

Final Submittal
(Blue Paper)

FINAL RO

WRITTEN EXAMINATION
AND REFERENCES

HARRIS JAN./FEB. 2006 EXAM

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JANUARY 23 - FEBRUARY 2, 2006
FEBRUARY 6, 2006 (WRITTEN)

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

Applicant Information

Name:

Date:

Facility/Unit: Harris Nuclear Plant

Region: I (II) III IV

Reactor Type: (W) CE BW GE

Start Time:

Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination, you must achieve a final grade of at least 80.00 percent. Examination papers will be collected 6 hours after the examination begins.

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**

2006 Harris RO NRC Written Exam

1. Given the following conditions:

- The plant is at 40% power.
- The crew has entered AOP-018, RCP Abnormal Conditions, due to temperature alarms on RCP "A".
- The following ERFIS indications currently exist for RCP "A":
 - Upper and Lower Thrust Bearing temperatures 182 deg F
 - Upper and Lower Radial Bearing temperatures 186 deg F
 - Motor Stator Winding Temperature 306 deg F
 - Motor Current Fluctuations Peak to Peak 25 Amps

Which ONE (1) of the following describes the impact of these indications, and the action required in accordance with AOP-018?

- A. Thrust bearing temperatures exceed allowable limits. Trip the reactor and trip RCP "A".
- B. Radial bearing temperatures exceed allowable limits. Trip RCP "A".
- C. Motor current fluctuations exceed allowable limits. Trip the reactor and trip RCP "A".
- D. Motor stator winding temperature exceeds allowable limits. Trip RCP "A".

2. Given the following conditions:

- The plant is at 100% power.
- All control systems are in their normal alignments.

Which ONE (1) of the following describes the maximum allowable amount of Letdown flow to prevent receiving alarm APP-ALB-007-3-4, LOW PRESSURE LETDOWN HIGH FLOW?

- A. 105 GPM
- B. 120 GPM
- C. 150 GPM
- D. 165 GPM

2006 Harris RO NRC Written Exam

3. Which ONE (1) of the following describes the parameter limit that will prevent an explosive atmosphere in the VCT?
- A. Nitrogen concentration is maintained less than 4%.
 - B. Hydrogen concentration is maintained greater than 4%.
 - C. Oxygen concentration is maintained less than 4%.
 - D. Hydrazine concentration is maintained greater than 4%.

2006 Harris RO NRC Written Exam

4. Given the following conditions:

- The plant is in Mode 4.
- RHR Train "A" is in service.
- The Instrument Air supply line to Heat Exchanger Flow Control Valve 1RH-30 becomes severed and is completely detached.

Which ONE (1) of the following describes the effect on the RHR system?

- A. The operating RHR pump will cavitate.
- B. The operating RHR pump will operate at shutoff head.
- C. RHR Heat Exchanger outlet temperature indication rises.
- D. RHR Heat Exchanger outlet temperature indication lowers.

5. Given the following conditions:

- A small break LOCA has occurred. The crew is in EPP-009, Post LOCA Cooldown and Depressurization.
- One RCP is operating.
- Two CSIPs are operating.
- RCS subcooling is 72 degrees F. The crew has determined that one CSIP can be stopped.

Which ONE (1) of the following describes the system response after the crew stops one CSIP?

- A. RCS break flow remains constant while ECCS flow decreases and RCS subcooling decreases.
- B. RCS pressure decreases in response to reduced ECCS flow and RCS subcooling decreases.
- C. RCS subcooling remains the same and flow from the running CSIP increases, reaching a balance with break flow.
- D. RCS temperature and pressure increase in response to the reduced ECCS flow and RCS subcooling remains the same.

2006 Harris RO NRC Written Exam

6. Which one of the following conditions will exist in the associated train when the SSPS "OPERATE/TEST MODE SELECTOR" switch is in the TEST position?
- A. ESF actuations will be inhibited and reactor trip signals will be available
 - B. ESF actuations will be available and reactor trip signals will be inhibited
 - C. Both ESF actuations and reactor trip signals will be inhibited
 - D. Both ESF actuations and reactor trip signals will be available

7. Which ONE (1) of the following describes the Nuclear Instrumentation response from the time control rods begin to drop due to a reactor trip from 100% power until the Source Range instruments energize?
- A. Prompt Drop of approximately 3 decades, followed by a $-1/3$ DPM startup rate for approximately 20 minutes.
 - B. Prompt Drop to approximately 5% power, followed by a $-1/3$ DPM startup rate for approximately 20 minutes.
 - C. Prompt Drop of approximately 3 decades, followed by a $-1/3$ DPM startup rate for approximately 3-4 hours.
 - D. Prompt Drop to approximately 5% power, followed by a $-1/3$ DPM startup rate for approximately 3-4 hours.

8. Which of the following describes how the Pressurizer Relief Tank (PRT) is cooled in accordance with OP-100, "Reactor Coolant System"?
- A. Recirculate the PRT through the Reactor Coolant Drain Tank heat exchanger using Component Cooling Water to cool the heat exchanger
 - B. Recirculate the PRT through the Reactor Coolant Drain Tank heat exchanger using Service Water to cool the heat exchanger
 - C. Drain the PRT to the Reactor Coolant Drain Tank while making up to the PRT from the Demineralized Water Storage Tank
 - D. Drain the PRT to the Containment Sump while making up to the PRT from the Reactor Makeup Water Storage Tank

9. Given the following conditions:

- A reactor trip and safety injection have occurred.
- RCS pressure is 1200 psig and lowering.
- Tavg is 550 degrees F and lowering slowly.
- PRZ level is 65% and rising.
- Containment pressure is 2 psig and rising.

Which ONE (1) of the following describes the cause of this event?

- A. A stuck open pressurizer PORV.
- B. Large break on an RCS cold leg.
- C. Small break on an RCS hot leg.
- D. A stuck open pressurizer spray valve.

2006 Harris RO NRC Written Exam

10. Which ONE (1) of the following states the NORMAL and ALTERNATE sources of makeup water to the CCW Surge Tank?

NORMAL

ALTERNATE

- | | | |
|----|-----------------------------|-----------------------------|
| A. | Demineralized Water System | Primary Makeup Water System |
| B. | Condensate Storage Tank | Demineralized Water System |
| C. | Potable Water System | Condensate Storage Tank |
| D. | Primary Makeup Water System | Potable Water System |

11. Given the following conditions:

- A small break LOCA is in progress.
- All equipment responded as designed.
- RCS pressure is 1450 psig and stable.
- Containment pressure is 2.5 psig and rising slowly.

Which ONE (1) of the following describes the trend on MCR Charging flow indication FI-122.A1 and the computer trend during this event?

- A. Charging flow indication stable prior to reactor trip, and rises to a stable higher value after reactor trip.
- B. Charging flow indication rising prior to reactor trip, and goes off-scale high upon safety injection actuation.
- C. Charging flow indication rising prior to reactor trip, and lowers to zero upon safety injection actuation.
- D. Charging flow indication stable prior to reactor trip, and lowers to zero upon safety injection actuation.

2006 Harris RO NRC Written Exam

12. Which ONE (1) of the following combinations of pressurizer heater groups may be powered from Emergency Diesel Generators following a Loss of Off-Site Power?

A. Groups A and B

B. Groups A and C

C. Groups B and D

D. Groups C and D

13. Given the following conditions:

- The plant is at 100% power.
- All control systems are in their normal alignments, with the exception of the Pressurizer Pressure Master Controller, which is in MANUAL.
- The Pressurizer Pressure Master Controller output fails HIGH.

Which ONE (1) of the following describes the effect on RCS pressure and the reason for that effect?

- A. RCS pressure rises due to PRZ spray valves closing and pressurizer control group heater energization.
- B. RCS pressure rises due to PRZ spray valves closing and pressurizer backup group heater energization.
- C. RCS pressure lowers due to pressurizer heater deenergization, PRZ spray valve operation, and operation of all 3 PRZ PORVs.
- D. RCS pressure lowers due to pressurizer heater deenergization, PRZ spray valve operation, and operation of 1 PRZ PORV.

14. Which one of the following reactor trip signals provides protection against DNB (Departure from Nucleate Boiling).

- A. High pressurizer level
- B. Overpower Delta T
- C. RCP underfrequency
- D. Steam generator low-low water level

15. Given the following conditions:

- The plant is currently at full power.
- The following sequence of events occurred:

0200 The normal feeder breaker to 6.9kV bus 1A-SA (Bkr 105) tripped open.
The 1A-SA EDG started and the sequencer correctly loaded all loads.
0215 The 1A-SA EDG tripped.
0220 The 1A-SA DC bus was lost.

- NO operator actions have been taken.
- The 1A-SA normal feeder (Bkr 105) has been repaired.

What is the current status of the load breakers on 6.9kV bus 1A-SA AND what action, if any, is required prior to re-energizing the bus?

- A. Closed; Open all load breakers on 6.9kV bus 1A-SA from the MCB.
- B. Closed; Open all load breakers on 6.9kV bus 1A-SA locally at the switchgear.
- C. Open; DC Bus 1A-SA must be reenergized prior to restoring Bus 1A-SA.
- D. Open; no additional action is necessary.

16. Given the following conditions:

- The following alarm is received in the control room:
 - APP-ALB-010-1-1B, RCP A UPPER OIL RSVR LOW LEVEL
- The crew reduces power from 65% to 47% in the last 30 minutes in accordance with AOP-038, Rapid Downpower, to remove RCP A from service.

In accordance with AOP-038, which of the following plant personnel must be notified?

- A. Health Physics
- B. Chemistry
- C. Plant Manager
- D. Operations Manager

17. Which one of the following contains BOTH conditions that will result in indicated reactor power being LOWER than actual reactor power?

- A. Source Range pulse height discrimination set too LOW
Intermediate Range Compensating voltage set too LOW
- B. Source Range pulse height discrimination set too HIGH
Intermediate Range Compensating voltage set too HIGH
- C. Source Range pulse height discrimination set too LOW
Intermediate Range Compensating voltage set too HIGH
- D. Source Range pulse height discrimination set too HIGH
Intermediate Range Compensating voltage set too LOW

2006 Harris RO NRC Written Exam

18. Which ONE (1) of the following describes the Steam Generator level indication that is available on the Auxiliary Control Panel?

