

FINAL SUBMITTAL

FARLEY INITIAL EXAM
50-348 & 50-364/2001-301

JULY 23 - 27, 2001

FINAL RO WRITTEN EXAMINATION

**AS-GIVEN WITH ANSWER KEY
AND REFERENCE MATERIAL**

RESPONSE BOOKLET REPORT
for Farley 2001-301 RO Test Test Form: 0

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

Applicant Information

Name:	Region: II
Date: 07/30/2001	Facility/Unit: Farley Nuclear Plant
License Level: RO	Reactor Type: W
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected six hours after the examination starts.

Applicant Certification

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

Applicant's Signature

Results

Examination Value	_____	Points
Applicant's Score	_____	Points
Applicant's Grade	_____	Percent

Farley 2001-301 RO Test

1.

A reactor startup is in progress from a shutdown condition with all control rods fully inserted. Shutdown rods are fully withdrawn.

While withdrawing the control rods to achieve criticality, the Reactor Operator fails to notice that rod speed is 30 steps/min rather than the normal 48 steps/min.

Which ONE of the following describes the effects the slower rod speed will have on actual critical conditions verses the predicted critical conditions of the ECC?

- A. Actual critical rod height will be higher than predicted critical rod height with actual power level the same as predicted.
- B. Actual critical rod height will be the same as predicted critical rod height with actual power level higher than predicted.
- C. Actual critical rod height will be higher than predicted critical rod height with actual power level lower than predicted.
- D. Actual critical rod height will be lower than predicted critical rod height with actual power level higher than predicted.

2.

The positive reactivity addition during a continuous rod withdrawal event at power is minimized by which ONE of the following?

- A. Increasing the Rod Insertion Limit (RIL) as power increases.
- B. Maintaining the control bank at the RIL to provide immediate negative reactivity.
- C. Increasing the minimum required Shutdown Margin (SDM) as power increases.
- D. Maintaining rods almost fully withdrawn from the core during power operations.

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3.

Which ONE of the following will result in the largest reactivity change?

(References are provided.)

- A. Inserting 10 steps with rods initially at 190 steps on Control Bank 'D' at 100% power at 50 MWD/MTU.
- B. Inserting 10 steps with rods initially at 190 steps on Control Bank 'D' at 0% power at 11,500 MWD/MTU.
- C. Withdrawing 10 steps with rods initially at 190 steps on Control Bank 'D' at 100% power at 50 MWD/MTU.
- D. Withdrawing 10 steps with rods initially at 190 steps on Control Bank 'D' at 0% power at 11,500 MWD/MTU.

4.

Preparations are being made for starting up the reactor per UOP-1.2, "STARTUP OF UNIT FROM HOT STANDBY TO MINIMUM LOAD." The announcement has been made on the plant PA system that 'Reactor Startup is Commencing'. The SS directs you to withdrawal rods in manual to establish reactor criticality.

While pulling rods the following annunciator is received:

- FA1, "SR HI FLUX AT S/D"
- Source Range (SR) indications for N-31 and N-32 read 2000 cps.

Which ONE of the following describes the actions that must be taken?

- A. Inform the SS that this is an expected alarm that will clear when the Source Ranges are deenergized and continue with the reactor startup.
- B. Suspend all operations involving positive reactivity additions, then emergency borate the RCS in accordance with AOP-27, "EMERGENCY BORATION."
- C. Suspend all operations involving positive reactivity additions, then immediately open the Reactor Trip breakers.
- D. Inform the SS that the alarm is unexpected. The "High Flux At Shutdown" switches on N-31 and N-32 must be placed in BLOCK prior to recommencing the reactor startup.

5.

While at 28% reactor power with a Unit 1 startup in progress, 1C Reactor Coolant Pump trips due to an overcurrent condition.

Assume no operator action and no rod motion occurs.

Which ONE of the following describes the Reactor and Tavg initial response?

- A. A reactor trip WILL occur and Loops A and B Tavg increases.
- B. A reactor trip WILL occur and Loops A and B Tavg decreases.
- C. A reactor trip will NOT occur and Loops A and B Tavg decreases.
- D. A reactor trip will NOT occur and Loops A and B Tavg increases.

Farley 2001-301 RO Test

6.

During a reactor startup, Control Bank D rods are at 10 steps withdrawn when Control Bank D rod 'P8' drops to the bottom.

Which ONE of the following describes the expected response of the "Rod at Bottom" alarm and the reason for that response?

- A. Actuated since bank overlap has already occurred between Control Bank A and Control Bank B.
- B. NOT actuated because Control Bank D rods are below 12 steps.
- C. Actuated because all Shutdown Bank rods are above 211 steps.
- D. NOT actuated because Control Bank C rods are below 211 steps.

7.

Unit 2 is at 100% steady-state power. All systems are in automatic and functioning properly.

The following annunciators are received:

- DC1, "RCP #1 SEAL LKOF FLOW LO"
- DA5, "2A RCP #2 SEAL LKOF FLOW HI"

The plant operator notes the following parameters:

	RCP	2A	2B	2C
#1 seal injection flow (gpm)		8.4	8.3	8.4
#1 seal leakoff flow (gpm)		0.0	4.0	4.0
#1 seal D/P (psid)		>400	>400	>400
RCP radial brg. temp (F)		190	184	183

Which ONE of the following is the most probable cause of these indications?

- A. 2A RCP #1 seal failure.
- B. Seal injection flow raised.
- C. 2A RCP #2 seal failure.
- D. A break in the 2A RCP #2 seal leakoff line.

Farley 2001-301 RO Test

8.

Which ONE of the following best describes the lubrication for the Reactor Coolant Pump (RCP) upper radial bearing under NORMAL steady-state operation?

- A. Receives lubrication from the seal injection water flowing up the RCP shaft.
- B. Receives lubrication from the RCP oil lift system.
- C. Receives lubrication from the Component Cooling Water system.
- D. Receives lubrication from the internal thrust runner driven pump.

9.

Operators are in the process of placing a CVCS mixed bed demineralizer with new resin into service when the RO notes the following primary system parameters:

- Reactor power is 101.2% and increasing.
- Tavg is 577 degrees F and increasing.
- Gross megawatts increased by 5 MWe without operator action.
- Rod control is in manual.

Which ONE of the following describes the most probable cause of these plant conditions?

- A. TCV-143, Temperature Divert Valve, is in the VCT position.
- B. Only Cation resin was placed in the demineralizer.
- C. The demineralizer was not sufficiently flushed prior to placing it in service.
- D. Only Anion resin was placed in the demineralizer.

10.

Charging, letdown and the pressurizer level control systems are operating in automatic. The selected pressurizer level channel (LT-459) has failed low.

Alarm DD1, "RCP SEAL INJ FLOW LO," annunciated a short time after LT-459 failed low.

Which ONE of the following describes the reason for the above alarm?

- A. The isolation of letdown caused charging flow to decrease and the seal injection header flow diminished due to the increasing pressure on the charging header.
- B. The loss of the pressurizer heaters caused charging flow to decrease and the seal injection header flow diminished due to the increasing pressure on the charging header.
- C. As charging flow increased, the D/P across the seal injection filter rose and the seal injection header flow diminished due to the increased resistance to flow.
- D. As charging flow increased, the seal injection header flow diminished due to the decreasing pressure on the charging header.

11.

Unit 1 has experienced a reactor/turbine trip from full power.

While performing FNP-1-ESP-0.1, "REACTOR TRIP RESPONSE," it is observed that the 'Rod Bottom' light is NOT lit for control rod 'M6' in Control Bank 'B'. DRPI shows control rod 'M6' at 228 steps.

Which ONE of the following actions must be performed in accordance with FNP-1-ESP-0.1, "REACTOR TRIP RESPONSE," in response to this condition?

- A. No action is required.
- B. An emergency boration of at least 2500 gallons is required.
- C. An emergency boration of at least 5000 gallons is required.
- D. Verify shutdown margin within the limits provided in the COLR.

12.

Given the following conditions on Unit 1:

- Reactor power is at 73%.
- Turbine load is being slowly increased.
- Control Bank D rod 'B8' indicates 144 steps.
- Control Bank D rod 'K6' indicates 156 steps.
- Remaining Control Bank 'D' rods indicate 168 steps.
- Control Bank D is being moved as required to maintain Delta I.
- Rod 'B8' does NOT move when Control Bank D is moved 'out' or 'in'.
- Rod 'K6' does move when Control Bank D is moved 'out' or 'in'.

Which ONE of the following describes the action required to be taken within one hour?

- A. Be in Mode 3, Hot Standby.
- B. Reduce turbine load and insert Control Bank D to 155 steps.
- C. Trip the reactor immediately and go to EEP-0, "REACTOR TRIP OR SAFETY INJECTION."
- D. Determine that the shutdown margin is within the limits specified in the COLR.

13.

Which ONE of the following describes an adverse consequence of exceeding the upper limit on accumulator nitrogen pressure?

- A. Accumulator pressure and RCS pressure will equalize before sufficient water has injected.
- B. Too little water volume would be available in the accumulator to refill the vessel.
- C. Accumulators could inject during a steamline break.
- D. Accumulator relief valve actuation and loss of accumulator integrity.

14.

Given the following plant conditions for Unit 1:

- Unit 1 reactor tripped 45 seconds ago.
- All Main Turbine Governor and Throttle Valves are closed.
- Main Generator output breakers are closed.

Which ONE of the following states the condition of the generator and the correct operator response?

- A. Generator exciter has failed; place the MAIN TURB EMERG TRIP switch to trip for 5 seconds.
- B. Generator is motoring; place the MAIN TURB EMERG TRIP switch to trip for 5 seconds.
- C. Generator is motoring; verify REVERSE POWER handswitch in BYPASS then open the 230 KV breakers 810 and 914.
- D. Generator exciter has failed; locally open the 230 KV breakers 810 and 914.

