SRO, and send the SPO to investigate. When the "A" MFWP trips or is shutdown, the SRO enters AP-545 and ensures the plant is running back to <55%. The OAC performs the immediate actions of AP-545 and monitors the runback. The SRO directs the RO's to have PPO place both the FWP trips switches into the "BOTH" position IAW AP-545.

Following the Plant Runback, ICS Neutron Error fails to +9. This causes the reactor to insert control rods while cross-limiting FW in the increase direction. The OAC diagnoses the problem and informs the SRO. The SRO directs the OAC to take manual control of the reactor and feedwater to stabilize the plant.

When the plant is stabilized from the Neutron Error failure, a Startup Transformer fault occurs. This takes out power to all the unit buses. It also removes power from the "A" ES 4160 bus until it is recovered by the "A" EDG. EFIC actuates on loss of all RCP's and all FWP's, but EFP-1 fails to auto start. The EFP-1 will start when selected to run in the control room. The BOP diagnoses the failure of the only available EFP to auto start and informs the SRO. The SRO directs the BOP to start EFP-1 IAW EOP-13, Rule 3 and 5 **(CT#1)**.

Ten minutes after EFP-1 is running, it's shaft seizes and EFP-1 is lost. The BOP diagnoses the loss of all FW flow and informs the SRO. SRO will enter EOP-04 for inadequate heat transfer and direct actions for energizing the 4160 Rx Aux bus and placing FWP-7 into service. **(CT#2)**.

OPTIONAL - When FWP-7 operation is established and feeding the OTSG's, the dedicated EDG supplying power to the 4160 Rx Aux. bus fails. The SRO cycles back to the front of EOP-04 and directs actions to place the plant on HPI/PORV cooling **(CT#3)**.

Procedures to be used during this scenario:

OP-507	OP-501	OP-605	OP-603
AP-545	AP-510	AP-770	
EOP-02	EOP-04		
Rule 3	Rule 5		

Target Quantitative Attributes - Scenario 1	Actual Attributes
1. Total Malfunctions (5-8)	9
2. Malfunctions after EOP entry (1-2)	3
3. Abnormal Events (2-4)	2
4. Major Transients (1-2)	1
5. EOP's entered requiring substantive actions (1-2)	2
6. EOP contingencies requiring substantive actions (0-2)	1
7. Critical Tasks (2-3)	3

Op-Test No: N-3 Scenario No: 3 Event No: 1 Page 1 of 1

Initiation: Examiner Initiated **Annunciator Alarms:** N-3-1
Termination: Power reduction in progress IAW AP-510
Event Description: CDP-1B demand fails to 0% **(Malf)** . ANN Alarm N-3-2 "CD PUMP B UNCOUPLED". Condensate flow decreases and DFT level begins to lower.

Time	Position	Applicant's Actions or Behavior
	BOP	Diagnoses the failure of CDP-1B • CD Flow Decreasing • DFT Level Decreasing • Hotwell Level Increasing • CDP-1B Controller Demand at 0% Pulls and reviews AR-602 for ANN Alarm N-3-2 Notifies the SRO of CDP-1B failure
	SRO	Directs BOP to take CDP-1B controller to hand and to attempt to raise demand. Directs BOP to notify TBO to check CDP-1B operation
	BOP	Attempts to take manual control of CDP-1B Notifies SRO of failure of manual operation of CDP-1B Directs TBO to check out CDP-1B operation

Op-Test No: N-3	Scenario No: 3	Event No: 2	Page 1 of 1

Initiation: Power Reduction Commenced **Cue:** ULD lowered to 10% by OAC
Termination: Power stabilized within capability of one CDP (55% to 60% power.
Event Description: Reduce power to < 60% power IAW AP-510.

Time	Position	Applicant's Actions or Behavior
	SRO	When CDP-1B controller fails to respond, enters AP-510 and directs power reduction to within capability of one CDP OAC directed to lower power • Set load rate to 5%/min. • Lower ULD to 10% BOP directed to • Notify TBO to check out CDP-1B operation • Notify TBO power reduction (Take Demins off as necessary) • Notify TBO to verify ASV-27 operation
	OAC	Commence power reduction IAW SRO directions • Set load rate to 5%/min. • Lower ULD to 10% Monitors plant power reduction
	BOP	Notify TBO to check out CDP-1B operation Notify TBO power reduction (Take Demins off as necessary) Notify TBO to verify ASV-27 operation

Op-Test No: N-3 Scenario No: 3 Event No: 3 Page 1 of 2

Initiation: Examiner Initiated **Annunciator Alarms:** K-3-2

Termination: PORV closed and selected closed, Spray valve isolated, alternate pressure signal selected, Pressurizer heaters control in Auto, and Technical Specifications addressed.

Event Description: RPS Channel "B" Pressure (RC-3B-PT1) fails high **(Malf).** ANN Alarm K-3-2 "SASS MISMATCH" RPS channel trips on high pressure. PZR spray and PORV actuate. PZR Spray Valve fails open **(Malf).** SRO directs OAC to close PZR spray isolation valve. SRO evaluates and enters TS 3.3.1(A). SRO directs the BOP to select good pressure signal source IAW OP-501. SRO directs BOP to "Bypass" "B" RPS channel IAW OP-507.

Time	Position	Applicant's Actions or Behavior
	OAC	Diagnoses the failure of RCS pressure input to SASS and "B" RPS Channel • ANN Alarm K-3-2 "SASS MISMATCH" ◆ Event Point 0784 "RCS Narrow Range Pressure" • "B" Loop pressures increasing on recorders RC-3A-PIR1 and RC-3A-PIR2 • Spray Valve opens to 40% position if left in AUTO • ANN Alarm J-6-1 "RPS CHANNEL B TRIP" • PORV opens if left in AUTO ◆ PORV Ultra Sonic meter show flow ◆ ANN Alarm I-5-1 "PORV SAFETY VALVE OPEN ◊ Event Point 1959 "RCV-10" ◆ ANN Alarm I-6-1 "PORV SOLENOID ENERGIZED" Verifies actual RCS high pressure does not exist Notifies SRO of the failure
	SRO	Directs OAC to close the PORV or PORV Block valve Directs OAC to take manual control of the Spray Valve and close it. When Spray Valve fails to respond to OAC, directs OAC to close the Spray Block valve. Directs OAC to take manual control of Pressurizer heaters and stabilize RCS pressure. Evaluates and applies TS 3.3.1(A) for RPS channel
	OAC	Selects the PORV to "Closed" position and verifies PORV closed Selects Spray Valve to manual and attempts to close it. Reports failure of the Spray Valve to respond to manual control to SRO Closes Spray Block Valve Takes Pressurizer heater controls to hand and stabilizes RCS pressure

Op-Test No: N-3 Scenario No: 3 Event No: 3 Page 2 of 2

Initiation: Examiner Initiated **Annunciator Alarms:** K-3-2
Termination: PORV closed and selected closed, Spray valve isolated, alternate pressure signal selected, Pressurizer heaters control in Auto, and Technical Specifications addressed.
Event Description: RPS Channel "B" Pressure (RC-3B-PT1) fails high **(Malf)**. ANN Alarm K-3-2 "SASS MISMATCH" RPS channel trips on high pressure. PZR spray and PORV actuate. PZR Spray Valve fails open **(Malf)**. SRO directs OAC to close PZR spray isolation valve. SRO evaluates and enters TS 3.3.1(A). SRO directs the BOP to select good pressure signal source IAW OP-501. SRO directs BOP to "Bypass" "B" RPS channel IAW OP-507.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs BOP to select alternate RCS pressure instrument IAW OP-501 Directs OAC to return PORV and Pressurizer heaters to "Auto" Directs BOP to place "B" RPS channel in "Bypass" IAW OP-507 Provides Peer checking of BOP OP-507 actions
	BOP	Selects alternate RCS pressure instrument IAW OP-501 • Checks alternate instrument reading on RC-3A-PIR1 and RC-3B-PIR2 • Selects RC-3-HS toggle switch (SASS Cabinet) to RPS-A
	OAC	Selects PORV to Auto Selects Pressurizer heater controls to Auto
	BOP	Places "B" RPS channel in "Bypass" IAW OP-507 • Verifies no other RPS Channels Bypassed • Verifies no EFIC Channels Bypassed • Gets RPS Bypass Key out of locker • Selects "B" RPS Channel to Bypass