- A. One channel of SG narrow range per SG
- B. Two channels of SG narrow range per SG
- C. One channel of SG wide range per SG
- D. Two channels of SG wide range per SG

19. Given the following conditions:

- Following a plant trip, EPP-004, "Reactor Trip Response," is being performed.
- The crew is verifying Natural Circulation conditions as a result of a loss of power to all RCPs.
- Five (5) core exit thermocouples are failed.

How do the failed core exit thermocouples affect indications used to verify Natural Circulation?

- A. • The Core Exit Temperature indications will be HIGHER than actual
 - RCS Subcooling will indicate MORE subcooling than actual
- B. • The Core Exit Temperature indications will be HIGHER than actual
 - RCS Subcooling will indicate LESS subcooling than actual
- C. • Core Exit Temperature indications will indicate LOWER than actual
 - RCS Subcooling will indicate MORE subcooling than actual
- D. • Core Exit Temperature indications will indicate the SAME as actual
 - RCS Subcooling will indicate the SAME subcooling as actual

20. Given the following conditions:

- A small break LOCA has occurred.
- Containment pressure is 3.8 psig and increasing.
- Containment temperature is 137°F and increasing.

The expected Containment Cooling Fan alignment will be one (1) fan in each Containment Fan Cooler Unit running in ...

- A. high speed with the post-accident dampers shut.
- B. high speed with the post-accident dampers open.
- C. low speed with the post-accident dampers shut.
- D. low speed with the post-accident dampers open.

2006 Harris RO NRC Written Exam

21. Which ONE (1) of the following describes the cooling water provided to the following Containment Cooling System components?

	<u>Containment Fan Coil Units</u>	<u>Containment Fan Coolers</u>
A.	Normal Service Water	Normal Service Water
B.	Normal Service Water	Emergency Service Water
C.	Emergency Service Water	Normal Service Water
D.	Emergency Service Water	Emergency Service Water

22. Given the following conditions:

- Emergency Boration is required.
- Boric Acid Pump "B" is operating

Which ONE (1) of the following alignments results in the FASTEST reactor power reduction in accordance with AOP-002, "Emergency Boration"?

- A. Open both 1CS-283, Boric Acid To Boric Acid Blender FCV-113A and 1CS-155, Make Up To VCT FCV-114A
- B. Open both 1CS-283, Boric Acid To Boric Acid Blender FCV-113A and 1CS-156, Make Up To VCT FCV-113B
- C. Open either 1CS-291, Suction From RWST LCV-115B or 1CS-292, Suction From RWST LCV-115D
- D. Open 1CS-278, Emergency Boric Acid Addition

23. Given the following conditions:

- The plant was operating with the Reactor Coolant System in a reduced inventory condition, with the "B" RHR train in service.
- RCS level was 85 inches below the reactor vessel flange.
- "B" RHR Pump exhibited signs of cavitation, and RHR Cooling was lost.
- The crew entered AOP-020, Loss of RCS Inventory or Residual Heat Removal while Shutdown.
- The cause of the Loss of Inventory has been corrected.

Which ONE (1) of the following actions is required to restore RHR flow using Train "B" in accordance with AOP-020?

- A. Raise CCW flow to Train "B" RHR heat exchanger to ensure adequate heat removal and maintain RCS temperature below 200 degrees F.
- B. Restore RCS inventory and vent the "B" RHR Pump at 190' RAB and 236' RAB in accordance with AOP-020, Attachment 1, RHR Venting.
- C. Refill the RCS to greater than 55 inches below the reactor vessel flange, start "B" RHR Pump, and maintain RHR flow less than 3500 GPM.
- D. Restore RCS inventory and start "B" RHR Pump at greater than 3500 GPM to sweep voids from the RHR system.

24. Given the following conditions:

- The plant is at 80% power.
- A Loss of Component Cooling Water has occurred.
- The crew is performing actions of AOP-014.
- The USCO has directed isolation of the non-essential CCW header to isolate the leak.

Which ONE (1) of the following describes the effect on the plant?

- A. Letdown and Charging must be stopped. RCPs may only run for up to 10 minutes due to loss of thermal barrier cooling flow.
- B. Letdown and Charging must be stopped. RCPs may only run for up to 10 minutes due to loss of motor oil cooling.
- C. Letdown and Charging are unaffected. RCPs may only be run for up to 10 minutes due to loss of thermal barrier cooling flow.
- D. Letdown and Charging are unaffected. RCPs may only be run for up to 10 minutes due to loss of motor oil cooling.

2006 Harris RO NRC Written Exam

25. With an SI signal present and both Containment Spray pumps in service, the Spray pump suctions are _____ aligned to the Containment Sump upon receipt of a _____ condition.
- A. manually; lo-lo RWST level
 - B. manually; high Containment Sump level
 - C. automatically; lo-lo RWST level
 - D. automatically; high Containment Sump level

26. Given the following conditions:

- The plant is at 50% power.
- ARR Fan S-1A is in operation in Containment.
- The following sequence of events occur:
 - APP-ALB-28-1-4, CNMT BLDG ARR CHAR FILTER TROUBLE is received
 - ARR Fan S-1A control switch indication is OFF

Which ONE (1) of the following describes the cause of the condition above?

- A. High charcoal filter DP.
- B. ARR Fan S-1A electrical overload
- C. High charcoal filter temperature
- D. Loss of power to ARR Fan S-1A

27. Given the following conditions:

- The unit is in Mode 3 at normal operating pressure.
- Pressurizer Pressure Control is in AUTO.
- Pressurizer Pressure Channel PT-445 fails high.

- PRZ Pressure Channel indications are:
 - PI-444 2025 psig
 - PI-445 2500 psig
 - PI-455 1975 psig
 - PI-456 2025 psig
 - PI-457 1975 psig

Assuming NO operator actions, which of the following describes the position of the PRZ PORVs and Spray Valves for the current plant conditions?

- A.
 - PRZ PORV PCV-444B closed
 - PRZ PORVs PCV-445B and PCV-445A open
 - PRZ Spray Valves PCV-444C and PCV-444D open

- B.
 - PRZ PORV PCV-444B open
 - PRZ PORVs PCV-445B and PCV-445A closed
 - PRZ Spray Valves PCV-444C and PCV-444D open

- C.
 - PRZ PORV PCV-444B closed
 - PRZ PORV PCV-445B and PCV-445A closed
 - PRZ Spray Valves PCV-444C and PCV-444D closed

- D.
 - PRZ PORV PCV-444B open
 - PRZ PORVs PCV-445B and PCV-445A closed
 - PRZ Spray Valves PCV-444C and PCV-444D closed

28. Given the following conditions:

- The plant is at 100% power.
- Pressurizer Level indication LT-459, 460, and 461 failed a channel check in accordance with OST-1021, Daily Surveillance Requirements.
- The USCO directs verification of actual pressurizer level using Cold-Calibrated channel LI-462.

Assuming actual pressurizer level is on program, which ONE (1) of the following describes the indication on LI-462 if it is indicating as designed?

- A. 40%
- B. 44%
- C. 54%
- D. 60%

29. Given the following conditions:

- An ATWS has occurred.
- Actions of FRP-S.1 are in progress.
- Reactor Trip Breakers indicate CLOSED.
- The RO is inserting control rods.

Which ONE (1) of the following describes ALL of the methods that may be attempted to locally cause control rods to insert?

- A. Open Reactor Trip Breakers only.
- B. Open Reactor Trip Breakers or one Rod Drive MG Set output breaker.
- C. Open Reactor Trip Breakers or both Rod Drive MG Set supply breakers.
- D. Open Reactor Trip Breakers, or both Rod Drive MG Set output breakers, or both Rod Drive MG Set supply breakers

30. Given the following conditions:

- A reactor startup is in progress.
- Both Intermediate Range channels indicate approximately 5×10^{-11} amps.
- Source Range Channel N-31 fails DOWNSCALE.

Which one of the following describes the required operator response and the reason for the response?

- A. Continue the reactor startup; with only one source range channel operable; 48 hours is allowed to restore two channels to service.
- B. Suspend the reactor startup; source range channels are not required to trip the reactor; however, the source range monitoring functions must be available.
- C. Continue the reactor startup; the Intermediate Range Neutron Flux Trip and the Power Range Neutron Flux-Low Trip provide the necessary core protection.
- D. Suspend the reactor startup; with only one source range channel operable, the minimum required Source Range High Flux Trip protection is not met.

31. Given the following conditions:

- The plant is in Mode 1.
- Irradiated Fuel movement is being performed in the Spent Fuel Pool in preparation for Refueling.
- Fuel Handling Building area radiation monitor RM-1*FR-3564ASA, fails HIGH and is declared inoperable.
- The crew has determined that all plant equipment is operating as required.

Which ONE (1) of the following describes the effect on the plant and the status of fuel movement in the Spent Fuel Pool?

- A. Fuel Handling Building Emergency Exhaust unit E-12 starts. Fuel movement may continue with no additional actions required.
- B. Fuel Handling Building Emergency Exhaust unit E-12 starts. Fuel movement may continue ONLY as long as BOTH Control Room Outside Air Intake radiation monitors remain operable
- C. Fuel Handling Building Emergency Exhaust unit E-12 must be declared inoperable. Fuel movement must be suspended until Fuel Handling Building Emergency Exhaust unit E-13 is placed in service in the recirculation mode.
- D. Fuel Handling Building Emergency Exhaust unit E-12 must be declared inoperable. Fuel movement must be suspended until both trains of Fuel Handling Building Emergency Exhaust are operating in the recirculation mode or restored to operable.

32. Given the following conditions:

- A Unit startup is in progress with the MSIVs closed.
- The operating crew is preparing to warm up the main steam lines.

Which one of the following actions will cause "A" SG pressure to INCREASE in this plant configuration?

- A. Decrease "A" SG PORV controller setpoint in AUTO.
- B. Decrease "A" SG PORV controller output in MANUAL.
- C. Decrease Steam Dump pressure controller output in STM PRESS mode.
- D. Decrease Steam Dump pressure controller setpoint in STM PRESS mode.