15.

Which ONE of the following describes an adverse consequence of exceeding the upper limit on accumulator nitrogen pressure?

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- B. Too little water volume would be available in the accumulator to refill the vessel.
- C. Accumulators could inject during a steamline break.
- D. Accumulator relief valve actuation and loss of accumulator integrity.

16.

Given the following plant conditions for Unit 1:

- Unit 1 reactor tripped 45 seconds ago.
- All Main Turbine Governor and Throttle Valves are closed.
- Main Generator output breakers are closed.

Which ONE of the following states the condition of the generator and the correct operator response?

- A. Generator exciter has failed; place the MAIN TURB EMERG TRIP switch to trip for 5 seconds.
- B. Generator is motoring; place the MAIN TURB EMERG TRIP switch to trip for 5 seconds.
- C. Generator is motoring; verify REVERSE POWER handswitch in BYPASS then open the 230 KV breakers 810 and 914.
- D. Generator exciter has failed; locally open the 230 KV breakers 810 and 914.

17.

Unit 1 experienced a load rejection that has resulted in a suspected fuel element failure. During the load rejection the Pressurizer PORV relieved to the PRT. The PRT pressure increased to approximately 100 psig and then decreased rapidly. Unit 1 has ramped down to 15% reactor power to allow a Planned Special Exposure (PSE) containment entry for investigative purposes.

Which ONE of the following exposure limits shall NOT BE EXCEEDED due specifically to the PSE limits?

- A. 25 rem total effective dose equivalent (TEDE) in any one calendar year and 100 rem TEDE during the worker's lifetime.
- B. 10 rem total effective dose equivalent (TEDE) in any one calendar year and 50 rem TEDE during the worker's lifetime.
- C. 5 rem total effective dose equivalent (TEDE) in any one calendar year and 25 rem TEDE during the worker's lifetime.
- D. 1 rem total effective dose equivalent (TEDE) in any one calendar year and 5 rem TEDE during the worker's lifetime.

18.

Given the following plant conditions:

- An overpressure condition caused a Pressurizer PORV to lift and it subsequently fails to reseat resulting in a small break Loss Of Coolant Accident (LOCA).
- A Safety Injection is in progress and Pressurizer pressure has stabilized at 1350 psig.
- The PRT rupture disc has ruptured and containment temperature is 185 degrees F.
- Actual Pressurizer level is 50%.

Select the combination below that completes the following statement:

The low Pressurizer pressure (1350 psig) tends to make the indicated Pressurizer level on LI-460 read (X) than the actual Pressurizer level; the high containment temperature (185 degrees F) tends to make the indicated level on LI-460 read (Y) than the actual level.

- | | (X) | (Y) |
|----|--------|---------|
| A. | Higher | Higher. |
| B. | Lower | Higher. |
| C. | Higher | Lower. |
| D. | Lower | Lower. |

19.

Unit 2 is at 100% power and 'B' Train is the on service train and is properly aligned.

All Component Cooling Water (CCW) pump Local/Remote selector switches at the Hot Shutdown Panel (HSP) are in "REMOTE."

All CCW pump handswitches on the MCB are in "AUTO."

Which ONE of the following describes a condition that will automatically start the 2B CCW pump?

- A. An 'S' signal occurs after CCW pump 2A has been secured from the MCB.
- B. An 'S' signal occurs after CCW pump 2C breaker has been racked out.
- C. An 'S' signal occurs after CCW pump 2A breaker has tripped on overload.
- D. An 'S' signal occurs after CCW pump 2C Local/Remote selector switch at the HSP has been taken to "LOCAL."

20.

The following conditions exist on Unit 1:

- 100% power steady-state.
- Charging flow is 52 gpm in auto and slowly trending up.
- VCT level is 32%, dropping slowly.
- Letdown flow is 65 gpm.
- Seal injection flow is 8 gpm/pump.
- Seal return flow is 3 gpm/pump.
- Pressurizer pressure and level are steady on program.
- Rad monitors R2, R7, R11 and R12 all trending upward.
- Rad monitors on plant vent stack trended upward until the minipurge was manually isolated, then they returned to normal values.

Which ONE of the following describes the required actions in accordance with AOP-1.0, "RCS LEAKAGE," for the existing plant conditions?

- A. Manually trip the reactor and go to EEP-0, "REACTOR TRIP OR SAFETY INJECTION."
- B. Manually SI and go to EEP-0, "REACTOR TRIP OR SAFETY INJECTION."
- C. Start an additional charging pump and commence a ramp down in power to Mode 3, "HOT STANDBY."
- D. Maintain present power level and determine a leak rate using STP-9.0, "RCS LEAKAGE TEST."

21.

Unit 1 is operating at 100% steady-state power. All systems are in automatic and functioning properly.

Pressurizer pressure channel PT-444 fails high.

Which ONE of the following represents the plant/system response if NO operator action is taken?

- A. The Pressurizer heaters will deenergize and both PORVs open, thus reducing RCS pressure resulting in a Pressurizer low pressure reactor trip and SI.
- B. The Pressurizer heaters will deenergize, both spray valves will open, thus reducing RCS pressure resulting in a Pressurizer low pressure reactor trip and SI.
- C. Both spray valves close and Pressurizer heaters energize, thus raising RCS pressure resulting in a Pressurizer high pressure reactor trip.
- D. The reactor will not trip on high pressure due to PORV-445A opening, thus reducing RCS pressure.

22.

Unit 2 is operating at 100% steady-state power.

The following MCB annunciator alarm and indications are received:

Annunciator: - HA3, "PRZR LVL LO B/U HTRS OFF LTDN SEC"

Indications: - LT-459 indicates 54%
- LT-460 indicates 0%

With the pressurizer level control selector switch in the I/II position, which ONE of the following will occur?

(Assume no operator action is taken. All systems are in automatic and functioning properly.)

- A. A reactor trip will occur due to high pressurizer level.
- B. A reactor trip will occur due to high pressurizer pressure.
- C. A reactor trip will occur due to low pressurizer pressure.
- D. Pressurizer level will decrease to and remain at 15%.

23.

Unit 1 has experienced a Large Break Loss Of Coolant Accident (LOCA) inside containment. The crew is currently in EEP-1, "LOSS OF REACTOR OR SECONDARY COOLANT," at step 16, "Check when to transfer to cold leg recirculation."

Step 16 of EEP-1 states:

<u>Action/Expected Response</u>	<u>Response NOT Obtained</u>
16.1 Check RWST level - LESS THAN 12.5 ft. RWST LVL <input type="checkbox"/> LI 4075A <input type="checkbox"/> LI 4075B	16.1 Return to step 14.

NOTE: Step 16.1 must be complete before continuing with this procedure.

16.2 Go to FNP-1-ESP-1.3, TRANSFER TO COLD LEG RECIRCULATION.

Which ONE of the following describes the basis for the above note?

- A. To ensure the maximum amount of RWST water is used and still allow adequate suction transfer time.
- B. To ensure most of the boric acid available in the RWST has been flushed through the core.
- C. To ensure the operators have taken sufficient time to evaluate plant status per step 14 of EEP-1.
- D. To ensure level in the containment sump is high enough to provide adequate suction head for the LHSI pumps.

24.

Which ONE of the following will result in a DECREASE in the Over-Power-Delta-Temperature (OPDT) setpoint?

- A. Pressurizer spray valve sticks open for 15 seconds (assuming the reactor does NOT trip).
- B. A reactor boration is initiated at 50% power.
- C. A power rise from 100% to 105% due to an inadvertent dilution.
- D. Feed flow to a steam generator is increased.

25.

Given the following plant conditions:

- An MSIV on the 'A' Main Steam line inadvertently closed tripping the Main Turbine and generating a reactor trip signal.
- Two minutes ago a code safety on the 'A' Main Steam line opened and failed to reseat resulting in a Safety Injection.
- The operators entered FRP-S.1 and fully inserted ALL control rods in AUTO and manual.
- It is now desired to reset SI and secure SI equipment.
- RCS pressure is now 1800 psig.

Which ONE of the following will prevent resetting SI from the Main Control Board under these conditions?

- A. RCS pressure is less than SI setpoint.
- B. Permissive P-4 has not actuated.
- C. The SI timing relays.
- D. RCS pressure is below the P-11 setpoint.

26.

While performing a reactor startup, as Control Bank D rods are being pulled, the operator observes Bank D rod 'B8' indicates 54 steps on DRPI while the demand step counters for Control Bank D indicates 100 steps.

Which ONE of the following describes the reason and the position of rod 'B8'?

- A. Because the step counters are the most accurate indication, rod 'B8' is at exactly 100 steps.
- B. Because the step counters are the most reliable indication, rod 'B8' is approximately 100 steps.
- C. Because DRPI is the most accurate indication, rod 'B8' is at exactly 54 steps.
- D. Because DRPI is the most reliable indication, rod 'B8' is approximately 54 steps.

27.

Which ONE of the following is the reason that a minimum primary loop pressure of 325 psig is required to be maintained in order to operate a Reactor Coolant Pump (RCP)?

- A. Ensures sufficient flow of reactor coolant through the RCP number one seal to provide seal cooling in the event that seal injection flow is lost.
- B. Ensures proper operation of the RCP number two seal by providing at least 200 psid across the seal.
- C. Ensures the pressure drop across the RCP number one seal allows opening the RCP seal bypass valve (HV-8142) to ensure cooling for the lower radial bearing.
- D. Ensures the pressure drop across the RCP number one seal is sufficient to prevent the seal runner from contacting the seal ring.

28.

A calculation of the Quadrant Power Tilt Ratio, QPTR, is being performed at 97% reactor power due to rod 'H14' in bank 'D' being misaligned. The following excore detector output readings were calculated after taking the drawer reading and dividing by the 100% correct values:

Instrument	N-41	N-42	N-43	N-44
Upper:	0.990	1.010	0.990	0.980
Lower:	0.960	1.070	0.950	0.940

Which ONE of the following describes the maximum allowed reactor power level if the QPTR CANNOT be restored within the required limits?