Op-Test No: N-3	Scenario No: 3	Event No: 4	Page 1 of 2

Initiation: Examiner Initiated **Annunciator Alarms:** L-3-3
Termination: Power stabilized at about 40-45% power.
Event Description: "A" Main Feed Pump oil system begins to degrade **(MALF)**. ANN Alarm L-3-3 "FWP TROUBLE". Three minutes into the failure the backup AC oil pump starts on low pressure. ANN Alarm I-1-3 "FWP A OIL PRESS LOW" and L-1-5 "FWP A EMERGENCY OIL PP AUTO START". Forty five seconds later the "A" Main Feedwater Pump will trip **(Malf)**, and ICS automatic runback to 55% power. Plant power will have to be reduced to 40-45% power to stabilize Tave and ΔTc. ANN ALARM L-1-1 "FWP A TRIP", L-4-1 "LOSS OF FW PP RUNBACK", and L-6-2 "UNIT MASTER IN TRACK"

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnose FWP-2A oil system problem • ANN Alarm L-3-3 "FWP TROUBLE" ◆ Event Point 1494 "Feedwater PP 2A Turb Lube FLTR diff press high" • 3 Minutes later the backup AC oil pump for FWP-2A auto starts ◆ ANN Alarm L-1-3 "FWP A OIL PRESS LOW" (3 minutes after L-3-3) ◆ ANN Alarm L-1-5 "FWP A EMERGENCY OIL PP AUTO START" ◆ FWP-4A ("A" FWP backup AC oil pump) running Notifies SRO of problem Monitors FWP-2A Control Oil and Lube Oil pressures
	SRO	Directs the BOP to notify the TBO of FWP-2A problems May decide to direct power reduction in case FWP-2A fails. If power reduction done, it should be IAW AP-510. May direct that FWP-2A be tripped and AP-545 actions performed
	OAC	When FWP-2A trips, performs immediate actions of AP-545. • Ensure plant runback in progress • Ensure FWV-28 opening • Ensure FWV-29 closing • Ensure FWV-30 closing

Op-Test No: N-3 Scenario No: 3 Event No: 4 Page 2 of 2

Initiation: Examiner Initiated **Annunciator Alarms:** L-3-3
Termination: Power stabilized at about 40-45% power.
Event Description: "A" Main Feed Pump oil system begins to degrade **(MALF)**. ANN Alarm L-3-3 "FWP TROUBLE". Three minutes into the failure the backup AC oil pump starts on low pressure. ANN Alarm I-1-3 "FWP A OIL PRESS LOW" and L-1-5 "FWP A EMERGENCY OIL PP AUTO START". Forty five seconds later the "A" Main Feedwater Pump will trip **(Malf)**, and ICS automatic runback to 55% power. Plant power will have to be reduced to 40-45% power to stabilize Tave and ΔTc. ANN ALARM L-1-1 "FWP A TRIP", L-4-1 "LOSS OF FW PP RUNBACK", and L-6-2 "UNIT MASTER IN TRACK"

Time	Position	Applicant's Actions or Behavior
	SRO	When FWP-2A trips, enters AP-545 and directs runback actions • Directs BOP to notify plant personnel • Directs OAC to ensure RCS pressure stabilized • Directs OAC to ensure Rx Power stabilized $\leq$ 45% • Directs OAC to ensure imbalance within limits • Direct that the PPO or CNO to place both of the FWP trip EFIC switches into the "BOTH" position. • Calls Chemistry for > 15% power change • Directs BOP/OAC to check that Regulating Rods are within insertion limits • Directs OAC to ensure all control rods are within 6.5% of their group average
	BOP	Notifies NSM, TBO, PPO, STA of loss of FWP-2A. Monitors balance of plant during the runback. Checks rod insertion curves for OAC Notify PPO or CNO to place both of the FWP trip EFIC switches into the "BOTH" position.
	OAC	Carry out actions of AP-545 as directed by SRO • Ensure Rx Power stabilized $\leq$ 45% • Ensure RCS pressure stabilized • Ensure imbalance within limits • Ensure that Regulating Rods are within insertion limits • Ensure all control rods are within 6.5% of their group average

Op-Test No: N-3	Scenario No: 3	Event No: 6	Page 1 of 1

Initiation: Examiner Initiated **Annunciator Alarms:** K-5-3

Termination: Power stabilized Rx and FW in Hand (Manual) control.

Event Description: "ICS Neutron Error fails to +9 **(Malf).** ANN Alarm K-5-3 "FW LIMITED BY RX" and K-6-2 "UNIT MASTER IN TRACK" SRO directs OAC to take manual control of Rx and Main FW to stabilize the plant.

Time	Position	Applicant's Actions or Behavior
	OAC	Diagnoses the Neutron Error Failure • ANN Alarm K-5-3 "FW LIMITED BY RX" • ANN Alarm K-6-2 "UNIT MASTER IN TRACK" • Neutron Error meter at +9 • Diamond Panel inserting control rods • FW flow increase to max. allowed with MBV's closed Notifies the SRO of failure
	SRO	Directs OAC to take Rx and FW demand stations to "Hand" and stabilize the plant.
	OAC	Takes Rx Diamond and Rx Demand stations to Manual/Hand Takes FW loop demand s to "Hand" Adjust FW flow to match Rx power and to stabilize the plant.
	BOP	Monitors balance of plant

Op-Test No: N-3	Scenario No: 3	Event No: 7	Page 1 of 1

Initiation: Examiner Initiated **Cue:** Rx Trip/Control room lighting reduced.
Termination: Plant stabilized on natural circulation with EFP-1 supplying OTSG's.
Event Description: "Loss of Startup Transformer **(Malf)** - This causes a loss of power to all unit buses and a loss of power to the "A" ES 4160 bus until the EDG recovers it. Control room lighting will be reduced until the "A" EDG re-energizes the "A" ES 4160 bus. EFIC actuates but fails to auto start EFP-1 **(Malf)**. SRO directs BOP to start EFP-1 **(CT#1)**.

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnose loss of Startup Transformer • Rx Trip • Loss of power to most secondary side equipment • Control room lighting reduced • "A" EDG starts and re-energizes "A" ES buses
	OAC	Performs Immediate actions of EOP-02 • Depress Rx trip push button • Verify group 1-7 fully inserted • Verify NI's indicate the Rx is shutdown • Depress Turbine trip push button • Verify TV's and GV's closed • Announces completion of EOP-02 Immediate actions
	BOP	Checks EFW operations • Notes EFW actuation • Notes EFP-1 not running • Carry out actions of EOP-13 Rule #3 • Start EFP-1
	SRO	Enters EOP-02 and re-verifies Immediate action • Directs OAC to depress Rx trip push button • Directs OAC to verify group 1-7 fully inserted • Directs OAC to verify NI's indicate the Rx is shutdown • Directs OAC to depress Turbine trip push button • Directs OAC to verify TV's and GV's closed Directs OAC/BOP to scan for symptoms
	BOP	Notifies SRO of auto start failure of EFP-1
	SRO	Directs BOP to start EFP-1 if not already running **(CT#1)** Directs BOP to control EFW IAW EOP-13 Rule #3

Op-Test No: N-3 Scenario No: 3 Event No: 8 Page 1 of 1

Initiation: 10 minutes after EFP-1 running **Annunciator Alarms:** H-7-4
Termination: EOP-4 actions being taken to put FWP-7 into service.
Event Description: "Ten minutes after EFP-1 started, EFP-1 shaft seizure occurs **(Malf)** and EFP-1 trips. ANN Alarm H-7-4 "EF PUMP 1 TRIP". SRO enters EOP-04.