33. Given the following conditions:

- REM-01TV-3534, Condenser Vacuum Pump Effluent radiation monitor, indication is rising.
- Chemistry has been directed to perform CRC-804, Primary to Secondary Leak Rate Monitoring, to quantify the leak rate

Which ONE (1) of the following indications will serve to verify the value of actual primary to secondary leak rate?

- A. Condenser Vacuum Pump Effluent Monitor indication and a conversion factor
- B. Local surveys of Steam Generator Blowdown Lines
- C. Alarm status of Main Steam Line Radiation Monitors RM-01MS-3591 SB, 3592 SB, or 3593 SB
- D. Trend on Turbine Building Vent Stack Effluent, RM-1TV-3536-1

34. Given:

- A Main Steam line break has occurred.
- Steam Generator pressures are:
 - SG A - 900 psig
 - SG B - 750 psig
 - SG C - 910 psig

Under these conditions...

- A. the open signal for the AFW flow control valve to SG-C will increase.
- B. AFW will isolate to SG-B following the Main Steam Line Isolation signal.
- C. the Turbine Driven AFW pump steam supply from SG-C will be blocked from opening.
- D. AFW will isolate to all SGs.

35. The crew is terminating SI in EPP-014, Faulted SG isolation.

Which ONE (1) of the following describes the reason for opening FK-122.1, Charging Flow control valve a minimal amount, prior to isolating the BIT?

- A. To prevent damage to the regenerative heat exchanger due to thermal shock.
- B. To maintain seal injection flow within analyzed limits by maintaining appropriate backpressure on the seal injection throttle valves.
- C. To prevent 'dead-heading' the running CSIP in the case where normal miniflow valves are not available.
- D. To establish and maintain stable makeup flow for RCS inventory control.

36. Given the following conditions:

- The plant is operating at 100% power when the following alarm is received:
 - APP-ALB-020-2-2, TURBINE RUNBACK OPERATIVE
- RCS Tavg has risen 9 degrees F and continues to rise.
- Steam Dumps indicate CLOSED.

Which ONE (1) of the following describes an indication that will verify a runback is in progress, and what action is required for operation of the steam dumps?

- A. Runback is verified by control rod insertion; Observe steam dumps opening in automatic when the C-7A bistable illuminates
- B. Runback is verified by Turbine First Stage pressure reduction on PI-446 and 447; Observe steam dumps opening in automatic when the C-7A bistable illuminates.
- C. Runback is verified by control rod insertion; Open steam dumps manually by placing the steam dump header pressure controller, PK-464.1, in MANUAL with the steam dump mode selector in TAVG
- D. Runback is verified by Turbine First Stage pressure reduction on PI-446 and 447; Open steam dumps manually by placing the steam dump header pressure controller, PK-464.1, in MANUAL with the steam dump mode selector in STEAM PRESS.

37. Given the following conditions:

- FRP-H.1, "Response to a Loss of Secondary Heat Sink," is being implemented.
- RCS bleed and feed has been initiated when Auxiliary Feedwater (AFW) capability is restored.
- All SGs are completely dry and depressurized.

Which of the following describes the strategy used to re-establish feed under these conditions?

- A. Feed ONLY one (1) SG to ensure RCS cooldown rates are established within Technical Specification limits
- B. Feed ONLY one (1) SG to minimize thermal shock to SG components
- C. Feed ALL SGs to establish subcooled conditions in the RCS as soon as possible
- D. Feed ALL SGs to allow termination of RCS bleed and feed as soon as possible

38. Given the following conditions:

- A Station Blackout has occurred.
- The crew is performing actions of EPP-001, Loss of Power to 1A-SA and 1B-SB Buses.
- The USCO has directed performance of Attachment 1 to restore off-site power to emergency buses.
- The lockout relay is tripped on the Startup Xfrmr. A

Which ONE (1) of the following describes the requirement for restoring power?

- A. Off-Site power may be restored without resetting the Startup Xfrmr lockout relay.
- B. The Startup Xfrmr lockout must be reset after receiving permission from the Load Dispatcher.
- C. The Startup Xfrmr must be isolated from the grid prior to restoration of power in accordance with Attachment 1.
- D. Switchyard breaker 52-2 or 52-3 must be closed in order to reset the Startup Xfrmr lockout relay.

39. Given the following conditions:

- A Loss of Off-Site power has occurred.
- All equipment is operating as designed.
- Prior to the trip, 'A' Reactor Water Makeup Pump was running.

Which ONE (1) of the following describes the operation of "A" Reactor Water Makeup Pump during this event?

"A" RW Makeup Pump...

- A. must be reset by placing the control switch in OFF prior to restarting.
- B. will remain running because it was sequenced back on after the EDG output breaker closed.
- C. will remain running because it did not receive a load shed signal on the loss of off-site power.
- D. will NOT be running unless bus 1A1 has been reenergized.

40. Given the following conditions:

- Failure of several cards in the Condensate Booster Pump controller cabinet has resulted in loss of all speed control of the 'B' Condensate Booster Pump from the MCB.
- Electrical power has been removed from the VSF coupling controller.
- You have been sent to take local manual control of the 'B' CBP scoop tube actuator.

Which ONE (1) of the following describes how to take local control of the "B" CBP scoop tube actuator?

- A. Momentarily position the selector lever to AUTOMATIC then release it to NEUTRAL. Then use the RAISE and/or LOWER pushbuttons on the actuator to adjust CBP speed.
- B. Position the selector lever to MANUAL and hold it in MANUAL. Then use the RAISE and/or LOWER pushbuttons on the CBP actuator to adjust CBP speed.
- C. Hold the selector lever to MANUAL while turning the hand crank to engage, then release to NEUTRAL. Then use the actuator hand crank to adjust CBP speed.
- D. Position the selector lever to MANUAL and hold it in MANUAL. Then use the actuator hand crank to adjust CBP speed while holding the lever in MANUAL.

41. The following conditions exist:

- A plant startup is in progress.
- Reactor power is currently 7%.
- A loss of Instrument Bus SII occurs.

Which ONE (1) of the following describes the effect on the plant?

- A. Reactor trips due to loss of one Source Range instrument.
- B. Source Range instruments energize prematurely.
- C. Reactor trips due to loss of one Intermediate Range instrument.
- D. Intermediate Range high flux reactor trip will NOT actuate if required.

42. Given the following conditions:

- REM-01SW-3500A, SW from WPB to Circ Water radiation monitor is in alarm.
- Chemistry sample verifies high activity in the piping monitored by REM-01SW-3500A

Which ONE (1) of the following describes the action required, and the reason for that action, in accordance with AOP-005, Radiation Monitoring System?

- A. Isolate Service Water to and from the WPB to determine the location of the leak. Place both trains of ESW in service to ensure cooling of essential plant equipment.
- B. Direct the Radwaste Operator to initiate isolation of individual components to locate the leak, and isolate Service Water to and from the WPB.
- C. Isolate Service Water to and from the WPB to determine the location of the leak. Place the running train of ESW in standby and shut down the standby train of ESW.
- D. Initiate a plant shutdown in accordance with GP-006. When the reactor is tripped, isolate Service Water to and from the WPB to minimize any radiological releases.

43. Given the following conditions:

- A reactor trip occurred from 35% power.
- The crew is performing EPP-004, Reactor Trip Response.
- All equipment has responded as designed.
- RCS Tavg is 558 degrees F.
- The BOP determines that an increase in Main Feedwater flow is desired to maintain SG levels at 50% NR.

Which ONE of the following describes the method used to increase Main Feedwater flow?

- A. Raising the automatic setpoint of the Main Feedwater Regulating Valve controllers
- B. Manually adjusting the Main Feedwater Regulating Valve position
- C. Raising the automatic setpoint of the Feed Reg Bypass valve controllers
- D. Manually adjusting the Feed Reg Bypass valve position

44. Given the following conditions:

- The plant has experienced a loss of offsite power.
- Both EDGs are running.
- All three AFW pumps are running with all six FCVs throttled to 20%.

Which ONE (1) of the following describes how a loss of the B EDG would affect the AFW system?

- A. Loss of the B MDAFW pump only.
- B. Loss of the B MDAFW pump and the TDAFW pump only.
- C. Loss of the B MDAFW pump and power to Main Steam C to Aux FW turbine, 1MS-72 SB.
- D. Loss of the B MDAFW pump and a full open signal to all six FCVs.

45. Given the following conditions:

- The plant is at 100% power.
- Recovery from a Loss of Instrument Bus 1DP-1A-S1 is in progress.
- The crew has de-energized the associated Process Instrumentation Cabinet in preparation for energizing Instrument Bus 1DP-1A-S1.
- The crew is evaluating bistable status prior to energizing the bus.

Which ONE (1) of the following describes the reason for checking bistable status?

- A. When the Instrument Bus is energized, a reactor trip may occur due to the associated Process Instrumentation Cabinet being de-energized, if another bistable of the same parameter is tripped.
- B. When the Process Instrumentation Cabinet is energized after the Instrument Bus, 'energize to actuate' bistables may experience a momentary inadvertent trip. Checking other bistables ensures an ESF actuation will not occur.
- C. Bistables are checked to ensure that each parameter for Process or Protection goes to its required state when the Instrument Bus and Process Instrumentation Cabinet is energized.
- D. Bistables are checked to ensure that all lights are out, verifying that the Process Instrumentation Cabinet normal and alternate supply breakers are open prior to reenergizing the Instrument Bus.

46. Given the following conditions:

- A loss of Instrument Bus Inverter SI has occurred.
- The crew is performing action contained in AOP-024, Loss of Uninterruptible Power Supply.
- Transfer of Bus SI to the alternate supply is required in accordance with OP-156.02, AC Electrical Distribution.

Which ONE (1) of the following describes how improper sequencing of the Instrument Bus is prevented for this transfer?