- A. 94%.
- B. 79%.
- C. 73%.
- D. 70%

29.

Given the following conditions:

- Reactor startup is in progress.
- All NI switches are in their normal lineup.
- Intermediate Range (IR) Channel N-35 indicates 3E-10.
- IR Channel N-36 indicates 9E-11.
- No manual blocks have been inserted.
- Source Range (SR) Channel N-31 has failed high.
- SR channel N-32 is functioning normally.

Which ONE of the following describes the plant response to the SR Channel N-31 failing high?

- A. A reactor trip signal is generated resulting in a reactor trip.
- B. A reactor trip signal is generated, but no trip occurs since one IR channel is above P-6.
- C. No reactor trip signal is generated since one IR channel is above P-6.
- D. No reactor trip signal is generated but, the level trip switch must be taken to bypass as soon as N-36 indicates above 1E-10.

30.

Given the following conditions on Unit 1:

- Reactor at 95% power.
- Steam dump controller in Tavg mode.

Which ONE of the following describes the requirements for the steam dump valve positioning signal to be passed to the steam dump valve actuators for a loss-of-load?

- A. A turbine trip has not occurred; 15% load decrease in 180 seconds; C-9 is present; P-12 is not present and the interlock selector switches are in 'ON' or 'BYP'.
- B. A turbine trip has not occurred; 15% load decrease in 120 seconds; C-9 is present; P-12 is not present and the interlock selector switches are not in 'OFF/RESET'.
- C. P-4 signal is not present; C-7 is present; C-9 is not present; P-12 is present and the interlock selector switches are not in 'OFF/RESET'.
- D. P-4 signal is present; C-7 is present; C-9 is present; P-12 is not present and the interlock selector switches are in 'ON' or 'BYP'.

31.

You have entered ECP-0.0, "LOSS OF ALL AC POWER."

- The turbine driven AFW pump will not start and all S/G WR levels are <50%.
- Reactor power is $<10^{-8}$ amps on both intermediate range channels and trending down.
- The fifth highest Core Exit Thermocouple is 732 degrees F and increasing.
- Subcooling is indicating -28 degrees F.
- RVLIS is not functioning.

Which ONE of the following actions should be taken at this point?

- A. Transition to FRP-C.2, "RESPONSE TO DEGRADED CORE COOLING."
- B. Transition to FRP-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK."
- C. Transition to ECP-0.2, "LOSS OF ALL AC POWER WITH SI REQUIRED."
- D. Continue in ECP-0.0, "LOSS OF ALL AC POWER."

32.

Given the following plant conditions:

- A small break Loss Of Coolant Accident (LOCA) has occurred.
- ALL RCPs have been manually tripped.
- Natural Circulation is believed to be established.

Core Exit Termocouples (CETC) system readouts have failed.

- Pressurizer pressure channel 'A', PT-455, indicates 1725 psig.
- Pressurizer pressure channel 'B', PT-457, indicates 1735 psig.
- RCS pressure PT-402 indicates 1690 psig.
- RCS pressure PT-403 indicates 1685 psig.
- RTD temperatures (degrees F) as follows:

	Loop 1	Loop 2	Loop 3
Thot	540	550	560
Tcold	533	543	553

Which ONE of the following temperature values (in degrees F) will be displayed on the Subcooled Margin Monitor when selected to the "RTD" mode?

(NOTE: Steam tables are provided as a reference.)

- A. 60.
- B. 57.
- C. 53.
- D. 73.

33.

What is the MINIMUM cooling equipment necessary to maintain post accident containment pressure below the design value on a design basis LOCA?

- A. Two Containment Cooling Fan units and two trains of Containment Spray.
- B. Two Containment Cooling Fan units and one train of Containment Spray.
- C. One Containment Cooling Fan unit and two trains of Containment Spray.
- D. One Containment Cooling Fan unit and one train of Containment Spray.

34.

Which ONE of the following will result in the Containment Spray Pumps receiving an AUTO start signal?

- A. Containment pressure of 28 psig during a Loss of Off Site Power.
- B. Containment Pressure of 17 psig.
- C. Loss of Off Site Power.
- D. Safety Injection signal.

35.

Given the following conditions on Unit 2:

- Reactor is at 100 % steady-state power.
- RCS boron concentration is 600 ppm.
- VCT level is currently 40% as indicated on level transmitter LT-112.
- Earlier in the shift VCT level transmitter LT-115 failed low and has been released to I&C for repair.
- Make up Mode Control Switch is in STOP
- The I&C person has just left the control room to electrically isolate LT-115.

I&C reports they have deenergized LT-112 inadvertently.

Which ONE of the following describes how the VCT level and reactor power would respond?

(Assume no operator action)

- A. VCT level increases; reactor power remains the same.
- B. VCT level decreases; reactor power increases.
- C. VCT level increases; reactor power decreases.
- D. VCT level decreases; reactor power decreases.

36.

Plant conditions are as follows:

- Unit 1 was at 100% reactor power.
- Unit 2 was in Mode 5.
- A dual-unit Loss of Offsite Power has occurred.
- All EDGs have started and tied onto the vital buses.
- Vital load sequencing has been completed.
- FNP-1-EEP-O, "REACTOR TRIP OR SAFETY INJECTION" has been entered on Unit 1.
- While the immediate actions are being completed, a Safety Injection (SI) signal is received on Unit 1.

Which ONE of the following describes the response of the Unit 1 Containment Fan Coolers from the time the SI signal is received?

- A. All fan coolers load shed on the SI signal and sequence back onto the vital buses in slow speed.
- B. All fan coolers load shed on the SI signal, and selected fan coolers sequence back onto the vital buses in slow speed.
- C. Selected fan coolers do NOT load shed on the SI signal, and the non-selected fan coolers remain de-energized.
- D. Selected fan coolers do NOT load shed on the SI signal, and the non-selected fan coolers sequence back onto the vital buses in slow speed.

37.

Unit 1 is in Mode 4, Hot Shutdown.

600 volt Load Center 1E has been tagged out for bus bar repair.

An uncontrolled increase in the Source Range count rate has been observed and operators are entering AOP-27.0, "EMERGENCY BORATION."

Attempts to start the 1A Boric Acid Transfer (BAT) pump have been unsuccessful.

Which ONE of the following describes the appropriate action(s) to be taken in accordance with AOP-27.0?

- A. Start 1B BAT pump and open MOV-8104, "Emerg Borate to Chg Pump Suct."
- B. Start 1B BAT pump and open FCV-113A, "Boric Acid to Blender," and FCV-185, "Man Emerg Boration."
- C. Open LCV-115B, "RWST to Chg Pump," and close LCV-115C, "VCT Outlet Iso."
- D. Initiate a manual safety injection.

38.

Unit 1 is in Mode 5, "COLD SHUTDOWN," with the following plant conditions:

- All CETC's read 195 degrees F and are stable.
- All S/G's wide range levels are 94%.
- All RCP's are secured.
- RCS pressure is 325 psig and stable.
- Train 'A' RHR is in service.
- Train 'B' RHR is inoperable for repairs.
- All systems aligned in their normal configuration for the present plant conditions.

A loss of RHR has just occurred and cannot be restored. RCS temperature is rising.

Which ONE of the following is the preferred method for heat removal in accordance with FNP-1-AOP-12.0, "RESIDUAL HEAT REMOVAL SYSTEM MALFUNCTION?"

- A. RWST gravity feed to RCS, spill through the Pressurizer PORVs.
- B. Charging Pump injecting flow through the normal charging line, spill through the Pressurizer PORVs.
- C. Natural Circulation RCS flow with the atmospheric relief valves open, AFW flow and SGBD established.
- D. Reflux cooling to any S/G with level maintained in the Narrow Range.

39.

The CCW normal makeup through MOV-3030A and B, "MKUP TO CCW FROM DW STOR TK," is not available. You must use the Alternate make-up source.

Which ONE of the following is a concern when using the alternate make up source, which is not a concern when using the normal makeup source?

- A. Possible radioactive contamination of the CCW system.
- B. Possible over pressurization of the CCW system.
- C. Limited capacity of the alternate make up water source.
- D. Possible dilution of the potassium chromate in the CCW system.

40.

FNP-1-FRP-Z.1, "RESPONSE TO HIGH CONTAINMENT PRESSURE," contains a CAUTION which states:

"IF FNP-1-ECP-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, is in effect, THEN containment spray should be operated as directed in FNP-1-ECP-1.1."

FNP-1-ECP-1.1 determines the number of Containment Spray pumps required based on which ONE of the following?

- A. Containment pressure, number of Containment Coolers started, and RWST level.
- B. Containment pressure, containment temperature and sump level.
- C. Containment temperature, number of Containment Coolers started, and RWST level.
- D. Containment pressure, number of Containment Coolers started, and sump level.

41.

The plant is responding to a large break LOCA with both trains of ECCS in operation. ESP-1.3, "TRANSFER TO COLD LEG RECIRCULATION," is in progress due to low level in the RWST.

The following occurred in rapid succession:

- SI reset is completed.
- One train of Penetration Room Filtration was verified in operation.
- The STA announces that containment pressure has risen to 30 psig and continues to rise.
- At the procedure step to align CCW to RHR heat exchanger, you are unable to open CCW to RHR heat exchanger valve MOV-3185A, "CCW TO 'A' RHR HX."

Which ONE of the following should be performed FIRST based on the above conditions?