Time	Position	Applicant's Actions or Behavior
	BOP	Diagnoses failure of EFP-1 • EFW flow goes to 0. • ANN Alarm H-7-4 "EF PUMP 1 TRIP". • EFP-1 green light lit. Notifies SRO of loss of all EFW
	SRO	Transitions to EOP-04 and directs actions • Plant personnel notified • PPO directed to perform EOP-14 enclosure #2 • SPO directed to open FWV-222 and FWV-223 • RCP's reduced to one per loop • Provides direction for the use of PORV if 2400# reached • Provides direction for Bypassing EFIC Isolation • At step 3.9 transitions to step 3.56 (Based upon OTSG available and FWP-7 available)
	OAC/BOP	Notify plant personnel of EOP-4 entry Directs PPO to perform EOP-14 enclosure #2 Direct SPO to open FWV-222 and FWV-223
	OAC	Reduce running RCP's to one per loop Monitors RCS pressure and operates PORV IAW SRO directions Monitors OTSG pressure and Bypasses EFIC Isolation IAW SRO direction

Op-Test No: N-3 Scenario No: 3 Event No: 9 Page 1 of 1

Initiation: EOP-04 direction **Cue:** EOP-14 enclosure 10 being used.
Termination: FWP-7 supplying the OTSG's.
Event Description: "SRO directs BOP to perform actions of EOP-14 enclosure #10 to place FWP-7 into service. **(CT#2)**

Time	Position	Applicant's Actions or Behavior
	SRO	Directs BOP to perform EOP-14 enclosure #10 to place FWP-7 into service. **(CT#2)** When FWP-7 available, directs BOP to feed OTSG's
	BOP	Performs EOP-14 enclosure #10 • Open breaker 3223 • Select MTDG-1 to "RUN" • Verify "RUN/MTDG-1" light (red) is lit. • Close Bkr 3225 • Verify 4160V REACTOR AUX BUS 3 voltage is stable. • Start FWP-7 Feed OTSG as directed by SRO

Op-Test No: N-3	Scenario No: 3	Event No: 10	Page 1 of 2

Initiation: Examiner Initiated **(OPTIONAL)** **Annunciator Alarms:** P-2-3
Termination: HPI/PORV cooling in progress.
Event Description: (OPTIONAL) When FWP-7 is in service and OTSG are being feed, MTDG-1 fails due to a fuel supply problem **(MALF)**. ANN Alarm P-2-3 "4 KV RX AUX BUS DEAD". SRO starts EOP-4 from beginning and directs actions to place the plant on HPI/PORV cooling **(CT#3)**.

Time	Position	Applicant's Actions or Behavior
	BOP	Diagnoses the loss of FWP-7 • ANN Alarm P-2-3 "4 KV RX AUX BUS DEAD". • Aux FW Flow goes to 0 • FWP-7 amp meter indicates 0. Notifies SRO of loss of FWP-7, loss of all feed capability
	SRO	Cycles back to the beginning of EOP-04 and provides direction to establish HPI/PORV cooling **(CT#3)**. Works through the first 8 steps again, but at step 3.9 should continue to step 3.10 (Loss of secondary cooling capability). • Direct BOP to establish full HPI ◆ Open MUV-73 ◆ Verify MUV-58 open ◆ Start MUP-1C with its required cooling ◊ RWP-3B ◊ DCP-1B ◊ MUP-1C ◆ Verify MUP-1B running ◆ Open MUV-23, 24, 25, & 26 ◆ Close MUV-27 ◆ Close MUV-49 • Directs OAC to ensure RCV-11 open • Directs OAC to open PORV (RCV-10) • Directs OAC to shutdown running RCP when ASCM lost
	OAC	Operates PORV IAW direction given be SRO. • At 2400# open PORV • Close PORV when • If ASCM exist, then 10° > adequate SCM • If ASCM does not exist, then 1600#

Op-Test No: N-3	Scenario No: 3	Event No: 10	Page 2 of 2

Initiation: Examiner Initiated **(OPTIONAL)** **Annunciator Alarms:** P-2-3
Termination: HPI/PORV cooling in progress.
Event Description: **(OPTIONAL)** When FWP-7 is in service and OTSG are being feed, MTGT-1 fails due to a fuel supply problem **(MALF)**. ANN Alarm P-2-3 "4 KV RX AUX BUS DEAD". SRO starts EOP-4 from beginning and directs actions to place the plant on HPI/PORV cooling **(CT#3)**.

Time	Position	Applicant's Actions or Behavior
	BOP	Establishes full HPI **(CT#3)** • Open MUV-73 • Verify MUV-58 open • Start MUP-1C with its required cooling ◆ RWP-3B ◆ DCP-1B ◆ MUP-1C • Verify MUP-1B running • Open MUV-23, 24, 25, & 26 • Close MUV-27 • Close MUV-49
	OAC	Open PORV IAW SRO direction • Full HPI then open PORV and leave it open **(CT#3)**

Examination Setup/Execution
Scenario 1

Scenario Setup

1. [ ] Initialize the simulator to 75% power and UNFREEZE the simulator.
2. [ ] Shutdown RCP-1C and perform the following:

- [ ] Select RC-5B-MS2 to TT3-Y position
- [ ] Insure SASS switch RC-3-HS selected to "RPS B" position
- [ ] Allow the plant to stabilize

2. [ ] In the "NRCEXAM" directory of LESSON PLAN, start lesson plan # 3
3. [ ] Trigger Lesson Plan Setup Step

4. Perform the following actions.

- [ ] Place WTP-6B in Pull-To-Lock
- [ ] Start SWP-1A and Shutdown SWP-1C
- [ ] Open Output Breaker 1661
- [ ] Open MOS 1661N
- [ ] Open MOS 1661S

5. Place the following Red Tags on the main control panel:

- [ ] ASV-5
- [ ] ASV-204
- [ ] MSV-55
- [ ] MSV-56
- [ ] WTP-6B
- [ ] BKR 1661
- [ ] MOS 1661N
- [ ] MOS 1661S
- [ ] MUP-1A
- [ ] RCP-1C

6. Ensure clean copies of the following "consumable" procedures are in the control room procedure books.

- [ ] EOP-02
- [ ] EOP-04
- [ ] AP-510
- [ ] AP-545
- [ ] OP-507

7. [ ] Advance all MCB recorders and remove line printer printouts and ensure ON-LINE.
8. [ ] Ensure all grease pencil marks on indicators and recorders are removed.
9. [ ] Ensure Batch Controller is Reset.
10. [ ] Ensure SPDS screens are Reset.
11. [ ] Review Turnover Sheet and ensure the simulator setup agrees with Turnover.
12. [ ] FREEZE the simulator and notify the lead examiner that simulator is ready to begin.

Scenario Execute

1 **When notified by the lead examiner**, UNFREEZE the simulator.

2 **CDP-1B CONTROLLER DEMAND FAILS TO 0**

When notified by the lead examiner, TRIGGER Lesson Plan Step #1 ("B" CDP Demand Fails To 0)

2.1 When TBO sent to check out CDP-1B, wait 3 minutes then report no apparent problems.

2.2 Take Demins off as necessary during the power reduction to 60%.

3 **"B" RPS PRESSURE FAILS HIGH / SPRAY VALVE FAILURE**

When notified by the lead examiner, TRIGGER Lesson Plan Step #2 ("B" RPS Press Fail, Spray Valve Fail)

3.1 When PPO/CNO sent to check EFIC channels not tripped, wait two (2) minutes then report via telephone that no EFIC channels are Bypassed.

4 **FWP-2A OIL SYSTEM FAILURE**

When notified by the lead examiner, TRIGGER Lesson Plan Step #3 ("A" MFWP Oil Sys Failure/Pump Trip)

4.1 This failure clogs the filter enough and oil system trouble alarm.

4.2 3 minutes later the auto start of backup AC oil pump occurs.

4.3 45 seconds after the backup AC oil pump starts the "A" MFWP will trip on low oil pressure

5 **ICS NEUTRON ERROR FAILS TO +9**

When notified by the lead examiner, TRIGGER Lesson Plan Step #4 (ICS Neutron Error Failure +9)

6 **STARTUP TRANSFORM FAULT, LOSS OF STARTUP and BEST TRANSFORMERS**

When notified by the lead examiner, TRIGGER Lesson Plan Step #5 (Loss of S/U Transformer, EFP-1 Fails To Auto Start)

6.1 When TBO directed to perform EOP-14 Enclosure 1, TRIGGER Lesson Plan Step #10. These action will take 23 minutes to be completed. Report them completed after this time period.

6.2 PPO will report "A" EDG & EFP-1 properly if control room calls.

7 **EFP-1 SHAFT SEIZURE 10 MINUTES AFTER STARTING**

10 minutes after EFP-1 is started, its shaft will seize up.