- A. The inverter will not allow transfer to the alternate supply if it is out of synch with the normal supply
- B. The bus must be deenergized and a kirk key used for the alternate supply breaker prior to reenergization of the bus
- C. The bus transfer switch is a 'break before make' contactor that will not allow two power sources to simultaneously supply the bus
- D. The normal and alternate supply breakers are electrically interlocked so that only one may be closed at a time

2006 Harris RO NRC Written Exam

47. Following a loss of Emergency DC bus 1B-SB, which of the following components would have power available?

- A. 1MS-72 SB, Main Steam C to Aux FW Turbine
- B. Emergency Load Sequencer 1B-SB
- C. TDAFW Pump control panel
- D. RM-1CR-3561B-SB, CNMT Ventilation Isolation Radiation Monitor

48. Given the following conditions:

- The unit is operating at 25% power.
- Emergency Diesel Generator (EDG) A-SA is loaded to 3800 KW while operating in parallel with the grid during the performance of OST-1013, "A-SA Emergency Diesel Generator Operation."
- A loss of off-site power occurs.

Which ONE (1) of the following describes the operation of EDG A-SA output breaker and the action required to initiate load sequencing?

- A. Remains closed with EDG A-SA load less than 3800 KW. Trip the EDG to initiate load sequencing.
- B. Remains closed with EDG A-SA load greater than 3800 KW. Trip the EDG to initiate load sequencing.
- C. Opens and then recloses to allow the sequencer to load. Verify automatic load sequencing occurs.
- D. Opens and remains open. Reset and restart the EDG to initiate automatic load sequencing.

49. Given the following conditions:

- EDG 1A-SA is operating in parallel with its associated bus with voltage and frequency control in AUTO.
- Current parameters are as follows:
 - Voltage and current are normal.
 - The EDG is loaded to 3.2 MW
 - Reactive load is 0.8 MVAR

If a 150 HP motor is started on the bus, which ONE (1) of the following describes the EDG parameters from steady state to steady state operation?

- A. Voltage and frequency are reduced
- B. Voltage is reduced, frequency remains the same
- C. MW output and MVAR output are raised
- D. MW output is raised, MVAR output remains the same.

50. Given the following conditions:

- The plant is at 80% power.
- A Loss of Instrument Air has occurred.
- Instrument Air pressure is 80 psig and lowering slowly.
- The crew has entered AOP-017, Loss of Instrument Air.

Which ONE (1) of the following describes the plant conditions that will require an immediate reactor trip?

- A. Loss of Instrument Air pressure to Containment
- B. Any SG level below 30% with loss of feedwater control
- C. Loss of VCT makeup capability with VCT level below 20%
- D. Loss of any 2 Instrument Air Compressors

51. Given the following conditions:

- A LOCA has occurred.
- Due to several component failures, the crew was required to perform EPP-012, Loss of Emergency Coolant Recirculation.
- The Crew is now entering FRP-J.1, Response to High Containment Pressure.
- Containment pressure is 45 psig and STABLE.
- BOTH Containment Spray Pumps are OFF.
- RWST Level is 2%.

Which ONE (1) of the following describes the actions required and the reason for the current strategy for reducing Containment Pressure?

- A. START both Containment Spray Pumps in accordance with FRP-J.1. RED CSF conditions take precedence over EPP-012 actions.
- B. OPERATE Containment Spray Pumps in accordance with the guidance in EPP-012, as directed by FRP-J.1. Conservation of RWST inventory takes precedence over Containment heat removal concerns.
- C. Perform ONLY the FRP-J.1 actions that do NOT conflict with or undo the action taken in EPP-012. Two Containment Fan Coolers will provide adequate depressurization to meet the Containment Safety Function requirements.
- D. Do NOT perform actions of FRP-J.1 until the RWST EMPTY alarm is clear and Containment Spray Pumps may be restarted. Ensure all other automatic actions related to containment isolation have occurred as required to ensure maintenance of minimum safety function.

52. Which ONE (1) of the following will automatically occur when a high alarm on RM-1CR-3561A-D, Containment Ventilation Isolation Area Radiation Monitors, is received?
- A. Containment Vacuum Relief Isolation Valves receive a CLOSE signal.
 - B. Airborne Radioactivity Removal (ARR) fans S-1A and B receive a TRIP signal.
 - C. Containment Isolation Phase "A" isolation valves receive a CLOSE signal.
 - D. Containment Fan Coil Units AH-37, 38, and 39 receive a TRIP signal.

2006 Harris RO NRC Written Exam

53. Which ONE (1) of the following describes the automatic action that occurs in response to a high radiation (red) alarm on the TB drain monitor?
- A. 1MD-285, Indus Waste to the Oil Separator, SHUTS; TB condensate pump area sump pumps TRIP
 - B. 1SWT-420, Indus Waste to LC Hold-Up Tank Isol Vlv, SHUTS; TB condensate pump area sump pumps TRIP
 - C. 1SWT-420, Indus Waste to LC Hold-Up Tank Isol Vlv, SHUTS; industrial waste sump pumps TRIP
 - D. 1MD-285, Indus Waste to the Oil Separator, SHUTS; tank area drain transfer pumps TRIP

54. Given the following conditions:

- The plant is at 100 percent power with the following SW alignment:
 - "A" and "B" Emergency Service Water Pumps are off.
 - "A" & "B" Emergency Service Water header supplied from Normal Service Water.
 - "A" Normal Service Water Pump running.
 - "B" Normal Service Water Pump off.
- Power is lost to Bus 1A-SA.
- The A EDG starts, re-energizes the bus, and sequences loads as designed.

Which ONE (1) of the following describes the effect on Service Water system alignment?

- A. "A" NSW Pump remains as the only pump in service since Bus 1A remained energized.
- B. The B NSW pump is now running with the same alignment.
- C. The A ESW pump is now running supplying the A ESW header.
- D. The B ESW pump started on low pressure and is supplying the B ESW header.

55. Given the following conditions:

A reactor trip and safety injection actuation have occurred.

Which one of the following sets of components are being supplied by the Emergency Service Water system?

- A. Containment fan coolers (AH-1, 2, 3, 4)
CSIP oil coolers
RHR heat exchangers
- B. RCP bearing oil coolers
Diesel Generator coolers
CCW heat exchangers
- C. AFW pump emergency makeup
CSIP oil coolers
CCW heat exchangers
- D. Containment fan coil units (AH-37, 38, 39),
AFW pump emergency makeup,
Diesel Generator coolers.

56. Given the following conditions:

- A rapid load reduction from 100% power to 65% power was performed approximately 3 hours ago.
- The RCS Gross Failed Fuel detector is in alarm.
- Charging Pump Room Fuel Breach Area Radiation Monitors are in alarm.
- Chemistry confirms RCS activity exceeds Technical Specification limits.

The USCO directs a plant shutdown be performed.

Which ONE (1) of the following actions is directed to limit the release of radioactivity in the event of a subsequent SGTR?

- A. MSIVs are closed.
- B. All SG PORV setpoints are raised.
- C. RCS is cooled down below 500°F.
- D. Maximum number of Condensate Polishing Demineralizers are placed in service.

2006 Harris RO NRC Written Exam

57. Which one of the following statements correctly describes how to locally shut the MSIVs from outside the Control Room?
- A. On the 236 level in the RAB, isolate air by closing 1IA-814, then remove cap and open drain valve 1IA-1876
 - B. On the 236 level in the RAB, remove the cap and open the drain for valve on 1IA-1876 then isolate air by closing 1IA-814.
 - C. On the 261 level in the RAB, isolate air by closing 1IA-814, then remove cap and open drain valve 1IA-1876
 - D. On the 261 level in the RAB, remove the cap and open the drain for valve on 1IA-1876 then isolate air by closing 1IA-814.

58. Given the following conditions:

- The plant is in Mode 5.
- Containment Pre-Entry Purge Makeup and Exhaust is in operation.
- The Personnel Airlock and Equipment Hatch are closed.
- The Containment Pre-Entry Purge Exhaust Isolation valve is inadvertently closed.
- NO other components reposition.

Which ONE (1) of the following describes the containment parameter affected by this failure and how the parameter is affected?

- A. Pressure RISES
- B. Temperature LOWERS
- C. Radiation Level RISES
- D. Humidity Level LOWERS

59. Given the following conditions:

- A LOCA has occurred.
- RCS pressure is 300 psig and stable.
- Containment pressure is 16 psig and lowering slowly.
- All equipment is operating as designed.
- The crew is performing actions contained in PATH-1, preparing to reset ESF Actuation signals.

Which ONE (1) of the following describes the conditions required to be met, if any, to reset Containment Isolation Phase A and B?

- A. Phase A and Phase B may be reset manually without additional conditions.
- B. Phase A may be reset manually at this time. Containment Spray must be reset prior to resetting Phase B.
- C. Phase B will NOT reset until Phase A is reset. Phase A may be reset at this time.
- D. Phase A will NOT reset until Safety Injection is reset. Phase B will NOT reset until containment pressure is below the actuation setpoint.

60. Which ONE (1) of the following describes the preferred method of operating RCPs and the reason during performance of EPP-009, Post LOCA Cooldown and Depressurization?

- A. Starting any RCP is undesirable because starting an RCP during Natural Circulation may cause a SG safety valve to lift.
- B. Starting one RCP is desirable to provide pressurizer spray flow and mix the RCS.
- C. Starting any RCP is undesirable because the heat input will delay RCS cooldown.
- D. Starting 2 or more RCPs is desirable because it collapses RCS voids and allows true measurement of RCS inventory.

61. Given the following conditions:

- A LOCA outside containment has occurred.
- The crew is performing the actions in EPP-013, LOCA Outside Containment.

Which ONE of the following indications is used to determine if the leak has been isolated in accordance with EPP-013?

- A. RCS pressure, because SI flow will repressurize the RCS with the break isolated.
- B. Pressurizer level, because with the break isolated, RCS inventory will rapidly rise.
- C. RVLIS indication, because as RCS inventory and pressure rise, vessel head and plenum voiding will immediately be reduced.
- D. Safety injection flow, because when the break is isolated, it is the first parameter that will change.

62. Given the following conditions:

- A Loss of Heat Sink has occurred.
- The crew is establishing RCS 'Bleed and Feed' in accordance with FRP-H.1, Loss of Secondary Heat Sink.
- The RO opens one PRZ PORV. He reports that NEITHER of the other two PORVs will open.