- A. Immediately go to FRP-Z.1, "RESPONSE TO HIGH CONTAINMENT PRESSURE."
- B. Immediately transfer to ECP-1.1, "LOSS OF EMERGENCY COOLANT RECIRCULATION," since cold leg recirculation cannot be established with MOV-3185A closed.
- C. Complete the alignment of at least one ECCS train for recirculation and then go FRP-Z.1, "RESPONSE TO HIGH CONTAINMENT PRESSURE."
- D. Hold at the step in effect until emergency support organizations can determine if cold leg recirculation should be established.

42.

Given the following conditions on Unit 1:

- Reactor is at 100% power.
- Pressurizer pressure is 2235 psig.
- Pressurizer pressure control is in AUTOMATIC.
- The PORV control switches are in 'AUTO'

Which ONE of the following describes the pressurizer PORVs response if pressurizer pressure channel PT-445 fails HIGH?

- A. PORV-445A will not close if RCS pressure drops below 2000 psig.
- B. PORV-445A and PORV-444B will not close until RCS pressure drops below 2000 psig.
- C. PORV-445A and PORV-444B will open.
- D. PORV-445A will open.

43.

Unit 1 is operating at 100% reactor power with all control systems functioning normally in automatic. The Pressurizer Level Control transfer switch is in position I/III.

The sensing line to Pressurizer level transmitter, LT-459, has just developed a reference leg leak where the reference leg connects to the level D/P cell.

Which ONE of the following describes the plant response from this leak?

- A. LI-459 indication will increase.
LI-460 indication will decrease.
LI-461 indication will decrease.
Charging header flow will decrease.
Backup heaters will energize.
- B. LI-459 indication will decrease.
LI-460 indication will increase.
LI-461 indication will increase.
Charging header flow will increase.
Letdown will isolate.
Backup heaters will de-energize.
- C. LI-459 indication will increase.
LI-460 indication will increase.
LI-461 indication will decrease.
Charging header flow will decrease.
Letdown will isolate.
- D. LI-459 indication will decrease.
LI-460 indication will decrease.
LI-461 indication will increase.
Charging header flow will decrease.
Letdown will isolate.
Backup heaters will de-energize.

44.

Unit 1 has experience a large break LOCA.

The SRO has directed you to place the hydrogen recombiners into service per EEP-1, "LOSS OF REACTOR OR SECONDARY COOLANT," ATTACHMENT 3, "POST LOCA HYDROGEN RECOMBINER OPERATION."

The POWER AVAILABLE light has been verified lit.

The "POWER ADJUST" potentiometer is set at '050'.

Which ONE of the following must be done to prevent the possibility of tripping the supply breaker due to drawing excessive current?

- A. Adjust the "POWER ADJUST" potentiometer to the zero (0) position, then turn the "POWER OUT SWITCH" switch to the ON position.
- B. Adjust the "POWER ADJUST" potentiometer to the position corresponding to 1150 - 1400 degrees F band, then turn the "POWER OUT SWITCH" switch to the ON position.
- C. Turn the "POWER OUT SWITCH" switch to the ON position, then adjust the "POWER ADJUST" potentiometer to the zero (0) position.
- D. Turn the "POWER OUT SWITCH" switch to the ON position, then slowly adjust the "POWER ADJUST" potentiometer to the position corresponding to 1150 - 1400 degrees F band.

45.

During refueling operations, a valid high alarm is received on a containment area radiation monitor.

Which ONE of the following describes your required actions concerning announcements that must be made?

- A. Do not have to announce an evacuation of containment because the containment evacuation alarm will sound.
- B. Should announce the affected area to ensure that non-essential personnel know to evacuate containment.
- C. Do not have to announce an evacuation of containment because HP coverage is already on the scene and only essential personnel will be in the area of fuel movement.
- D. Should announce the affected area, but no evacuation of containment is required since only essential personnel will be in the area of fuel movement.

46.

Unit 1 is shutdown for refueling with fuel movement in progress. The audio count rate selector switch is selected to Source Range channel N-31 and the speaker selector switch is in NORMAL (amplifier 1 supplying the control room speaker and amplifier 2 supplying the containment speaker.) An instrument power fuse blows on N-31.

Which ONE of the following describes the sequence of actions to be taken?

- A. Continue the fuel movement in progress, monitor the remaining NI channels, select Source Range channel N-32 on the audio count rate selector.
- B. Suspend all fuel movement, monitor the remaining NI channels, select Source Range channel N-32 on the audio count rate selector, repair N-31, and then continue fuel movement.
- C. Continue the fuel movement in progress, monitor the remaining NI channels, select Source Range channel N-32 on the audio count rate drawer, then initiate repairs on N-31.
- D. Suspend all fuel movement, monitor the remaining NI channels, select Source Range channel N-32 on the audio count rate selector, continue fuel movement, and then repair N-31.

47.

Annunciator FH5, "SFP AREA RE25 A OR B HI RAD" is in alarm on Unit 1.

It has been determined that Spent Fuel Pool Exhaust Flow Gas monitors R-25A and R-25B indicate high activity.

Which ONE of the following describes the automatic action(s) that occur as a result of this alarm?

- A. The SFP supply and exhaust fans shift to the recirculation mode.
- B. The SFP supply and exhaust fans trip, the SFP HVAC supply and exhaust dampers close, and ONLY penetration room filtration unit 1A starts.
- C. The SFP supply and exhaust fans trip, the SFP HVAC supply and exhaust dampers close, and the containment purge supply and exhaust dampers close.
- D. The SFP supply and exhaust fans trip, the SFP HVAC supply and exhaust dampers close, and BOTH penetration room filtration units 1A and 1B start.

48.

Unit 1 is operating at 55% reactor power with all control systems in automatic functioning properly. FT-477, which is the controlling feedwater flow control channel for the 1A Steam Generator (S/G), fails low.

With NO immediate operator action, which ONE of the following will initially be a direct result of the failure?

- A. Feed Regulating Valve, FCV-478, will open, SGFP speed will increase, and 1A S/G level will increase causing P-14 to actuate closing only FCV-478 and it's bypass valve, FCV-479.
- B. Feed Regulating Valve, FCV-478, will open, SGFP speed will increase, and 1A S/G level will increase causing P-14 to actuate closing all Feed Regulating Valves and their bypass valves.
- C. Feed Regulating Valve, FCV-478, will close, SGFP speed will decrease and all S/G levels will decrease causing a Reactor trip on LO-LO S/G level.
- D. Feed Regulating Valve, FCV-478, will open, SGFP speed will decrease and all S/G levels will decrease causing a Reactor trip on LO-LO S/G level.

49.

Unit 2 has been ramping up and is currently on HOLD at 80% power with all control systems in automatic functioning properly.

Given the following plant conditions:

- Control bank 'D' rods are at 191 steps.
- Loop 'A' Tavg channel is 572 degrees F.
- Loop 'B' Tavg channel is 568 degrees F.
- Loop 'C' Tavg channel is 566 degrees F.

Which ONE of the following explains how the Rod Control System will initially respond if the selected P_{imp} pressure fails high?

(Assume no Operator action.)

- A. Rods will step out at 72 steps/minute.
- B. Rods will step out at 40 steps/minute.
- C. Rods will not move.
- D. Rods will step out at 8 steps/minute.

50.

Unit 1 is at 100% power with the following plant conditions:

- All Pressurizer heaters are energized.
- Letdown flow is 75 gpm.
- Charging flow is 105 gpm.
- S/G levels are constant.
- Tavg/Tref are matched.

Which ONE of the following events could produce the above plant conditions?

- A. The Pressurizer level control channel has failed high.
- B. An atmospheric relief valve has opened.
- C. A S/G tube leak has occurred.
- D. Pressurizer spray bypass flow has increased.

51.

Given the following conditions on Unit 1:

- The plant was stable at 100% power when a large load rejection occurred, followed by an immediate steam generator tube rupture.
- The shift crew has implemented EEP-0, "REACTOR TRIP OR SAFETY INJECTION," and EEP-3, "STEAM GENERATOR TUBE RUPTURE."
- RCS average temperature is 550 degrees F and decreasing slowly.
- The crew is ready to commence an RCS cooldown to 485 degrees F.
- Both the C-7A and C-9 lights are illuminated on the Bypass and Permissive panel.

Which ONE of the following action(s), if any, should be taken with the steam dumps?

- A. They should be opened fully to obtain the maximum cooldown rate possible.
- B. They are NOT available as indicated by the C-7A and C-9 lights both being illuminated.
- C. They should NOT be opened past 10% demand to prevent overshooting the required CETC temperatures.
- D. They should be opened the maximum amount that can be controlled to prevent main steam isolation.

52.

Given the following conditions on Unit 1:

- The plant was at 100% power when the 1C S/G Main Steam line ruptured inside containment.
- Plant trip, safety injection, and Phase A containment isolation have actuated per design.
- Applicable steps of EEP-0, "REACTOR TRIP OR SAFETY INJECTION," and EEP-2, "FAULTED STEAM GENERATOR ISOLATION," to isolate 1C S/G have been performed.
- The crew is currently implementing EEP-1, "LOSS OF REACTOR OR SECONDARY COOLANT."
- Containment pressure spiked to 35 psig and is now continuing to decrease slowly.
- Pressurizer level is 20% and increasing.

Which ONE of the following meets or exceeds prerequisites for securing Containment Spray (CS) in accordance with EEP-1?

- A. When CS has been aligned to the containment sump for 10 hours and containment pressure is 18 psig.
- B. When CS has been aligned to the containment sump for 16 hours and containment pressure is 10 psig.
- C. When CS has been in operation for 10 hours and containment pressure is 18 psig.
- D. When CS has been in operation for 8 hours and containment pressure is 10 psig.

53.

The plant is in UOP-3.1, "POWER OPERATION," at 33% power and ramping up.

All systems are in automatic and controlling properly.

Steam dumps are in the Tavg mode and the control rods are at 72 steps on control bank 'D'.