7.1 If called as PPO to check it out, wait 2 minutes then report pump not running, hot wiring smell in area.

7.2 When PPO directed to perform EOP-14 Enclosure #2, TRIGGER Lesson Plan Step #11. These actions will take 15 minutes to perform. About 10 minutes after triggering this step, call control room as PPO and request which H_2 analyzer to put in service and which sample point.

7.3 When SPO directed to open FWV-222 and 223, TRIGGER Lesson Plan Step #9. Wait about 3 minutes then report FWV-222 and 223 open

8 (OPTIONAL) MTDG-1 FAILURE, LOSS OF POWER FOR FWP-7

If notified by the lead examiner, TRIGGER Lesson Plan Step #7 (FWP-7 Failure, Loss Of All FW, PORV/HPI Cooling)

EXAM N-2
TURNOVER

A. Initial conditions:

1. Time in core life - 247 EFPD
2. Rx power and power history - 75% for 4 days
3. Boron concentration - 1088 PPMB
4. Xenon - Equilibrium
5. RCS Activity - Fuel 0.0005 uCi/ml

B. Tech. Spec. action requirement(s) in effect: 3.7.5(D) EFP-2 red tagged to mechanical maintenance for governor replacement. 6 hours into 72 hour action statement. EFP-2 is scheduled to be released for post maintenance testing in 4 hours.

C. Clearances in effect:

1. EFP-2 for governor replacement
2. WTP-6B (Demin Water Transfer Pump) for motor/pump realignment
3. MUP-1A to electrical maintenance to replace control power fuses. MUP-1A will be returned to service in two hours.
4. Breaker 1661, MOS 1661S, and MOS 1661N to Dispatcher. Breaker 1661 tripped open on previous shift (cause unknown). Line crew in 500 KV switchyard trouble shooting the breaker.
5. RCP-1C due to ground fault

D. Significant problems/abnormalities:

1. SWP-1A is running while engineering performs an analysis of anomalous vibration reading taken during last SP. Vibrations were within allowable limits but had increased from previous SP.

2. RCP-1C tripped 4 days ago. Electrical maintenance has determined that RCP-1C has a ground fault in its stator.

E. Evolution's/maintenance for the on-coming shift:

1. Perform post maintenance test of EFP-1 and MUP-1A when released from maintenance.

F. Units 1 and 2 status: On-Line

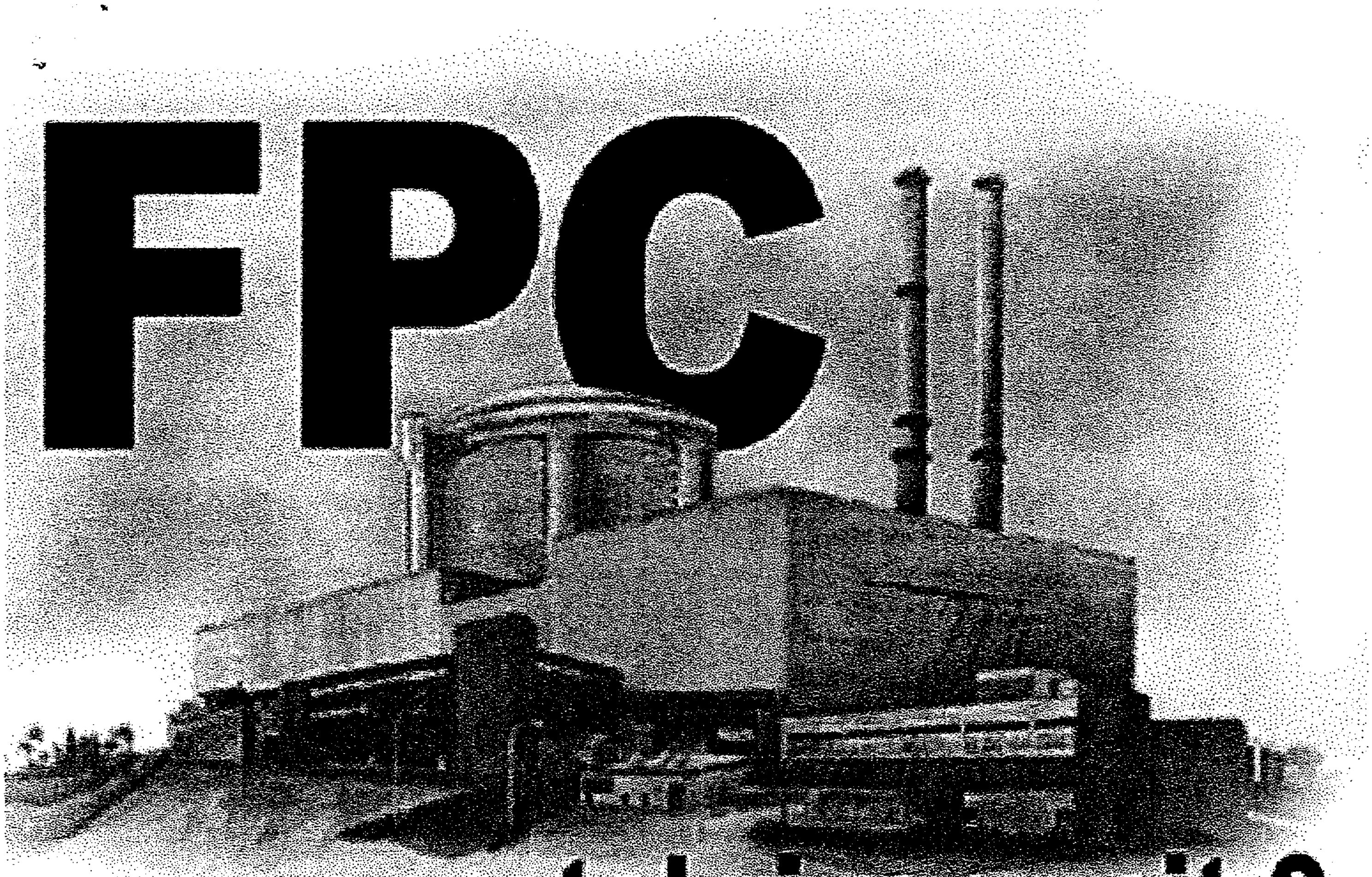
G. Units 4 and 5 status: On-Line

H. SSOD - Instruct the RO's to walk down the main control board and provide you with the following data:

1. RCS Average Temperature __________
2. RCS Pressure __________
3. Pressurizer Level __________
4. Make-up Tank Level __________
5. Turbine Load __________
6. Turbine Reference __________

NOTE: If full implementation of the emergency plan is not required for this exam.

FPC



crystal river unit 3

1999

Operating Examination

Simulator Scenarios

Book One

OPERATING EXAMINATION SCENARIO OUTLINE

Facility: Crystal River Unit 3 **Scenario Number:** 4 **Operating Test Number:** 1

Examiners: ______________________ **Operators:** ______________________

Objectives:

1. Evaluate SRO candidates ability to manage shift resources and exercise command and control during normal and emergency conditions.
2. Evaluate SRO candidates ability to implement emergency and abnormal operating procedures.
3. Evaluate SRO candidates ability to interpret and apply Tech Specs associated with RPS nuclear instrumentation operability.
4. Evaluate the SRO/RO in the reducing plant power with the Rx Diamond and Rx Demand stations in manual. Actions IAW OP-204
5. Evaluate SRO/RO candidates ability to respond to a toxic gas situation. Actions IAW AP-513. **(OPTIONAL)**
6. Evaluate SRO/RO candidates ability to diagnose and respond to a cooling water leak inside the containment on the supply line to RCP-1C.
7. Evaluate SRO/RO candidates ability to diagnose and respond to failure of ICS to re-ratio when RCP-1C is shutdown. Actions IAW OP-302 or AP-545.
8. Evaluate SRO/RO candidates ability to diagnose and respond to a loss of a second RCP and failure of RPS to initiate a reactor trip **(ATWS)**. Actions IAW AI-505 and EOP-02.
9. Evaluate SRO/RO candidates ability to diagnose and respond to a post trip overcooling event. Actions IAW EOP-05.

Initial Condition: The reactor is at 45% power with the Diamond and Reactor Demand stations in manual.