Which ONE (1) of the following describes the consequences of the PORV failures?

- A. A Red Path on the Core Cooling CSF will develop due to loss of RCS Inventory with no available makeup.
- B. RCS 'Feed and Bleed' cooling must be established to ensure sufficient SI flow at the operable PORV setpoint.
- C. The RCS may not depressurize quickly enough to ensure sufficient SI flow to provide RCS heat removal, and other RCS openings may have to be established.
- D. 'Bleed and Feed' cooling of the RCS must be terminated and secondary depressurization to inject Condensate pump flow must be immediately initiated.

63. Given the following conditions:

- A MANUAL reactor trip was initiated due to Component Cooling Water problems.
- All RCP's are stopped.
- The crew has transitioned to EPP-004, REACTOR TRIP RESPONSE.

Which ONE (1) of the following pairs of parameters is indicative that natural circulation cooling is occurring?

- A. SG pressure stable and CET's decreasing.
- B. SG pressure stable and T_{hot} increasing.
- C. SG pressure increasing and RCS subcooling decreasing.
- D. SG pressure increasing and T_{cold} trending to saturation for SG pressure.

64. Given the following conditions:

- A LOCA has occurred.
- Multiple failures have resulted in a transition to EPP-012, Loss of Emergency Coolant Recirculation.
- RWST level is 4%.
- The crew is preparing to make up to the RWST per EPP-012.

Which ONE (1) of the following describes the effect on the plant of the RO resetting the SI Auto Suction Switchover in accordance with EPP-012?

- A. Allows resetting of the SI signal and manual realignment of safeguards equipment.
- B. Allows manual operation of Containment Spray pump discharge and chemical addition valves
- C. Defeats the automatic open and shut features of the RHR Pump Miniflow Isolation Valves.
- D. Defeats the automatic open and shut features of the CSIP Alternate Miniflow Isolation Valves.

65. In procedure EPP-015, Uncontrolled Depressurization of All Steam Generators, the Operator is directed to establish feed flow to all three Steam Generators.

What is the setpoint and basis for establishing flow in this range?

- A. 12.5 KPPH, maintain minimum feed flow to ensure CST inventory is maintained until RHR can be placed in service.
- B. 210 KPPH, maintain a minimum required feed flow to ensure adequate heat sink is maintained.
- C. 12.5 KPPH, establish a minimum verifiable flow to ensure components remain wet so that thermal stresses are minimized upon a feed flow increase.
- D. 210 KPPH, establish a minimum verifiable flow to ensure components remain wet so that thermal stresses are minimized upon a feed flow increase.

66. The plant is operating at 100% power.

Which ONE (1) of the following requires the EARLIEST action in accordance with Technical Specifications?

- A. One Containment Isolation Valve is declared inoperable.
- B. Containment Average Air Temperature is 122 degrees F.
- C. Containment Vacuum is -1.2 inches water gauge.
- D. Containment Pressure is 1.2 psig.

67. While implementing an AOP, the crew encounters a step that directs them to 'REFER TO' a different procedure.

At this point the crew will...

- A. exit the current AOP and immediately transition to the new procedure and perform applicable actions.
- B. complete the procedure in progress and refer to the other procedure after the exit conditions are met.
- C. perform actions of the other procedure as necessary in conjunction with the procedure in effect.
- D. perform and complete the referenced procedure as written prior to performing actions of any other procedures.

68. The plant is in Mode 3.

Based on the current plant conditions, which ONE (1) of the following is NOT a task that the RO may direct an STA to perform?

- A. Silence control room annunciators
- B. Operate Radiation Monitoring System controls
- C. Operate the Source Range Audio Count Rate Drawer
- D. Operate the Metal Impact Monitoring System (MIMS)

69. Given the following conditions:

- A reactor startup is being performed 90 hours after a plant trip.
- Critical boron concentration is determined to be 80 ppm.
- The estimated critical rod position is Control Bank D at 100 steps.

Which of the following identifies the - 500 PCM and + 500 PCM rod positions for these conditions?

	<u>- 500 PCM</u>	<u>+ 500 PCM</u>
A.	Bank D @ 37 Steps	Bank D @ 175 Steps
B.	Bank D @ 47 Steps	Bank D @ 180 Steps
C.	Bank D @ 57 Steps	Bank D @ 182 Steps
D.	Bank D @ 62 Steps	Bank D @ 190 Steps

2006 Harris RO NRC Written Exam

70. Maintaining the Refueling boron concentration greater than that required by the Core Operating Limit Report (COLR) ensures the reactor remains shutdown by at least ...

- A. 1.3%.
- B. 2.0%.
- C. 2.5%.
- D. 5.0%.

71. Given the following conditions:

- A 25 year old male started working for the Operations Department at Harris on June 2nd of this year.
- He previously worked at Millstone Unit 3 as part of the Maintenance Department.
- His exposure for this year at Millstone was 1600 mRem.
- He has received NO Progress Energy management exposure extensions and NO emergency exists.

Which one of the following is the ADDITIONAL Total Effective Dose Equivalent exposure that the individual can receive WITHOUT management concurrence at Harris this year?

- A. 400 mRem.
- B. 2000 mRem.
- C. 2400 mRem.
- D. 3400 mRem.

72. A job must be performed under the following conditions:

- Dose rate at job location is 90 mrem/hr.
- Airborne Radioactivity Area from particulates due to weld grinding:
 - Total Internal dose for the job if respirator is worn is 0 mrem.
 - Total Internal dose for the job if no respirator is worn is 82 mrem.
- Time to complete job while wearing a respirator is 3.5 hours.
- Time to complete job without wearing a respirator is 2.75 hours.

Which ONE (1) of the following describes whether a respirator will be worn, and why?

- A. No, wearing a respirator will raise total exposure.
- B. Yes, wearing a respirator will lower total exposure.
- C. No, wearing a respirator will make no difference to the total exposure.
- D. Yes, a respirator must be worn anytime airborne radiation is present.

73. The following conditions exist:

-A fire has been identified and verified in the Reactor Auxiliary Building.

Which ONE (1) of the following is NOT an action the Control Room Operator is required to perform in accordance with FPP-002, "Fire Emergency"?

- A. notify the S-SO
- B. coordinate Fire Brigade efforts to protect potentially affected safety-related equipment.
- C. review the appropriate Fire Preplan List.
- D. sound the fire alarm and announce the location of the fires.

2006 Harris RO NRC Written Exam

74. During performance of AOP-004, Remote Shutdown, which ONE (1) of the following describes the responsibility of the RO?
- A. Monitor and control plant conditions from the Auxiliary Control Panel (ACP)
 - B. Align plant equipment at the Auxiliary Transfer Panel (ATP) and Switchgear Rooms to facilitate control of plant equipment from outside the control room
 - C. Start and control EDGs locally to provide safety-related power
 - D. Locally operate and control CSIPs for RCS Makeup

2006 Harris RO NRC Written Exam

75. After a loss of power to 60 KVA NNS UPP-1, what method of communication will be used between the MCR and plant personnel?

- A. Plant PA
- B. Radios
- C. Telephones
- D. Sound Powered Phones

PROGRESS ENERGY

HARRIS TRAINING SECTION

EXAMINATION ANSWER KEY

EXAM NUMBER: 2006 ILC RO NRC Exam LESSON/COURSE CODE: None

SUBJECT/CATEGORY: 2006 ILC RO NRC Written Exam

EXAM POINT VALUE: 75

See Attached

QA VITAL RECORD

ANSWER KEY REPORT
for Harris RO NRC Exam 2006 Test Form: 0

Answers

#	ID	0
1	003 A2.03 1	D
2	004 A1.07 1	B
3	004 K5.02 1	C
4	005 K6.03 1	D
5	006 A1.06 1	B
6	006 A4.06 2	A
7	007 EK1.04 1	B
8	007 K4.01 2	A
9	008 AK2.01 1	A
10	008 K1.05 1	A
11	009 EA2.22 1	C
12	010 K2.04 1	A
13	010 K3.01 1	D
14	012 K5.01 1	C
15	013 A2.05 2	B
16	015 G2.1.14 3	B
17	015 K5.02 1	B
18	016 K4.01 1	C
19	017 K3.01 2	D
20	022 A3.01 4	D
21	022 K1.01 1	B
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23	025 G2.1.30 2	B
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26	027 A4.04 1	C
27	027 AK2.03 2	C
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29	029 EA1.12 1	D
30	032 AK3.01 1	D
31	034 K6.02 1	A
32	035 A1.02 1	B
33	037 AA2.01 1	A
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36	041 G2.4.50 1	D
37	054 AK1.02 2	B
38	055 EA2.06 1	B
39	056 AA2.76 1	D
40	056 G2.1.30 2	C
41	057 AA2.19 1	C
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44	061 K2.02 1	A
45	062 A1.03 1	B
46	062 A2.03 1	B