- A malfunction of the DEH control system results in a turbine trip.
- The rod control system is placed in manual and used with the steam dumps to stabilize reactor power at 33%.
- Steam dump control is then inadvertantly transferred from the Tavg mode to the steam pressure mode.

For the conditions given, assuming NO further operator action, what will be the response of the plant?

- A. RCS temperature will decrease and pressurizer level will decrease.
- B. RCS temperature will increase and pressurizer level will increase.
- C. Steam dumps will modulate to bring steam header pressure to the steam dump controller setpoint.
- D. No effect in steam pressure mode. The steam dumps will continue to control RCS temperature.

54.

Unit 1 experienced an event 2 minutes ago and the following conditions now exist on Unit 1:

- Reactor power is 100% and STABLE.
- RCS Tavg is at normal operating temperature and STABLE.
- RCS pressure is at normal operating pressure and STABLE.
- Containment pressure is INCREASING.

The following conditions now exist on Unit 1 Steam Generators:

	'A'	'B'	'C'
Steam flow	STABLE	STABLE	STABLE
Feed flow	PEGGED HIGH	STABLE	STABLE
Pressure	STABLE	STABLE	STABLE
Level	DECREASING	STABLE	STABLE

Which ONE of the following events is in progress?

- A. Main Feed line break INSIDE containment.
- B. Main Steam line break INSIDE containment.
- C. 1A Main Feed Water Regulating valve has failed OPEN.
- D. 1A Feed Flow Indicator has failed high.

55.

Given the following conditions on Unit 1:

- A Loss of All AC Power has occurred.
- The crew has entered ECP-0.0, "LOSS OF ALL AC POWER."
- Power can not be immediately restored.
- Attempts are being made to restore power to the emergency buses.

In accordance with ECP-0.0, which ONE of the following describes the LONGEST amount of time available to ensure enough DC capacity to start a Diesel Generator and sequence needed loads?

- A. 30 minutes.
- B. 60 minutes.
- C. 90 minutes.
- D. 120 minutes.

56.

Given the following plant conditions:

- Unit 2 has been holding at 33% reactor power.
- Condenser vacuum is slowly degrading.

Which ONE of the following alarms/indications will be the FIRST to actuate?

- A. GJ2, "LO VAC TURB TRIP."
- B. KK2, "TURB COND VAC LO-LO."
- C. CONDENSER AVAILABLE C-9 will extinguish.
- D. KC3, "1A OR 1B SGFP TRIPPED."

57.

The plant was operating at 10% Reactor power when a loss of off site power caused the RCP's to trip.

Identify ALL of the indications that would verify adequate natural circulation is occurring.

- 1 - Core exit thermocouples --- increasing
- 2 - Core exit thermocouples --- stable or decreasing
- 3 - RCS hot leg temperature --- stable or decreasing
- 4 - RCS hot leg temperature --- increasing
- 5 - S/G pressure --- stable or decreasing
- 6 - S/G pressure --- increasing
- 7 - RCS hot leg temperature --- at saturation for S/G pressure
- 8 - RCS cold leg temperature --- at saturation for S/G pressure

- A. 1, 4, 5, and 7
- B. 2, 4, 6, and 8
- C. 1, 3, 6, and 7
- D. 2, 3, 5, and 8

58.

Which ONE of the following provides water to the shaft seal system for the 2B steam generator feed pump (SGFP)?

- A. Condensate pump discharge.
- B. 2B SGFP discharge.
- C. Condensate storage tank.
- D. Demineralized water system.

59.

The crew has performed ECP-0.0, "LOSS OF ALL AC POWER," and transitioned to ECP-0.1, "LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED." While performing ECP-0.1, step 3, "Reset PHASE A CTMT ISO," there was a simultaneous loss of a Vital Instrument bus and SI actuation.

Which ONE of the following describes the crews required action(s)?

- A. Return to ECP-0.0, restore the instrument bus; then transition to ECP-0.2, "LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED" when directed.
- B. Reset the SI signal; then transition to ECP-0.2, "LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED" when directed.
- C. Transition to EEP-0, "REACTOR TRIP OR SAFETY INJECTION,"; then transition to ECP-0.0, restore the instrument bus; then return to ECP-0.1.
- D. Immediately transition to ECP-0.2, "LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED".

60.

Given the following plant conditions:

- Unit 1 reactor has tripped from full power.
- Safety injection has occurred.
- AFW flow cannot be established.
- All S/G narrow range levels are at approximately 15% and decreasing.
- FNP-1-FRP-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK," has been entered.

The following indications are observed:

- Pressurizer pressure is 1900 psig.
- S/G wide range levels are 'A' 48%, 'B' 40% and 'C' 41% and decreasing at a rate of 1% every 5 minutes.
- All intact S/G pressures are 950 psig
- Containment pressure is 10 psig.
- Fifth hottest core exit temperature is 705 degrees F.

Which ONE of the following actions should be performed as quickly as possible in accordance with FNP-1-FRP-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK?"

- A. Stop all RCP's and initiate bleed and feed.
- B. Stop all RCP's and establish main feedwater flow to an intact S/G with one SGFP.
- C. Stop all RCP's and establish condensate flow to an intact S/G.
- D. Cooldown the RCS and place RHR in service.

61.

Given the following plant conditions:

- Unit 1 is operating at 100% power.

Which ONE of the following radiation monitors, if it goes into alarm condition and remains in alarm, will cause an automatic initiation of the emergency dose calculations on the Automatic Rapid Dose Assessment (ARDA)?

- A. Containment Radioactive Gas Monitor (R-12).
- B. Condenser Air Ejector Gas Monitor (R-15A).
- C. Containment Purge Exhaust Gas Monitor (R-24A).
- D. Steam Jet Air Ejector Gas Monitor (R-15C).

62.

Unit 1 is operating at 100% steady-state reactor power all systems are in automatic and functioning properly.

- A reactor trip and SI has just occurred.
- A problem in the high voltage switchyard deenergizes the 1B S/U transformer.
- D/G 1B cannot be started.
- S/G narrow range levels are 'A' 26%, 'B' 45% and 'C' 45%.

Which Unit 1 AFW pump(s) are running?

- A. 'A' MDAFW and TDAFW.
- B. 'A' and 'B' MDAFW.
- C. 'B' MDAFW only.
- D. 'A' MDAFW only.

63.

Unit 1 has been holding at 33% power for the last 24 hours.

Which ONE of the following signals would result in an AUTO start of the Turbine Driven AFW pump?

- A. Trip of both Steam Generator Feed Pumps.
- B. Safety Injection signal.
- C. All Steam Generator levels at 27%.
- D. AMSAC signal.

64.

With the plant at 100% power, the TDAFW pump steam supply valve from 1B SG, HV-3235A, has been locally isolated in the main steam valve room, and air to the valve has been tagged out.

If an auto start signal is received, how will the operation of the TDAFW pump be affected?

- A. The TDAFW pump will not start, since the steam supply valve from 1B SG, HV-3235A, will not open, the permissive for opening the TDAFW pump steam admission valve, HV-3226, on an auto start signal cannot be obtained.
- B. The TDAFW pump will start, but not enough steam will be supplied to the turbine to operate it at normal speed while supplying full water flow.
- C. The TDAFW pump will start and operate at rated speed while supplying full water flow to the Steam Generators.
- D. The TDAFW pump will start since the isolated air to the TDAFW pump steam supply valve, HV-3235A, also isolates air to the TDAFW steam admission valve, HV-3226, which fails open and will allow steam from 1C S/G to supply the turbine.

65.

Which ONE of the following could be an effect on plant operation if the 'A' Train of the Service Water system was lost?

- A. Steam Generator Blowdown could isolate due to high heat exchanger outlet temperature.
- B. Containment air temperature could rise due to loss of cooling water to RCP motor air coolers.
- C. Service Water cooling to the 'A' CCW heat exchanger, which is supplying the miscellaneous header, could be lost resulting in higher letdown temperature.
- D. Spent Fuel Pool could overheat as a result of the loss of Service Water cooling to the 'A' Spent Fuel Pool heat exchanger.

66.

Given the following plant conditions:

- Service Water Pumps A, B and D are running.
- Service Water Pump "C" Spare Pump Selector switch is in the "D" position.
- Service Water Pump E selector switch is in "LOCAL."

A Safety Injection with a Loss of Off Site Power occurs.

Assuming the ESF sequencers operate properly, which ONE of the following describes the operating status of the Service Water Pumps following the ESF sequencer operation?

	Pump 'C'	Pump 'D'	Pump 'E'
A.	ON	ON	ON
B.	ON	OFF	OFF
C.	OFF	ON	OFF
D.	ON	OFF	ON

67.

Which ONE of the following describes the NORMAL, EMERGENCY, and BACKUP power supplies to Emergency 4160V AC Bus 1F?

	<u>NORMAL</u>	<u>EMERGENCY</u>	<u>BACKUP</u>
A.	S/U 1B	1-2A DG	S/U 1A
B.	S/U 1A	1-2A DG	S/U 1B
C.	S/U 1A	1B DG	S/U 1B
D.	S/U 1B	1B DG	S/U 1A

68.

Annunciator BK5, "ANNUN SYS DC GND" alarmed approximately 20 minutes ago on Unit 1. Appropriate personnel were notified to locate and correct the ground. You are informed that the ground is on the 125V DC Bus 1A.

Which ONE of the following will result if the ground caused the loss of the 125V DC Bus 1A?

- A. DGs 1-2A and 1C will auto start.
- B. TDAFW pump will become inoperable.
- C. S/G atmospheric reliefs will become inoperable.
- D. Power for 'A' Train 4160V AC breaker position indication will auto shift to Unit 2 'A' Train DC.

69.

Annunciator WB2, "1-2A DG DAY TANK FO LVL HI-LO" has just alarmed.