Turnover Information: Demin water transfer pump WTP-6B is out of service for motor/pump realignment. WTP-6B is scheduled for return to service in 10 hours. EFP-2 is OOS and red tagged to mechanical maintenance for governor replacement. The plant is six hours into a 72 hour actions statement based on TS 3.7.5(D). EFP-2 is scheduled to be released for post maintenance testing in 4 hours. MUP-1A is tagged to electrical maintenance to replace fuses in the DC start circuits. MUP-1A will be returned to service in two hours. SWP-1A is running while engineering performs an analysis of anomalous vibration readings taken during the last SP.

During the previous shift Breaker 1661 tripped - cause unknown. A line crew is in the 500 KV switchyard troubleshooting the breaker. Breaker 1661, MOS 1661N, and MOS 1661S are currently OPEN and red tagged to the dispatcher.

During the power increase the previous shift experienced some minor oscillations in Neutron Error. The Diamond and Reactor Demand stations were placed to manual and power was held at 45%. I&C identified and replaced a faulty memory module in the reactor demand subsystem. Operations engineering has recommended a 5% power change with the Diamond station in manual to verify the memory module is tracking. After the power change return the ICS to full auto and commence power increase to full power.

Event No.	Event Type*	Malf. No.	Event Description
1	(R) - OAC		Decrease Reactor power to 40% with the reactor demand station in manual and balance of plant tracking. Actions IAW OP-204.
2	(N) - OAC/SRO		When reactor power is stable at 40%, establish full ICS automatic operation. Actions IAW OP-504.
3.	(I) - ALL		Power Range NI-6 in the "B" RPS Channel fails high slowly **(MALF)**. ICS responds by driving rods in and cross-limiting FW to increase. RO's take manual control of RX and Feedwater and stabilize the plant. SRO evaluates and applies TS 3.3.1(A). SRO directs the RO's to select operable NI signal IAW OP-501 and to "Bypass" "B" RPS channel IAW OP-507.
4.	(N)-BOP/SRO		Units 1 & 2 call an report an on going toxic gas release (Chlorine) at the discharge canal cooling towers. Actions IAW AP-513 **(OPTIONAL)**.
5	(C) - ALL		RCP-1C cooling water header develops an 800 gpm leak in containment **(Malf)**. SW supply and return valves to RCP-1C are closed to stop the leak. Actions IAW AI-505, AR-303 and AP-330.
6	(N) - OAC/SRO		Shutdown RCP-1C within five minutes of losing SW cooling water flow. Actions IAW OP-302 limit and precaution.
7	(I) - OAC		ICS fails to re-ratio main feedwater flows when RCP-1C is shutdown **(Malf)**. FW Bailey stations are taken to manual and FW is manually re-ratioed. Actions IAW AP-545 or OP-302.
8	(MT) - All		RCP-1A trips **(MALF)**. 2 RPS channels fail to trip **(MALF) (ATWS)**. The OAC/SRO diagnose the ATWAS condition and initiate a manual reactor trip. **(CT#1)**. Actions IAW AI-505 memory items and EOP-02.
9	(MT) - All		Post trip, a MSSV on the "A" OTSG fails to fully re-seat **(MALF)** and the "A" Startup FW Control Valve is fails full open **(MALF)**. Crew diagnoses post trip overcooling and isolate the "A" OTSG. **(CT#2)** Actions IAW EOP-05.
Scenario Duration		120 minutes	**Exercise Termination:** Plant stable with primary to secondary heat transfer established with the "A" OTSG isolated.

*(N)ormal evolution, (R)eactivity manipulation, (I)instrument failure, (C)omponent failure, (M)ajor transient

Narrative Summary:

Operations engineering has recommended a 5% power change with the Diamond station in manual to verify the ICS reactor demand memory module is tracking properly. Plant management has directed a 5% power reduction to ensure power is kept well below MFW Block Valve operation setpoints. After the power decrease the crew returns the ICS to full auto and commence a power increase to full power.

When the ICS is in full "Auto" NI-6 ("B" RPS) fails high slowly **(MALF)**. ICS will respond to the failure by driving in control rods and cross-limiting (increasing) FW. OAC diagnoses the failed NI-6 instrument and informs the SRO. SRO directs OAC to take manual control of Rx and FW and stabilizes the plant. OAC verifies reactor stable on remaining NI channels. SRO directs the BOP to select SASS input to the ICS to an operable NI signal IAW OP-501. SRO directs the OAC to return ICS to full auto IAW OP-504. SRO evaluates and applies TS 3.3.1(A) and directs the BOP to "Bypass the "B" RPS Channel IAW OP-507. (TS directs RPS channel be "Tripped" or "Bypass" within one hour. It is expected that SRO will direct the channel be "Bypassed").

Optional Event - When the "B" RPS channel is "Bypassed", Unit 1 & 2 supervisor informs the crew that a chlorine leak has occurred at the helper cooling towers. SRO enters AP-513 and directs the BOP to place the Control Complex into Emergency recirculation. Crew should make a PA announcement and ensure building operators taking protective actions.

RCP-1C develops an 800 GPM SW leak on its on it's cooling water supply line inside the RB. The RO's diagnose the failure and inform the SRO. SRO directs the BOP to isolate SW to the RCP-1C. Actions IAW AR-303, AP-330 and AI-505. SRO/RO should track total time RCP-1C is without SW cooling and shutdown RCP-1C before 5 minutes is exceeded IAW OP-302 Limits and Precaution.

When RCP-1C is shutdown, ICS fails to properly re-ratio main feedwater. The OAC diagnoses the failure and informs the SRO. The SRO directs the OAC to take FW Loop Demands to hand and re-ratio main feedwater. SRO may also direct the Rx Diamond and Bailey to manual to ensure Rx power stable.

When feedwater has been reratioed and the plant stabilized RCP-1A trips. With RPS channel "B" in "Bypass" two additional RPS channels fail to trip following the loss of the second RCP **(MALF)**. The OAC/SRO diagnose a the **ATWS** condition and initiate a manual reactor trip **(CT#1)**. SRO enters EOP-02 and directs RO response. Actions IAW AI-505 memory items and EOP-02.

Post trip, one MSSV on the "A" OTSG fails to fully re-seat **(MALF) and** the "A" Startup FW Control Valve fails full open **(MALF)**. The RCS goes into a significant post trip overcooling transient. The OAC/BOP diagnose the post trip overcooling and notify the SRO. The SRO transitions to EOP-05 and directs RO response. The rate of OTSG "A pressure reduction will require that "A" OTSG be isolated manually to terminate the overcooling **(CT#2)**. When the overcooling transient has been terminated the SRO will transition back to EOP-02 and complete required actions. Actions IAW EOP-05 and EOP-02.

Procedures to be used during this scenario:

OP-204	OP-504	OP-302	OP-507
AP-330	AP-513	AP-545	
EOP-02	EOP-05		
Rule 3			

Target Quantitative Attributes - Scenario 1	Actual Attributes
1. Total Malfunctions (5-8)	6
2. Malfunctions after EOP entry (1-2)	2
3. Abnormal Events (2-4)	2
4. Major Transients (1-2)	2
5. EOP's entered requiring substantive actions (1-2)	2
6. EOP contingencies requiring substantive actions (0-2)	1
7. Critical Tasks (2-3)	2

Op-Test No: N-4 Scenario No: 4 Event No: 1 Page 1 of 1

Initiation: Turnover Sheet
Termination: Power reduced to about 40% by NI's.
Event Description: Decrease Reactor power to 40% with the reactor demand station in manual and balance of plant tracking. Actions IAW OP-204.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs OAC to reduce Rx power 5% with Rx in manual. Provide SRO reactivity management
	OAC	Commences to insert rod IAW OI-01 guidelines to establish Rx at about 40% by NI's • Announces the start and completion of each control rod manipulation. • Waits for SRO acknowledgment of the intention to move rods before rods are moved.
	BOP	PEER check OAC actions Monitor balance of plant

Op-Test No: N-4 Scenario No: 4 Event No: 2 Page 1 of 1

Initiation: Turnover Sheet
Termination: ICS returned to full "Auto" operation.
Event Description: When reactor power is stable at 40%, establish full ICS automatic operation. Actions IAW OP-504.