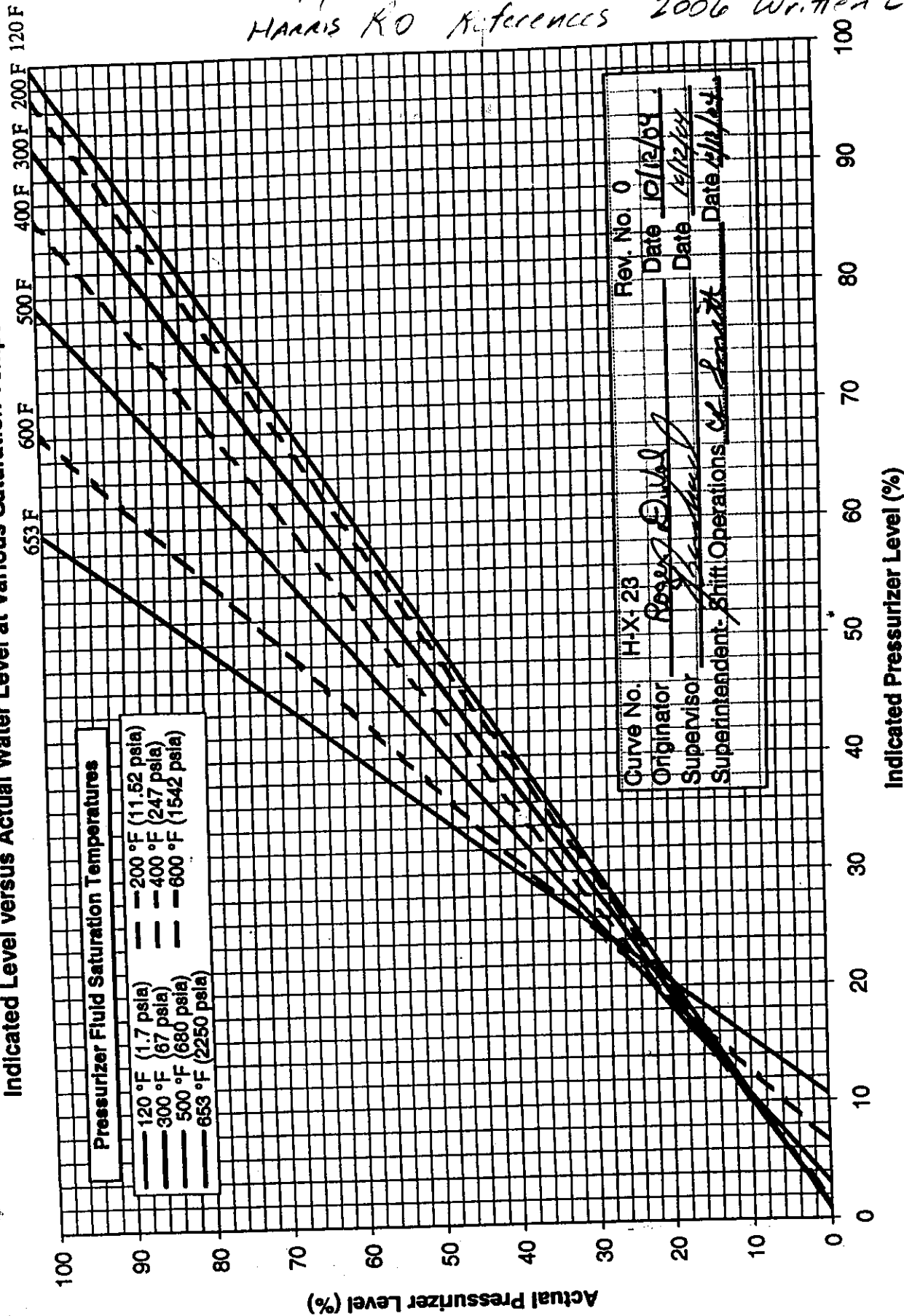
ANSWER KEY REPORT
for Harris RO NRC Exam 2006 Test Form: 0

Answers

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48	064 A2.16 1	C
49	064 A3.05 1	C
50	065 AA2.06 1	B
51	069 AK3.01 1	B
52	072 K1.02 1	A
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55	076 A3.02 2	C
56	076 AA2.02 1	C
57	078 K1.05 1	C
58	103 A1.01 1	A
59	103 A4.04 1	A
60	E03 EK3.4 1	B
61	E04 EK3.1 1	A
62	E05 EK2.1 1	C
63	E09 EA1.3 1	A
64	E11 EK2.1 1	D
65	E12 EK3.1 1	C
66	G2.1.11 4	C
67	G2.1.23 1	C
68	G2.1.9 1	D
69	G2.2.1 1	C
70	G2.2.26 2	D
71	G2.3.10 3	B
72	G2.3.2 1	B
73	G2.4.27 2	B
74	G2.4.34 1	B
75	G2.4.43 2	D

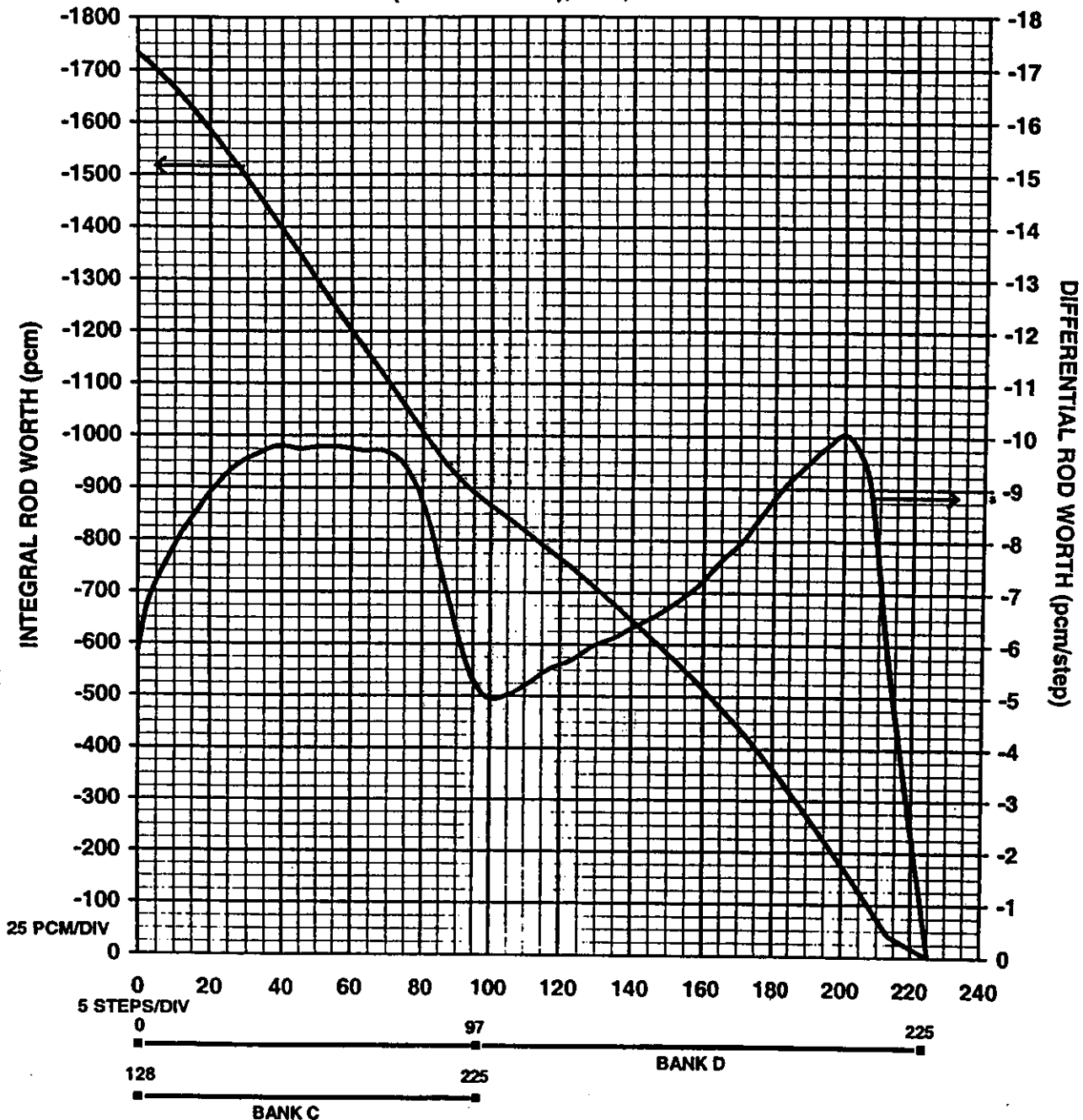
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 HARRIS RO References 2006 Written Exam

Pressurizer Level Cold Calibrated Channel (LI-462)
Indicated Level versus Actual Water Level at Various Saturation Temperatures



100000

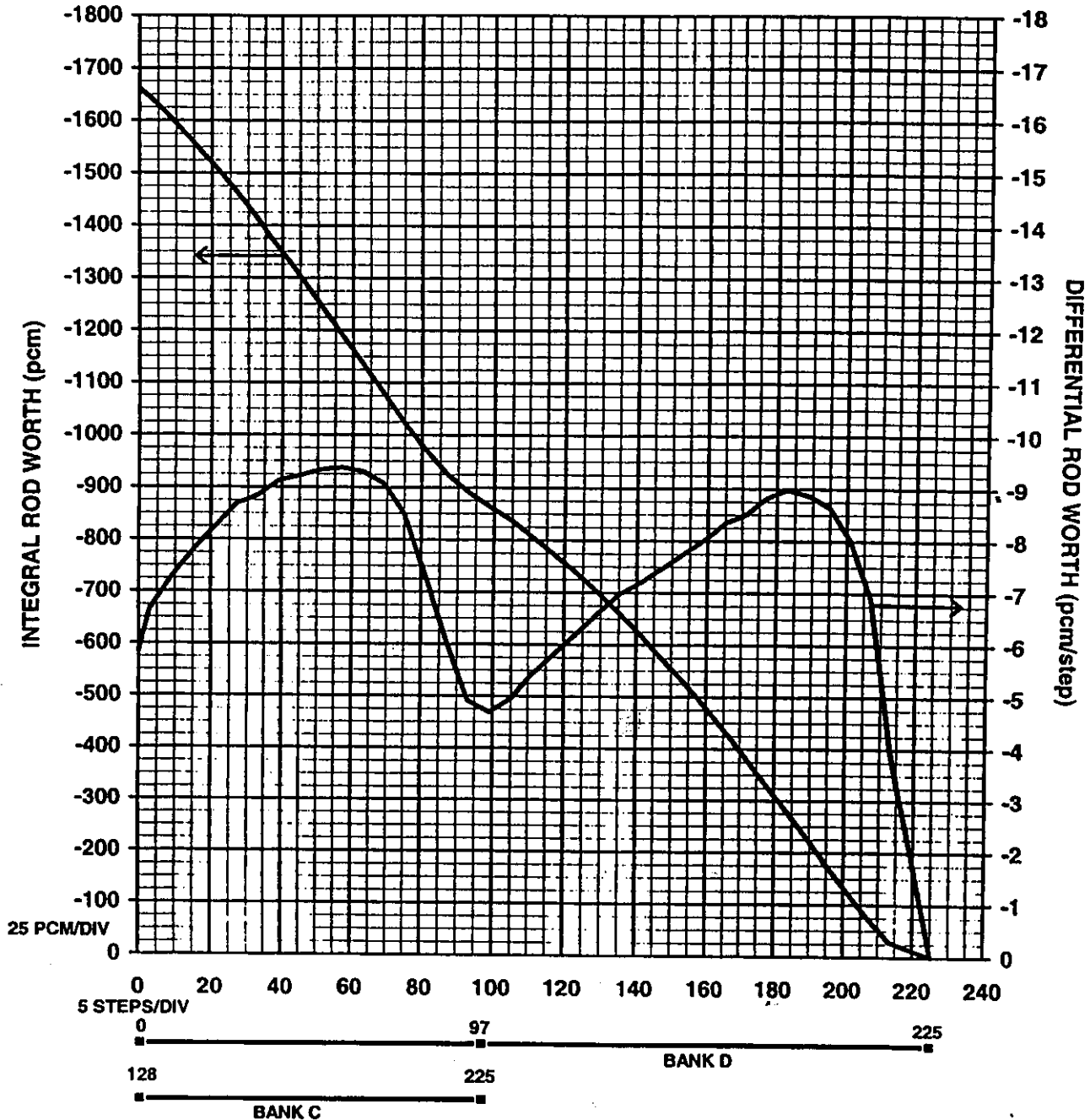
**HARRIS UNIT 1 CYCLE 13
DIFFERENTIAL AND INTEGRAL
ROD WORTH CONTROL BANKS D and C
MOVING WITH 97 STEP OVERLAP
BOL ($0 \leq \text{EFPD} \leq 161$), HZP, WITH NO XENON**