You receive a call from the diesel building systems operator who reports the 1-2A DG fuel oil transfer pump had initiated an auto makeup and will not shutoff. The operator reports that the local control switch is not operating and he will need to deenergize the fuel oil transfer pump.

Which ONE of the following 208V Motor Control Center (MCC) sections provides power to the malfunctioning fuel oil transfer pump?

- A. MCC 1T.
- B. MCC 1S.
- C. MCC 1P.
- D. MCC 1N.

70.

The Instrument Air (IA) line has ruptured. IA is no longer being supplied to FCV-3009A, FCV-3009B, and FCV-3009C, (Service Water (SW) from Component Cooling Water (CCW) Heat Exchanger Flow Control Valves.)

Which ONE of the following actions must be taken in accordance with AOP-6.0, "LOSS OF INSTRUMENT AIR," to ensure maximum heat removal capability of the on-service 'C' CCW heat exchanger?

- A. Isolate SW supply to the standby CCW heat exchanger by closing MOV-3130B (SW to CCW Heat Exchanger).
- B. Jack open FCV-3009C to restore SW to the CCW on-service heat exchanger.
- C. Start the 'B' Train CCW pump.
- D. Start the standby SW pump.

71.

The control room has just been evacuated due to a fire in the cable spreading room.

Which ONE of the following conditions will require the use of reactor head vents to assist in plant recovery when operating from the Hot Shutdown Panels?

(Assume no Safety Injection signal present)

- A. Loss of Reactor Coolant Pumps.
- B. Pressurizer level decreasing below 15% level.
- C. Steam Generator levels decreasing below 25% level.
- D. High Head Safety Injection flow of 225 gpm with RCS pressure at 2235 psig.

72.

A radioactive liquid release is in progress from the #2 Waste Monitor Tank (WMT) to the river in accordance with a liquid waste permit and SOP-50.1, "LIQUID WASTE PROCESSING SYSTEM LIQUID WASTE RELEASE FROM WASTE MONITOR TANK."

- Annunciator FH2, "RMS CH FAILURE," has just alarmed.
- R-18, "LIQ WASTE DISCH," is pegged low on the Radiation Monitoring system console and the Low Alarm light is illuminated.

Which ONE of the following describes the actions required in accordance with SOP-50.1?

- A. Immediately close RCV-18, WMT Disch to Environment, and inform the Shift Support Supervisor.
- B. Check RCV-18, WMT Disch to Environment, closed automatically, notify Chemistry to implement sampling in accordance with the Offsite Dose Calculation Manual.
- C. Immediately secure #2 WMT pump, inform the Operations Support Supervisor (OSS), then inform Chemistry to implement sampling in accordance with the Offsite Dose Calculation Manual.
- D. Check RCV-18, WMT Disch to Environment, closed automatically, verify the last reading on R-18 was below the setpoint and inform the Shift Support Supervisor.

73.

Which ONE of the following describes the overpressure protection used for Waste Gas Decay Tanks (WGDT) #1 through #6?

- A. Individual 150 psig relief valve to WGDT #8 which relieves to the plant vent stack via a 100 psig relief valve.
- B. Individual 100 psig relief valve directly to the plant vent stack.
- C. Individual 150 psig relief valve to WGDT #7 which relieves to the plant vent stack via a 100 psig relief valve.
- D. Individual 150 psig relief valve directly to the plant vent stack.

74.

You are the unit operator and a waste gas decay tank release is in progress. You receive a radiation alarm and note that it is R-14, "Plant Vent Stack Monitor."

Which ONE of the following methods would you use to confirm that the automatic actions associated with R-14 had occurred?

- A. The red alarm light on the R-14 monitor drawer is confirmation.
- B. The SI component monitor light box (MLB-1) indication for RCV-14 would confirm the automatic actions.
- C. If the automatic action does not occur, an alarm on the MCB will actuate.
- D. Call the Systems Operator to check the waste gas panel indication for RCV-14.

75.

A Steam Generator tube leak is in progress on the 1A SG.

- R-23A, "SGBD HX OUTLET," is in High Alarm.

Which ONE of the following describes the automatic action(s) that should occur as a result of the High Radiation Alarm?

- A. SGBD Isolation Valves, HV-7614A, B, and C close.
- B. Dilution Discharge Valve, RCV-023B closes.
- C. SGBD Hx Discharge Valve, FCV-1152 closes.
- D. SGBD Hx Discharge Valve, FCV-1152, and Dilution Discharge Valve, RCV-023B close.

76.

Which ONE of the following conditions allows a RCP to be started even though high containment pressure has caused a Phase 'B' isolation, and all support systems normally needed to start a RCP are NOT available?

- A. When responding to a small-break LOCA in accordance with EEP-1, "LOSS OF REACTOR OR SECONDARY COOLANT."
- B. When responding to an inadequate core cooling event in accordance with FRP-C.1, "INADEQUATE CORE COOLING."
- C. When responding to a loss of secondary heat sink in accordance with FRP-H.1, "LOSS OF SECONDARY HEAT SINK."
- D. When responding to a Natural Circulation Cooldown with allowance for Reactor Vessel Head Steam Voiding per ESP-0.3, "NATURAL CIRCULATION COOLDOWN WITH ALLOWANCE FOR REACTOR VESSEL HEAD STEAM VOIDING (WITH RVLIS)."

77.

Unit 1 is making preparations for a reactor startup. The Circulating Water (CW) system has been running for 20 minutes after an extended shutdown when a Systems Operator (SO) notices heavy debris on the pump suction screens. The 1A CW pump was secured and the pump suction screens have been cleaned.

You are currently restarting the CW System IAW SOP-26.0, "CIRCULATING WATER SYSTEM." An SO has been dispatched to the Wet Pit to ensure proper CW Pump start and operation.

The SO provides the following information to you:

- Both CW Pump discharge valves are closed.
- The wet pit level is 150 feet, 0 inches.
- All Cooling Tower inlet valves are closed and all Cooling Tower fans are secured.
- The 1A CW Pump motor is still warm due to being run 30 minutes ago.

Which ONE of the following MUST be done prior to starting the 1A Circulating Water Pump?

- A. The 1A Circulating Water Pump associated discharge valve must be opened.
- B. Must wait an additional 30 minutes for the motor to cool.
- C. Manually open LCV-560, "SW TO CW CANAL LCV" and raise wet pit level.
- D. Cooling Tower inlet valves must be opened and Cooling Tower fans must be started.

78.

Unit 1 is operating at 100% reactor power when one of the "A" Train Service Water to Turbine Building D/P switches (PDS-569 or 566) develops a leak on the low pressure side.

The following annunciator comes in alarm:

- AF5, "SW TO TURB BLDG A OR B TRN FLOW HI"

Which ONE of the following describes the condition of the Service Water System and the appropriate procedure to execute?

- A. MOV-514 or MOV-516 is shut, MOV-515 and MOV-517 are open; go to FNP-1-AOP-7.0, "LOSS OF TURBINE BUILDING SERVICE WATER."
- B. MOV-515 or MOV-517 is shut, MOV-514 and MOV-516 are open; go to FNP-1-AOP-7.0, "LOSS OF TURBINE BUILDING SERVICE WATER."
- C. MOV-514 and MOV-516 are shut, MOV-515 and MOV-517 are open; trip the reactor and go to FNP-1-EEP-0, "REACTOR TRIP OR SAFETY INJECTION."
- D. MOV-515 and MOV-517 are shut, MOV-514 and MOV-516 are open; trip the reactor and go to FNP-1-EEP-0, "REACTOR TRIP OR SAFETY INJECTION."

79.

Which ONE of the following describes the function of the Gross Failed Fuel Detector (GFFD) system?

- A. Has no automatic interlocks; provides indication of failed fuel only after shutdown due to N-16 and N-17 at power masking.
- B. Automatically closes RCS LOOPS 2&3 HOT LEG SAMPLE Isolation Valve (SV3102) on High Radiation (modified by a design change implemented in 1999); provides indication of failed fuel only after shutdown due to N-16 and N-17 at power masking.
- C. Automatically closes RCS LOOPS 2&3 HOT LEG SAMPLE Isolation Valve (SV3102) on High Radiation (modified by a design change implemented in 1999); provides indication of failed fuel at power.
- D. Has no automatic interlocks; provides indication of failed fuel at power.

80.

A rupture occurred in the service air header. Air pressure decreased and resulted in the isolation of service air. After the isolation, instrument air header pressure returned to normal.

Which ONE of the following describes what the air pressure indicators on the Main Control Board, PI-4004A, "SVC AIR PRESS," and PI-4004B, "INST AIR PRESS," should indicate?

- A. 0 psig on both PI-4004A and PI-4004B.
- B. 0 psig on PI-4004A and 90 - 100 psig on PI-4004B.
- C. 90 - 100 psig on PI-4004A and 0 psig on PI-4004B.
- D. 90 - 100 psig on both PI-4004A and PI-4004B.

81.

Well water pump #2 is selected to the 'AUTO' position locally.

Which ONE of the following signals should have caused well water pump #2 to autostart?

- A. Fire Protection Tank level is at 29 feet and decreasing, and "#2 PUMP LEAD" is selected at the fire pump house.
- B. Either Fire Protection Tank makeup AOV closes fully and "#2 PUMP LEAD" is selected at the fire pump house.
- C. Sanitary Water Pump pressure control valve remains at least 90% open for 10 seconds.
- D. Sanitary Water Tank level is at 22" Below Mounting Flange and decreasing.

82.

Both Units are operating at 100% power. You are the Operator-At-The-Controls (OATC) for Unit 1, and the end of your shift is approaching. Unit 2 has just experienced a reactor trip and the operators are entering EEP-0, "REACTOR TRIP OR SAFTEY INJECTION." Your shift relief has just arrived at the control room and requests permission to enter the at-the-controls area in order to walk down the Unit 1 control board.