Time	Position	Applicant's Actions or Behavior
	SRO	Direct OAC to return ICS to full Auto IAW OP-504 • Diamond Panel selected to AUTO • "MEAS VAR" selected on Rx Bailey station • Tave Error verified to be a 0% (50% scale) • "POS" selected on Rx Bailey station • "AUTO" push-button on Rx Bailey station depressed • Verify that ICS comes out of "Track" and that plant is stable
	OAC	Return ICS to full Auto IAW OP-504 • Diamond Panel selected to AUTO • "MEAS VAR" selected on Rx Bailey station • Tave Error verified to be a 0% (50% scale) • "POS" selected on Rx Bailey station • "AUTO" pushbutton on Rx Bailey station depressed • Verify that ICS comes out of "Track" and that plant is stable
	BOP	PEER check OAC actions

Op-Test No: N-4	Scenario No: 4	Event No: 3	Page 1 of 3

Initiation: Examiner Initiated **Annunciator Alarm:** K-3-2 "SASS MISMATCH
Termination: "B" RPS Channel "Bypassed" and ICS back to full "Auto".
Event Description: Power Range NI-6 in the "B" RPS Channel fails high slowly **(MALF)**. Annunciator Alarms K-3-2 "SASS MISMATCH" and K-5-3 "FW LIMITED BY REACTOR". ICS responds by driving rods in and cross-limiting FW to increase. RO's take manual control of RX and Feedwater and stabilize the plant. SRO evaluates and applies TS 3.3.1(A). SRO directs the RO's to select operable NI signal IAW OP-501 and to "Bypass" "B" RPS channel IAW OP-507.

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnose a failure of NI input to ICS • Annunciator Alarm K-3-2 "SASS MISMATCH". ◆ Event Point 808 "Neutron Power" Mismatch • Annunciator Alarm K-5-3 "FW LIMITED BY REACTOR" • Rods inserting continuously • FW flow increasing due to cross-limit • Tave decreasing Notifies SRO of the failure
	SRO	Directs the OAC to take manual control of Rx and FW. Directs OAC to stabilize the plant using FW control stations.
	OAC	Selects the Diamond and Rx Bailey station to "Manual" Selects both FW loop demands to hand Reduce FW to balance with Rx power and stabilize the plant Monitors RCS • RCS Tave • RCS Pressure • Rx Power
	BOP	Monitor balance of plant • Pressurizer Level • RCS Pressure • Tave • Turbine

Op-Test No: N-4	Scenario No: 4	Event No: 3	Page 2 of 3

Initiation: Examiner Initiated **Annunciator Alarm:** K-3-2 "SASS MISMATCH
Termination: "B" RPS Channel "Bypassed" and ICS back to full "Auto".
Event Description: Power Range NI-6 in the "B" RPS Channel fails high slowly **(MALF)**. Annunciator Alarms K-3-2 "SASS MISMATCH" and K-5-3 "FW LIMITED BY REACTOR". ICS responds by driving rods in and cross-limiting FW to increase. RO's take manual control of RX and Feedwater and stabilize the plant. SRO evaluates and applies TS 3.3.1(A). SRO directs the RO's to select operable NI signal IAW OP-501 and to "Bypass" "B" RPS channel IAW OP-507.

Time	Position	Applicant's Actions or Behavior
	SRO	Reviews Technical Specification 3.3.1(A) and declares RPS Channel "B" in-operable. Directs BOP to place the "B" RPS channel in "Bypass" within one hour IAW TS and OP-507 and provides PEER checks of BOP actions. • Gets Key #1 for RPS cabinet doors and Key #2 for maintenance Bypass of and RPS channel. • Verifies no other channels of RPS are "Bypassed" or "Tripped" • Direct PPO or CNO to verify no channels of EFIC Bypassed • Open "B" RPS Cabinet and locate "Bypass" key switch on 880 Trip module. • Select 880 module to "Bypass" • Verify proper alarms received/clears for channel "Bypass" ◆ Annunciator Alarm J-6-1 "RPS CHANNEL B TRIP" clears ◆ Annunciator Alarm J-6-3 "RPS CHANNEL B BYPASSED" Directs the OAC to return RX Diamond, Rx Bailey, and FW loops to AUTO IAW OP-504 • Rx Diamond selected to AUTO • "MEAS-VAR" selected on Rx Bailey and Tave error verified to be 0% (50% meter position) • "POS" selected on Rx Bailey and Rx Bailey placed into AUTO • FW loop Demand Stations selected to "MEAS-VAR" and FW error verified to be 0% (505 meter position) • FW loop Demand Stations selected to "POS" and placed into AUTO. Directs the BOP to select SASS to NI-7/8 IAW OP-501 • Determine good signal present by checking NI-7 and NI-8 signal readings on the main control board or Group 59 display. • Locate SASS source selection switch IC-4112-HS2 in ES ACT. CABINET 4C (Note: This is not where it is located at in the plant. Simulator Deviation)

Op-Test No: N-4	Scenario No: 4	Event No: 3	Page 3 of 3

Initiation: Examiner Initiated **Annunciator Alarm:** K-3-2 "SASS MISMATCH
Termination: "B" RPS Channel "Bypassed" and ICS back to full "Auto".
Event Description: Power Range NI-6 in the "B" RPS Channel fails high slowly **(MALF)**. Annunciator Alarms K-3-2 "SASS MISMATCH" and K-5-3 "FW LIMITED BY REACTOR". ICS responds by driving rods in and cross-limiting FW to increase. RO's take manual control of RX and Feedwater and stabilize the plant. SRO evaluates and applies TS 3.3.1(A). SRO directs the RO's to select operable NI signal IAW OP-501 and to "Bypass" "B" RPS channel IAW OP-507.

Time	Position	Applicant's Actions or Behavior
	OAC	Return RX Diamond, Rx Bailey, and FW loops to AUTO IAW OP-504 once BOP has selected NI-7/8 for ICS input. • Rx Diamond selected to AUTO • "MEAS-VAR" selected on Rx Bailey and Tave error verified to be 0% (50% meter position) • "POS" selected on Rx Bailey and Rx Bailey placed into AUTO • FW loop Demand Stations selected to "MEAS-VAR" and FW error verified to be 0% (505 meter position) • FW loop Demand Stations selected to "POS" and placed into AUTO.
	BOP	Place the "B" RPS channel in "Bypass" IAW OP-507. • Get Key #1 for RPS cabinet doors and Key #2 for maintenance Bypass of and RPS channel. • Verify no other channels of RPS are "Bypassed" or "Tripped" • Direct PPO or CNO to verify no channels of EFIC Bypassed • Open "B" RPS Cabinet and locate "Bypass" key switch on 880 Trip module. • Select 880 module to "Bypass" • Verify proper alarms received for channel "Bypass" ◆ Annunciator Alarm J-6-1 "RPS CHANNEL B TRIP" clears ◆ Annunciator Alarm J-6-3 "RPS CHANNEL B BYPASSED" Select SASS to NI-7/8 IAW OP-501 • Determine good signal present by checking NI-7 and NI-8 signal readings on the main control board or Group 59 display. • Locate SASS source selection switch IC-4112-HS2 in ES ACT. CABINET 4C (Note: This is not where it is located at in the plant. Simulator Deviation)

Op-Test No: N-4	Scenario No: 4	Event No: 4	Page 1 of 2

Initiation: Examiner Initiated **(OPTIONAL)** **Cue:** Call From Unit 1&2 Supervisor
Termination: Control Complex Ventilation in Recirculation.
Event Description: Units 1 & 2 call an report an on going toxic gas release (Chlorine) at the discharge canal cooling towers. Actions IAW AP-513 **(OPTIONAL)**.

Time	Position	Applicant's Actions or Behavior
	SRO	When notified by Unit 1&2 supervisor that a Chlorine release is occurring and coming toward the plant, enters AP-513 and provides direction to crew. • Directs BOP to select CONTROL COMPLEX HVAC ISOLATE/RESET switches to "ISO" • Directs a PA announcement be made of the TOXIC gas situation. • Insures plant operators notified and taking protective actions. • Directs the BOP to verify CC dampers properly aligned ◆ AHD-12 closed ◆ AHD-12D Closed ◆ AHD-2C closed ◆ AHD-2E closed ◆ AHD-1C closed ◆ AHD-1E closed ◆ AHD-3 open • Directs the BOP to verify proper fan operation ◆ AHF-20 A&B stopped ◆ AHF-44 A&B stopped ◆ AHF-30 stopped • Notifies Health Physics to sample the Control Complex and Berm area
	OAC	Makes PA announcement to plant personnel of Toxic gas Ensure NSM/STA/PPO/SPO/CNO notifies of Toxic gas and taking protective actions.