CURVE NO.	A-13-6	REV NO.	0
ORIGINATOR	<i>Charley...</i>	DATE	<i>10/14/04</i>
SUPERVISOR	<i>R. Nichol...</i>	DATE	<i>10/23/04</i>
SUPERINTENDENT - SHIFT OPERATIONS	<i>CR Smith</i>	DATE	<i>10/24/04</i>

HARRIS UNIT 1 CYCLE 13 DIFFERENTIAL AND INTEGRAL ROD WORTH CONTROL BANKS D and C MOVING WITH 97 STEP OVERLAP

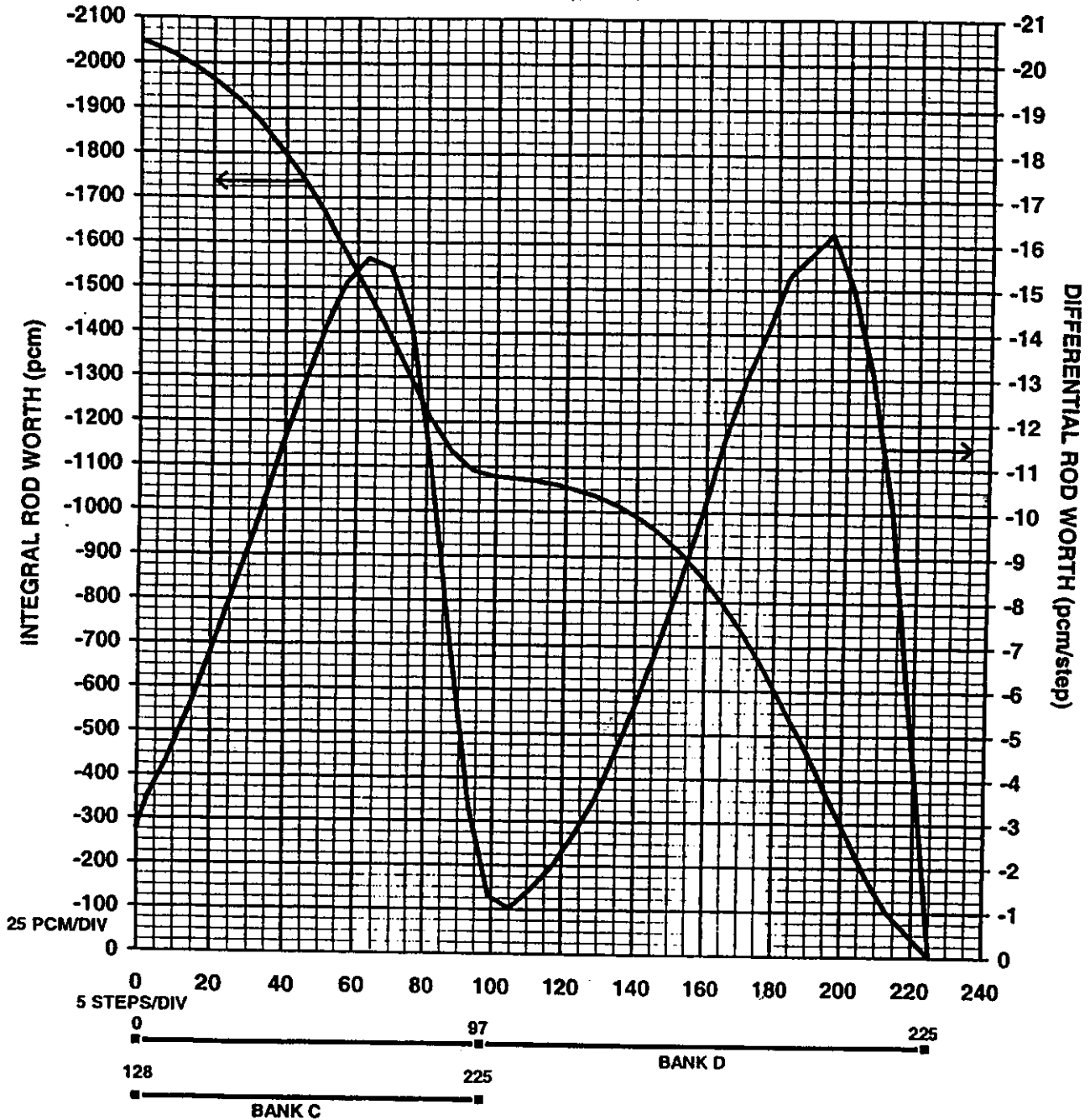
MOL (161 < EFPD ≤ 333), HZP, WITH NO XENON



CURVE NO.	A-13-7	REV NO.	0
ORIGINATOR	<i>Charles J. Smith</i>	DATE	<i>10/14/04 10/15/04</i>
SUPERVISOR	<i>Michael J. ...</i>	DATE	<i>10/23/04</i>
SUPERINTENDENT - SHIFT OPERATIONS	<i>CR Smith</i>	DATE	<i>10/24/04</i>

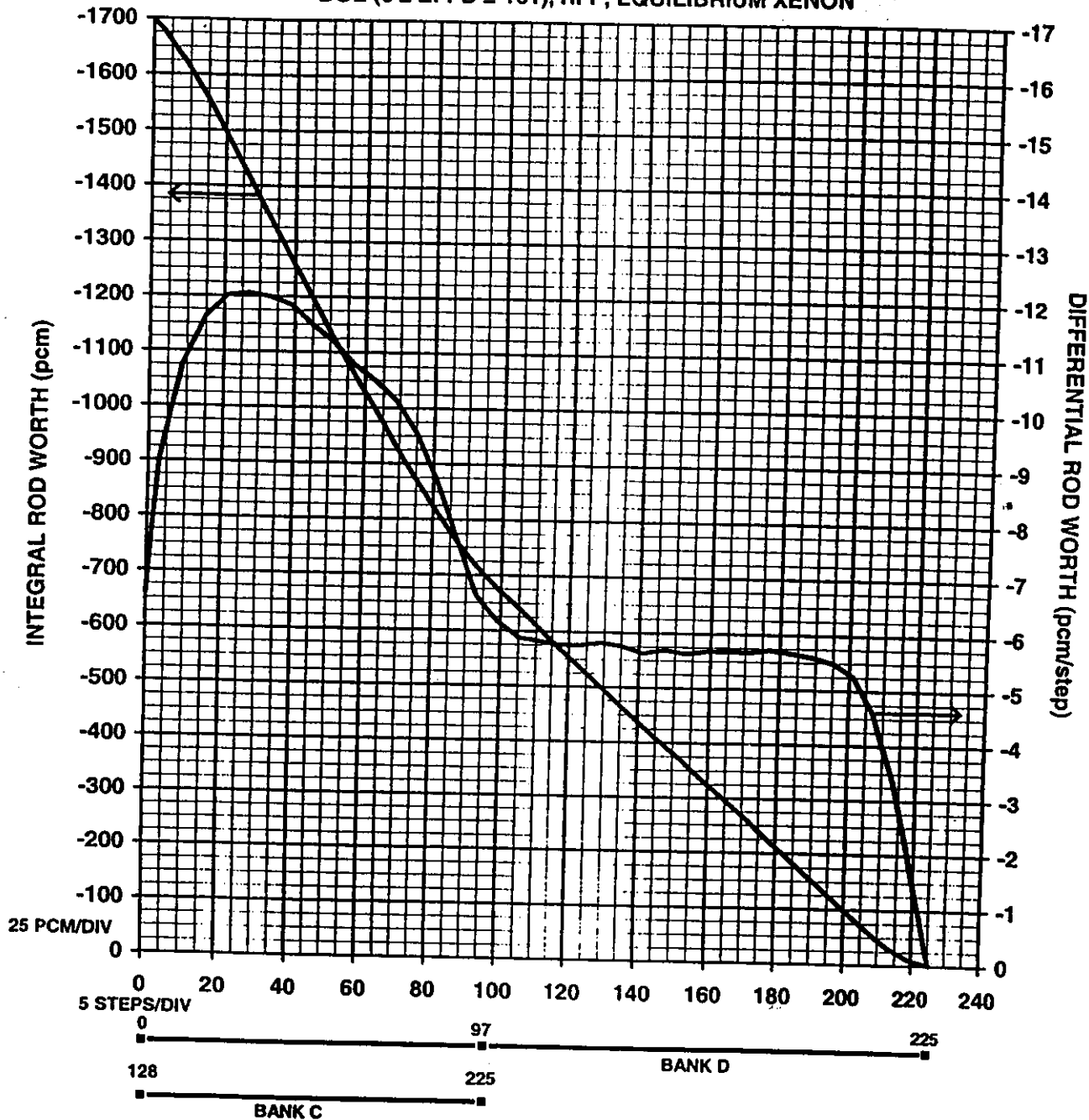
**HARRIS UNIT 1 CYCLE 13
DIFFERENTIAL AND INTEGRAL
ROD WORTH CONTROL BANKS D and C
MOVING WITH 97 STEP OVERLAP**