Who can authorize access to the at-the-controls area of Unit 1 under the above conditions?

- A. Only the Shift Supervisor or Unit 1 OATC.
- B. Only the Shift Supervisor, Unit 1 OATC or Unit 1 Unit Operator (UO).
- C. Only the Shift Supervisor.
- D. Only the Unit 1 OATC.

83.

Which ONE of the following represents the proper use of a "REFERENCE USE" procedure?

- A. The procedure must be reviewed often enough to be familiar with the requirements of the document and the user is responsible for ensuring that actions performed complies with the requirements of the procedure.
- B. Provided the procedure is readily available for reference, the procedure may be performed completely from memory and the user is responsible for results.
- C. The procedure must be reviewed prior to task performance and often enough to ensure that the activity is being performed correctly.
- D. The procedure must be readily available and each step of the procedure must be reviewed prior to performance of that step.

84.

In EEP-2, "FAULTED STEAM GENERATOR ISOLATION," the operator is cautioned that any faulted steam generator should remain isolated during subsequent recovery actions unless needed as a heat sink for RCS cooldown.

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

- A. AFW pumps could reach run-out flow and cavitate causing damage to the pumps and possibly rendering them inoperable.
- B. Additional steaming from the S/G will increase the likelihood of damaging other equipment, power supplies, or instrumentation in the vicinity of the break.
- C. Un-isolating a faulted steam generator could result in an RCS cooldown causing a severe transient that challenges the primary-secondary barrier.
- D. Re-establishing feed flow to the faulted S/G would cause SI to re-actuate on high steam flow and interfere with the RCS cooldown to Mode 5, Cold Shutdown.

85.

Which ONE of the following illustrates the UNIT DIFFERENCES for the Reactor Water level indication LI-2965 (A and B)?

- A. Unit 1 is direct readout indicating 120 to 160 feet and Unit 2 is dual digital readout indicating 0 to 120 and 120 to 160 feet.
- B. Unit 2 is direct readout indicating 120 to 160 feet and Unit 1 is dual digital readout indicating 0 to 120 and 120 to 160 feet.
- C. Unit 1 is direct readout indicating 120 to 160 feet and Unit 2 is dual digital readout indicating 0 to 300 and 300 to 612 inches.
- D. Unit 2 is direct readout indicating 120 to 160 feet and Unit 1 is dual digital readout indicating 0 to 300 and 300 to 612 inches.

86.

Which one of the following is considered a Temporary Plant Alteration that supports Maintenance per AP-13, "Control of Temporary Alterations?"

- A. Placement of a plant labeling deficiency tag IAW AP-25, "Equipment Identification."
- B. Lifting leads to defeat a MCB annunciator in preparation for repairs by the oncoming team.
- C. Installation of tygon tubing on a pump drain line IAW AP-14, "Safety Tagging."
- D. Gagging of a relief valve in preparation for a hydrostatic test of that system.

87.

Unit 2 is currently in Mode 4, Hot Shutdown. At 0900 today, it is discovered that a routine 24-hour surveillance involving Shutdown Margin was last performed at 0600 on the previous day.

Which ONE of the following describes the response to the failure to perform the surveillance?

- A. The Technical Specification LCO 3.0.3 is applied.
- B. The LCO is immediately declared not met and the ACTION statement is immediately initiated.
- C. The surveillance may be delayed for up to 24 hours from the time of discovery per Technical Specification 4.0.3.
- D. The surveillance requirements are satisfied if the surveillance is completed by 1200 today.

88.

An individual has requested a Restricted Removal (RR) tag order to allow performance of a maintenance task that he has been assigned.

Which ONE of the following positions, at a minimum, must the individual hold in order to mark the RR block on the Tag Order Acceptance section of the cover sheet for a maintenance task?

- A. A designated operator.
- B. A tagging official.
- C. An apprentice.
- D. A journeyman.

89.

With the plant in Mode 5, Cold Shutdown, a small accessible area in containment has a general area dose rate of 1150 mrem/hr. The top of this area cannot be enclosed for the purpose of locking the area.

Which ONE of the following describes the minimum additional measures (other than appropriate posting) that must be executed for this area?

- A. Must be barricaded off, conspicuously posted, and a flashing light must be activated.
- B. Must be roped off and the entrance to the containment must be kept locked.
- C. Must be barricaded off, conspicuously posted, and a guard posted at the entrance to the this area.
- D. A flashing light must be activated and the entrance to containment must be kept locked.

90.

An operator must make an entry into a High Radiation area. The operator's radiation exposure history is as follows:

- Age: 51 years
- Lifetime TEDE: 39 Rem
- TEDE for the year: 0.2 Rem
- TODE for the year: 3.0 Rem

- No dose extensions have been approved.

Which ONE of the following states the additional TEDE (Total Effective Dose Equivalent) and TODE (Total Organ Dose Equivalent) that the operator is limited to for the year per FNP-0-M-001, "HEALTH PHYSICS MANUAL," Administrative Guidelines?

	<u>Additional Annual TEDE Allowed</u>	<u>Additional Annual TODE Allowed</u>
A.	1.8 Rem	17 Rem
B.	1.8 Rem	1.5 Rem
C.	0.25 Rem	17 Rem
D.	0.25 Rem	1.5 Rem

91.

Which ONE of the following describes the primary basis for depressurizing all intact Steam Generators (S/G) to atmospheric pressure in FRP-C.1, "RESPONSE TO INADEQUATE CORE COOLING?"

- A. Ensure CETC temperatures are reduced to less than 700 degrees F.
- B. Reduce S/G pressure to increase feedwater flow.
- C. Reduce RCS pressure for establishing low-head safety injection.
- D. Enhance natural circulation cooling of the reactor core.

92.

Which ONE of the following describes when Critical Safety Function Status Tree monitoring must begin after a reactor trip?

- A. Completion of the immediate action steps of EEP-0, "REACTOR TRIP OR SAFETY INJECTION," with a Safety Injection in progress.
- B. Transition is made from EEP-0 to ESP-0.1, "REACTOR TRIP RESPONSE," at step 4 of EEP-0.
- C. Identification of symptoms of a challenge to a fission product barrier, whenever the challenge occurs.
- D. Entry is made to the Emergency Response Procedures (ERPs), beginning with step 1 of EEP-0 or ECP-0.0, "LOSS OF ALL AC POWER."

93.

Given the following plant conditions:

- AOP-27, "EMERGENCY BORATION," has been entered.
- Initial RCS boron concentration was 1100 ppm.
- RCS Tavg is 521 degrees F following an uncontrolled cooldown.
- Normal emergency boration has been in progress for 2 minutes.
- FI-110, "Boric Acid Emerg Borate," flow indicates 40 gpm.
- Charging flow is 60 gpm.

Which ONE of the following is the MINIMUM amount of time emergency boration must continue?

(NOTE: Step 8.3 of FNP-1-AOP-27.0 provided as a reference.)

- A. Minimum time has already been met.
- B. Two more minutes.
- C. Four more minutes.
- D. Six more minutes.

94.

Which ONE of the following describes how immediate operator actions will be performed and who in the crew will perform them, if the shift crew is executing Emergency procedure:

EEP-0, "REACTOR TRIP OR SAFETY INJECTION,"
FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWT," or
ECP-0.0, "LOSS OF ALL AC POWER?"

- A. Perform steps in sequential order; steps performed by the OATC and Shift Supervisor.
- B. Perform steps in any order; steps performed by the OATC and Shift Supervisor.
- C. Perform steps in sequential order; steps performed by the OATC and Unit Operator.
- D. Perform steps in any order; steps performed by the OATC and Unit Operator.

95.

Which ONE of the following describes the reason for rechecking RCS and S/G pressure at some point after failing to meet the safety injection termination criteria when performing actions in response to EEP-1, "LOSS OF REACTOR OR SECONDARY COOLANT?"

- A. To determine if the criterion for stopping RCPs has been met.
- B. To determine if the break has been isolated.
- C. In case there is a faulted S/G which was not fully depressurized at the time the SI termination criteria was checked.
- D. In case the requirement for power has decreased sufficiently to allow securing of some selected heavy loads and the EDGs.

96.

Unit 1 has experienced a Loss Of Coolant Accident (LOCA). The crew is currently in ESP-1.2, "POST LOCA COOLDOWN AND DEPRESSURIZATION." RCS cooldown to cold shutdown is in progress and the crew has just started to reduce RCS pressure to refill the pressurizer.

Which ONE of the following would indicate to the crew that voiding in the RCS is occurring?

- A. Rapidly decreasing Safety injection flow.
- B. Rapidly increasing RCS pressure.
- C. Rapidly decreasing core exit thermal couple temperature.
- D. Rapidly increasing pressurizer level.

97.

A small break LOCA has occurred outside containment.

Actions of ECP-1.2, "LOCA OUTSIDE CONTAINMENT," have been completed and RCS pressure continued to decrease. A transition was made to ECP-1.1, "LOSS OF EMERGENCY COOLANT RECIRCULATION."

Which ONE of the following describes the reason a transition was made to ECP-1.1?

- A. To recover after the break was isolated.
- B. To terminate offsite release.
- C. To reverify that all automatic actions have been completed.
- D. To take compensatory actions for lack of inventory in the containment sump.

98.

Which ONE of the following is the primary basis for stopping all Reactor Coolant Pumps (RCP) in FRP-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK?"

- A. It establishes natural circulation to enhance the bleed and feed capability of safety injection.
- B. It extends the time available to restore feed flow before bleed and feed criteria is met.
- C. It anticipates a pressure decrease caused by spray valves opening when air is restored to containment.
- D. It anticipates the low RCS pressure caused by opening Pressurizer PORVs during bleed and feed.

99.

The following plant conditions exist.

- At 0900 hrs the RCS is at 430 degrees F.
- RCS pressure is stable at 2235 psig.