Op-Test No: N-4	Scenario No: 4	Event No: 4	Page 2 of 2

Initiation: Examiner Initiated **(OPTIONAL)** **Cue:** Call From Unit 1&2 Supervisor
Termination: Control Complex Ventilation in Recirculation.
Event Description: Units 1 & 2 call an report an on going toxic gas release (Chlorine) at the discharge canal cooling towers. Actions IAW AP-513 **(OPTIONAL).**

Time	Position	Applicant's Actions or Behavior
	BOP	Select CONTROL COMPLEX HVAC ISOLATE/RESET switches to "ISO" Verify CC dampers properly aligned • AHD-12 closed • AHD-12D Closed • AHD-2C closed • AHD-2E closed • AHD-1C closed • AHD-1E closed • AHD-3 open Directs the BOP to verify proper fan operation • AHF-20 A&B stopped • AHF-44 A&B stopped • AHF-30 stopped

Op-Test No: N-4	Scenario No: 4	Event No: 5	Page 1 of 1

Initiation: Examiner Initiated **Annunciator Alarm:** C-1-12 "REACTOR BLDG SW SYSTEM LEAK"
Termination: SW isolated to RCP-1C.
Event Description: RCP-1C cooling water header develops an 800 gpm leak in containment **(Malf)**. Annunciator Alarms C-1-12 "REACTOR BLDG SW SYSTEM LEAK" and I-3-3 "RC PUMP C CLG WTR FLOW LOW". SW supply and return valves to RCP-1C are closed to stop the leak. Actions IAW AI-505, AR-303 and AP-330.

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnoses SW system leak on RCP-1C. • Annunciator Alarm C-1-12 "REACTOR BLDG SW SYSTEM LEAK" • Annunciator Alarm I-3-3 "RC PUMP C CLG WTR FLOW LOW". • SW surge tank level decrease • RB Sump level increase Notifies SRO of leak on RCP-1C SW line.
	SRO	Directs BOP to isolate SW to and from RCP-1C IAW AI-505 guidance for isolation of leaks. • Close SWV-82 • Close SWV-86 Directs OAC to shutdown RCP-1C within 5 minutes of loss of SW cooling (Limit and Precaution of OP-302 Should do a fast pre-job brief before shutting down RCP-1C to ensure RO's know expected actions.
	OAC	Tracks time RCP-1C operated without SW cooling. PEER check BOP actions to isolate SW to RCP-1C
	BOP	Isolates SW to RCP-1C • Close SWV-82 • Close SWV-86 Open SWV-277 to bring SW surge Tank level back to normal.

Op-Test No: N-4	Scenario No: 4	Event No: 6	Page 1 of 1

Initiation: Loss of all SW to RCP-1C
Termination: RCP-1C shutdown.
Event Description: Shutdown RCP-1C within five minutes of losing SW cooling water flow. Actions IAW OP-302 limit and precaution.

Time	Position	Applicant's Actions or Behavior
	SRO	Should hold quick job pre-brief before shutting down RCP-1C to cover expected RO actions. • If AP-545 actions to be performed by OAC ♦ Power level < 75% already ♦ FW re-ratio "A" side increase, "B" side decrease • IF OP-302 to be used to shutdown RCP-1C ♦ RCS pressure control swapped to "B" loop ♦ Narrow Range Tc selected to loop with operating RCP (RC-5B-MS2 selected to TT-3) ♦ lift oil pump started ♦ RCP -1C shutdown Directs OAC to shutdown RCP-1C IAW OP-302 or AP-545 dependent upon length of time taken to isolate SW to RCP and how close the 5 minute limit.
	OAC	Shutdown RCP-1C • If AP-545 actions to be performed by OAC ♦ Check power level < 75% already ♦ RCP-1C shutdown ♦ Check FW re-ratio "A" side increase, "B" side decrease • IF OP-302 to be used to shutdown RCP-1C ♦ RCS pressure control swapped to "B" loop ♦ Narrow Range Tc selected to loop with operating RCP (RC-5B-MS2 selected to TT-3) ♦ lift oil pump started ♦ RCP -1C shutdown ♦ Check FW re-ratio "A" side increase, "B" side decrease
	BOP	PEER check OAC actions.

Op-Test No: N-4 Scenario No: 4 Event No: 7 Page 1 of 1

Initiation: RCP-1C shutdown
Termination: FW manually re-ratioed and plant stable
Event Description: ICS fails to re-ratio main feedwater flows when RCP-1C is shutdown **(Malf).** FW Bailey stations are taken to manual and FW is manually re-ratioed. Actions IAW AP-545 or OP-302.

Time	Position	Applicant's Actions or Behavior
	OAC	Diagnoses failure of ICS to re-ration FW when RCP-1C shutdown • FW flow do not change Informs the SRO and takes manual control of FW loops "A" and "B" May also take the Reactor to manual to give stable power platform to match FW to.
	SRO	Directs OAC to take FW loops to hand and re-ratio FW to the OTSG's. If AP-545 used: • Ensures MFW flow re-ratioed • RCS pressure stabilized • Lift oil pump running • Narrow range Tc selected to loop with operating RCP. (RC-5B-MS2 selected to TT-3) • ΔTc between -5 and +5 • Vital plant parameters (PZR LVL, Tave, MS Hdr Press) approaching stability • Imbalance checked within limits • Narrow Range RCS pressure verified on "B" loop
	OAC	Manually re-ratio FW to the OTSG and stabilizes the plant. If AP-545 used: • Ensures MFW flow re-ratioed • RCS pressure stabilized • Lift oil pump running • Narrow range Tc selected to loop with operating RCP. (RC-5B-MS2 selected to TT-3) • ΔTc stabilized between -5 and +5 • Vital plant parameters (PZR LVL, Tave, MS Hdr Press) approaching stability • Imbalance checked within limits
	BOP	Monitors balance of plant Select "B" loop for RCS pressure control (SASS switch RC-3-HS verified selected to "B" RPS)

Op-Test No: ______ Scenario No: __________ Event No: 8 Page 1 of 1

Initiation: Examiner Initiated **Annunciator Alarm:** I-1-1 "RC PUMP A TRIP"
Termination: Reactor tripped and EOP-02 immediate action performed and verified.
Event Description: RCP-1A trips **(MALF)**. 2 RPS channels fail to trip **(MALF) (ATWS)**. Annunciator Alarms I-1-1 "RC PUMP A TRIP" and J-7-1 RPS CHANNEL C TRIP". The OAC/SRO diagnose the ATWAS condition and initiate a manual reactor trip. **(CT#1)**. Actions IAW AI-505 memory items and EOP-02.

Time	Position	Applicant's Actions or Behavior
	OAC	Diagnoses condition which requires Rx trip (ATWAS) • Annunciator Alarm I-1-1 "RC PUMP A TRIP" • Annunciator Alarm J-7-1 RPS CHANNEL C TRIP" • Only two RCP remaining, requiring Rx Trip • RCS pressure increasing to above trip setpoint, requiring Rx trip SRO notified of tripping the plant manually due to setpoints exceeded **(CT#1)**
	SRO	Directs OAC to trip plant and carry out EOP-02 immediate actions. **(CT#1)** Once OAC finished with first pass of immediate actions, immediate actions verified by SRO • Rx trip pushbutton depressed • Groups 1-7 full inserted • NI's indicate Rx shutdown • Turbine trip push-button depressed • GV's and TV's verified closed
	OAC	Performs immediate actions of EOP-02 • Rx trip pushbutton depressed • Groups 1-7 full inserted • NI's indicate Rx shutdown • Turbine trip push-button depressed • GV's and TV's verified closed Immediate actions verified with SRO • Rx trip pushbutton depressed • Groups 1-7 full inserted • NI's indicate Rx shutdown • Turbine trip push-button depressed • GV's and TV's verified closed
	BOP	Monitors balance of plant and scanning for symptoms

Op-Test No: N-4 Scenario No: 4 Event No: 9 Page 1 of 2

Initiation: Rx Trip
Termination: "A" OTSG isolated and plant temperature stabilized
Event Description: Post trip, a MSSV on the "A" OTSG fails to fully re-seat **(MALF)** and the "A" Startup FW Control Valve is fails full open **(MALF)**. Crew diagnoses post trip overcooling and isolate the "A" OTSG. **(CT#2)** Actions IAW EOP-05.