Which ONE of the following causes the greatest pressurized thermal shock concerns?

- A. At 0930, RCS temperature is 500 degrees F.
- B. At 0930, RCS temperature is 360 degrees F.
- C. At 1000, RCS temperature is 530 degrees F.
- D. At 1000, RCS temperature is 330 degrees F.

100.

During a small break Loss Of Coolant Accident (LOCA) on a cold leg, when there is not a large amount of injection flow from the ECCS through the core and out the break, a phase is reached where the vessel level continues to decrease below the hot leg penetrations and boiling in the core is the means of transporting the core heat to the bubble. A fixed differential pressure exists between the core and the break and is maintained by the loop seal.

Which ONE of the following describes the primary mechanism for heat removal during this phase?

- A. Condensation of vapor from the bubble at the hot leg side of the S/G U-tubes, which is cooled by S/G water, and then drains back down to the core via the hot legs.
- B. Condensation of vapor in the head, which is cooled by fans in containment, and then drains back down to the core.
- C. Slug flow via the cold legs through the loop seal and flashing across the cold leg break.
- D. Condensation of vapor from the bubble at the cold leg side of the S/G U-tubes, which is cooled by S/G water, and then drains back down to the core via the cold legs.

"SIMULATOR CORE"

CURVE 34

INTEGRAL WORTH VS. STEPS WITHDRAWN OF BANKS
C AND D MOVING IN OVERLAP; BOL, HZP, NO XENON

STEPS	WORTH (pcm)	STEPS	WORTH (pcm)	STEPS	WORTH (pcm)	STEPS	WORTH (pcm)
D226	0.0	D199	68.5	D173	174.3	D147	290.5
D225	1.2	D198	72.0	D172	178.0	D146	296.0
D224	2.3	D197	75.5	D171	182.8	D145	301.5
D223	3.5	D196	79.0	D170	187.5	D144	307.0
D222	4.7	D195	83.5	D169	192.3	D143	311.0
D221	5.8	D194	88.0	D168	197.0	D142	315.0
D220	7.0	D193	92.5	D167	200.8	D141	319.0
D219	8.8	D192	97.0	D166	204.5	D140	323.0
D218	10.5	D191	100.5	D165	208.3	D139	329.0
D217	12.3	D190	104.0	D164	212.0	D138	335.0
D216	14.0	D189	107.5	D163	217.3	D137	341.0
D215	16.5	D188	111.0	D162	222.5	D136	347.0
D214	19.0	D187	115.5	D161	227.8	D135	351.3
D213	21.5	D186	120.0	D160	233.0	D134	355.5
D212	24.0	D185	124.5	D159	236.8	D133	359.8
D211	27.3	D184	129.0	D158	240.5	D132	364.0
D210	30.5	D183	132.8	D157	244.3	D131	370.3
D209	33.8	D182	136.5	D156	248.0	D130	376.5
D208	37.0	D181	140.3	D155	253.3	D129	382.8
D207	40.0	D180	144.0	D154	258.5	D128	389.0
D206	43.0	D179	148.8	D153	263.8	D127	393.5
D205	46.0	D178	153.5	D152	269.0	D126	398.0
D204	49.0	D177	158.3	D151	273.0	D125	402.5
D203	53.0	D176	163.0	D150	277.0	D124	407.0
D202	57.0	D175	166.8	D149	281.0	D123	413.5
D201	61.0	D174	170.5	D148	285.0	D122	420.0
D200	65.0						

Total worth of Shutdown Banks is -3222 pcm. Total worth of the Control Banks is -4602 pcm.

Total worth of all banks is -7824 pcm. Conservative worth of most reactive rod (H02 at EOL) is -1240 pcm.

SIMULATOR CURVES

Unit 1 VOLUME 1 CURVE 34 CYCLE 16
 INTEGRAL WORTH VS. STEPS WITHDRAWN OF BANKS
 C AND D MOVING IN OVERLAP; MOL, HZP, NO XENON

REV. 29

STEPS	WORTH (pcm)	STEPS	WORTH (pcm)	STEPS	WORTH (pcm)	STEPS	WORTH (pcm)
D226	0.0	D199	216.3	D173	458.8	D147	598.3
D225	3.3	D198	227.5	D172	466.0	D146	602.6
D224	6.7	D197	238.8	D171	472.3	D145	606.8
D223	10.0	D196	250.0	D170	478.5	D144	611.0
D222	13.3	D195	260.8	D169	484.8	D143	615.3
D221	16.7	D194	271.5	D168	491.0	D142	619.5
D220	20.0	D193	282.3	D167	497.0	D141	623.8
D219	26.3	D192	293.0	D166	503.0	D140	628.0
D218	32.5	D191	303.3	D165	509.0	D139	632.0
D217	38.8	D190	313.5	D164	515.0	D138	636.0
D216	45.0	D189	323.8	D163	520.5	D137	640.0
D215	53.0	D188	334.0	D162	526.0	D136	644.0
D214	61.0	D187	343.3	D161	531.5	D135	647.8
D213	69.0	D186	352.5	D160	537.0	D134	651.5
D212	77.0	D185	361.8	D159	542.0	D133	655.3
D211	86.8	D184	371.0	D158	547.0	D132	659.0
D210	96.5	D183	379.8	D157	552.0	D131	663.0
D209	106.3	D182	388.5	D156	557.0	D130	667.0
D208	116.0	D181	397.3	D155	561.8	D129	671.0
D207	127.0	D180	406.0	D154	566.5	D128	675.0
D206	138.0	D179	413.8	D153	571.3	D127	678.8
D205	149.0	D178	421.5	D152	576.0	D126	682.5
D204	160.0	D177	429.3	D151	580.5	D125	686.3
D203	171.3	D176	437.0	D150	585.0	D124	690.0
D202	182.5	D175	444.3	D149	589.5	D123	694.0
D201	193.8	D174	451.5	D148	594.0	D122	698.0
D200	205.0						

Total worth of Shutdown Banks is -3222 pcm. Total worth of the Control Banks is -4602 pcm.

Total worth of all banks is -7824 pcm. Conservative worth of most reactive rod (H02 at EOL) is -1240 pcm.

SIMULATOR CURVES

Unit 1 VOLUME 1 CURVE 34 CYCLE 16
 INTEGRAL WORTH VS. STEPS WITHDRAWN OF BANKS
 C AND D MOVING IN OVERLAP; EOL, HZP, NO XENON

REV. 30

STEPS	WORTH (pcm)	STEPS	WORTH (pcm)	STEPS	WORTH (pcm)	STEPS	WORTH (pcm)
D226	0.0	D199	359.8	D173	746.3	D147	995.8
D225	5.8	D198	377.5	D172	758.0	D146	1003.5
D224	11.7	D197	395.3	D171	769.3	D145	1011.3
D223	17.5	D196	413.0	D170	780.5	D144	1019.0
D222	23.3	D195	430.0	D169	791.8	D143	1026.3
D221	29.2	D194	447.0	D168	803.0	D142	1033.5
D220	35.0	D193	464.0	D167	813.5	D141	1040.8
D219	45.5	D192	481.0	D166	824.0	D140	1048.0
D218	56.0	D191	496.8	D165	834.5	D139	1054.8
D217	66.5	D190	512.5	D164	845.0	D138	1061.5
D216	77.0	D189	528.3	D163	854.8	D137	1068.3
D215	91.0	D188	544.0	D162	864.5	D136	1075.0
D214	105.0	D187	559.0	D161	874.3	D135	1081.5
D213	119.0	D186	574.0	D160	884.0	D134	1088.0
D212	133.0	D185	589.0	D159	893.3	D133	1094.5
D211	149.5	D184	604.0	D158	902.5	D132	1101.0
D210	166.0	D183	617.8	D157	911.8	D131	1107.3
D209	182.5	D182	631.5	D156	921.0	D130	1113.5
D208	199.0	D181	645.3	D155	929.5	D129	1119.8
D207	216.8	D180	659.0	D154	938.0	D128	1126.0
D206	234.5	D179	672.0	D153	946.5	D127	1131.5
D205	252.3	D178	685.0	D152	955.0	D126	1137.0
D204	270.0	D177	698.0	D151	963.3	D125	1142.5
D203	288.0	D176	711.0	D150	971.5	D124	1148.0
D202	306.0	D175	722.8	D149	979.8	D123	1153.5
D201	324.0	D174	734.5	D148	988.0	D122	1159.0
D200	342.0						

Total worth of Shutdown Banks is -3861 pcm. Total worth of the Control Banks is -5439 pcm.
 Total worth of all banks is -9300 pcm. Conservative worth of most reactive rod (H02 at EOL) is -1240 pcm.

Step

Action/Expected Response

Response NOT Obtained

NOTE: In response to an uncontrolled cooldown below 525°F, the cold shutdown boron concentration is the maximum boron concentration required regardless of the extent of the cooldown.

8.2 Check RCS TAVG - LESS THAN 525°F.

8.2 Perform the following.

8.2.1 Verify shutdown margin greater than Technical Specification requirement using FNP-1-STP-29.1, SHUTDOWN MARGIN CALCULATION (TAVG 547°F) or FNP-1-STP-29.2, SHUTDOWN MARGIN CALCULATION (TAVG < 547°F OR BEFORE THE INITIAL CRITICALITY FOLLOWING REFUELING).

8.2.2 WHEN shutdown margin greater than Technical Specification requirement, THEN proceed to step 9.

8.2.3 Continue emergency boration and return to step 5.

8.3 Continue emergency boration based on initial boron concentration and RCS TAVG.

Approximate Boration (4 wt% boric acid)	
Initial RCS Boron Concentration	Each °F TAVG Is Less Than 525°F
0 ppm	50 gal
300 ppm	52 gal
600 ppm	55 gal
1200 ppm	60 gal
1500 ppm	64 gal
1800 ppm	68 gal