Time	Position	Applicant's Actions or Behavior
	OAC/BOP	Diagnose overcooling event • "A" OTSG pressure decreasing • Tave < normal 555°F and decreasing • SPDS displays indicate overcooling event trace • "A" OTSG level increasing • "A" FW flow high Notifies SRO of overcooling symptoms
	SRO	Enter EOP-05 and directs the BOP to isolate the "A" OTSG • MS Isolation pushbutton depressed • FW Isolation push-buttons depressed • EFV-58 selected to manual and closed Directs OAC to maintain PZR level • If level < 50" ◆ Close MUV-49 ◆ Open MUV-24 ◆ Open MUV-73 & ensure open MUV-28 ◆ Start second MUP if needed and open additional valves ◊ Start DCP-1B ◊ Start RWP-3B ◊ Start MUP-1C ◊ Open MUV-23, 25, 26 and necessary Direct the OAC to stabilize RCS temperature when overcooling terminated.

Op-Test No: N-4	Scenario No: 4	Event No: 9	Page 2 of 2

Initiation: Rx Trip
Termination: "A" OTSG isolated and plant temperature stabilized
Event Description: Post trip, a MSSV on the "A" OTSG fails to fully re-seat **(MALF)** and the "A" Startup FW Control Valve is fails full open **(MALF)**. Crew diagnoses post trip overcooling and isolate the "A" OTSG. **(CT#2)** Actions IAW EOP-05.

Time	Position	Applicant's Actions or Behavior
	BOP	Depress the "A" OTSG MS Isolation push-buttons • Verifies MSV-411 and 412 closed Depress the "A" OTSG MFW Isolation push-buttons • Verifies FWP-2A tripped • Verifies following valves closed ◆ FWV-31 ◆ FWV-30 ◆ FWV-36 ◆ FWV-28 ◆ FWV-14 • Close EFV-58
	OAC	Maintain PZR level • If level < 50" ◆ Close MUV-49 ◆ Open MUV-24 ◆ Open MUV-73 & ensure open MUV-28 ◆ Start second MUP if needed and open additional valves ◊ Start DCP-1B ◊ Start RWP-3B ◊ Start MUP-1C ◊ Open MUV-23, 25, 26 and necessary When overcooling stopped, stabilizes RCS temperature using the TBV's

Examination Setup/Execution
Scenario 4

Scenario Setup

1. [ ] Initialize the simulator to 45% power and UNFREEZE the simulator.
2. [ ] In the "NRCEXAM" directory of LESSON PLAN, start lesson plan # 4
3. [ ] Trigger Lesson Plan Setup Step

4. Perform the following actions.

- [ ] Place WTP-6B in Pull-To-Lock
- [ ] Start SWP-1A and Shutdown SWP-1C
- [ ] Open Output Breaker 1661
- [ ] Open MOS 1661N
- [ ] Open MOS 1661S
- [ ] Select "Manual" on the Diamond Control Panel
- [ ] Select "Hand" on the Reactor Bailey station.

5. Place the following Red Tags on the main control panel:

- [ ] ASV-5
- [ ] ASV-204
- [ ] MSV-55
- [ ] MSV-56
- [ ] WTP-6B
- [ ] BKR 1661
- [ ] MOS 1661N
- [ ] MOS 1661S
- [ ] MUP-1A

6. Ensure clean copies of the following "consumable" procedures are in the control room procedure books.

- [ ] OP-204
- [ ] OP-504
- [ ] OP-507
- [ ] AP-330
- [ ] AP-513
- [ ] AP-545
- [ ] EOP-02
- [ ] EOP-05

7. [ ] Advance all MCB recorders and remove line printer printouts and ensure ON-LINE.
8. [ ] Ensure all grease pencil marks on indicators and recorders are removed.
9. [ ] Ensure Batch Controller is Reset.
10. [ ] Ensure SPDS screens are Reset.
11. [ ] Review Turnover Sheet and ensure the simulator setup agrees with Turnover.
12. [ ] FREEZE the simulator and notify the lead examiner that simulator is ready to begin.

Scenario Execute

1 **When notified by the lead examiner,** UNFREEZE the simulator.

2 **NI-6 FAIL HIGH SLOWLY (EVENT #3)**

When notified by the lead examiner, TRIGGER Lesson Plan Step #1 (NI-6 Fail High Slowly)

2.1 When PPO/CNO sent to check that EFIC channels are not bypassed, wait 1 minute then report all EFIC channels operable (None Bypassed).

3 **UNIT 1&2 TOXIC GAS REPORT (EVENT #4 - OPTIONAL)**

If notified by the lead examiner, call the as the Unit 1&2 supervisor and report a very bad Chlorine leak at the discharge canal cooling towers. It appears the wind is taking it toward Unit #3.

3.1 When PPO/SPO warned of the toxic gas conditions, report that they are both in the control complex area. SPO in the break room, PPO in the office with NSM.

4 **SW LEAK ON RCP-1C SUPPLY LINE (EVENT #5)**

When notified by the lead examiner, TRIGGER Lesson Plan Step #2 (RCP-1C SW LEAK)

4.1 This failure is an 800 gpm RCP-1C SW supply line leak.

5 **RCP-1A TRIP, NO RX TRIP (ATWAS) (EVENT #8)**

When notified by the lead examiner, TRIGGER Lesson Plan Step #3 (RCP-1A TRIP)

6 **POST TRIP OVERCOOLING (EVENT #9) (CONDITIONAL)**

When the reactor is tripped, Lesson Plan Step #4 will activate (POST TRIP OVERCOOLING)

6.1 This step will fail the "B" SUCV full open and fail one MSSV on the "B" OTSG open. This results in an over feed and over steaming condition on the "B" OTSG.

EXAM N-2
TURNOVER

A. Initial conditions:

1. Time in core life - 247 EFPD
2. Rx power and power history - 45% for 2 hours
3. Boron concentration - 1088 PPMB
4. Xenon - Equilibrium
5. RCS Activity - Fuel 0.0005 uCi/ml

B. Tech. Spec. action requirement(s) in effect: 3.7.5(D) EFP-2 red tagged to mechanical maintenance for governor replacement. 6 hours into 72 hour action statement. EFP-2 is scheduled to be released for post maintenance testing in 4 hours.

C. Clearances in effect:

1. EFP-2 for governor replacement
2. WTP-6B (Demin Water Transfer Pump) for motor/pump realignment
3. MUP-1A to electrical maintenance to replace control power fuses. MUP-1A will be returned to service in two hours.
4. Breaker 1661, MOS 1661S, and MOS 1661N to Dispatcher. Breaker 1661 tripped open on previous shift (cause unknown). Line crew in 500 KV switchyard trouble shooting the breaker.

D. Significant problems/abnormalities:

1. SWP-1A is running while engineering performs an analysis of anomalous vibration reading taken during last SP. Vibrations were within allowable limits but had increased from previous SP.

2. During the power increase the previous shift experienced some minor oscillations in Neutron Error. The Diamond and Reactor Demand stations were placed to manual and power was held at 45%. I&C identified and replaced a faulty memory module in the reactor demand subsystem. Operations engineering has recommended a 5% power change with the Diamond station in manual to verify the memory module is tracking. After the power change return the ICS to full auto and commence power increase to full power. Operation management wants 5% power reduction done instead of power increase to stay clear of Main FW Block valve operation

E. Evolution's/maintenance for the on-coming shift:

1. Perform post maintenance test of EFP-1 and MUP-1A when released from maintenance.

2. Perform a 5% power reduction with Rx in manual then return Rx to Auto.

3. Once ICS back in full auto, continue with plant power increase.

F. Units 1 and 2 status: On-Line

G. Units 4 and 5 status: On-Line

EXAM N-2
TURNOVER

H. SSOD - Instruct the RO's to walk down the main control board and provide you with the following data:

1. RCS Average Temperature ________
2. RCS Pressure ________
3. Pressurizer Level ________
4. Make-up Tank Level ________
5. Turbine Load ________
6. Turbine Reference ________

NOTE: If full implementation of the emergency plan is not required for this exam.