EOL (333 < EFPD ≤ 517), HZP, WITH NO XENON



CURVE NO.	A-13-8	REV NO.	0
ORIGINATOR	<i>Charles J. Griffin</i>	DATE	10/14/04 10/15/04
SUPERVISOR	<i>Richard Hill</i>	DATE	10/23/04
SUPERINTENDENT		DATE	
SHIFT OPERATIONS	<i>CR Smith</i>	DATE	10/24/04

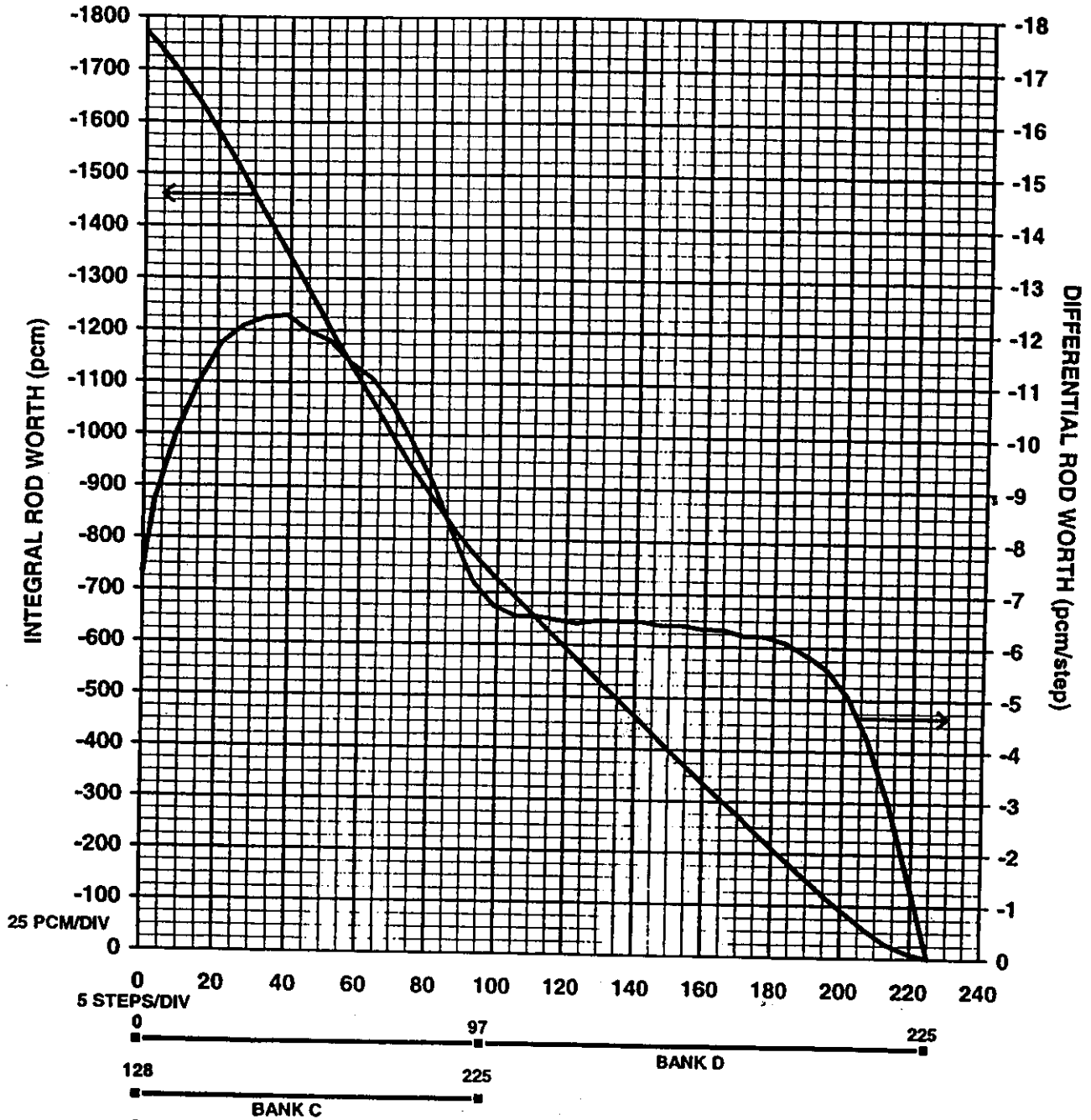
**HARRIS UNIT 1 CYCLE 13
DIFFERENTIAL AND INTEGRAL
ROD WORTH CONTROL BANKS D and C
MOVING WITH 97 STEP OVERLAP
BOL ($0 \leq \text{EFPD} \leq 161$), HFP, EQUILIBRIUM XENON**



CURVE NO.	A-13-9	REV NO.	0
ORIGINATOR	<i>Cherry</i>	DATE	<i>10/11/04</i>
SUPERVISOR	<i>Michael D. H.</i>	DATE	<i>10/23/04</i>
SUPERINTENDENT -			
SHIFT OPERATIONS	<i>CR Smith</i>	DATE	<i>10/24/04</i>

**HARRIS UNIT 1 CYCLE 13
DIFFERENTIAL AND INTEGRAL
ROD WORTH CONTROL BANKS D and C
MOVING WITH 97 STEP OVERLAP**

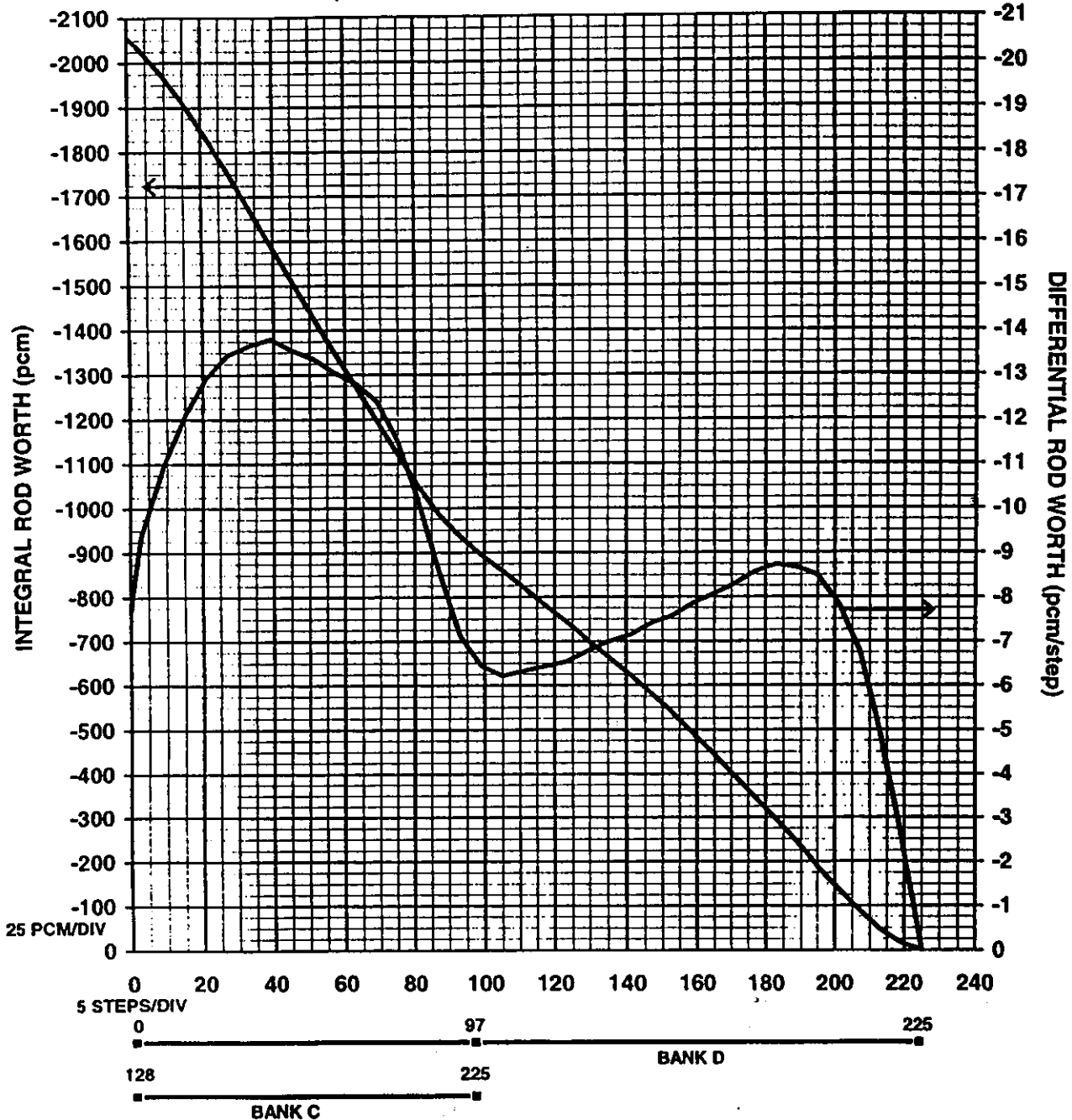
MOL (161 < EFPD ≤ 333), HFP, EQUILIBRIUM XENON



CURVE NO.	A-13-10	REV NO.	0
ORIGINATOR	<i>Charles G. Smith</i>	DATE	10/14/04
SUPERVISOR	<i>W. Michael Ghe</i>	DATE	10/23/04
SUPERINTENDENT - SHIFT OPERATIONS	<i>CR Smith</i>	DATE	10/24/04

HARRIS UNIT 1 CYCLE 13 DIFFERENTIAL AND INTEGRAL ROD WORTH CONTROL BANKS D and C MOVING WITH 97 STEP OVERLAP

EOL (333 < EFPD ≤ 517), HFP, EQUILIBRIUM XENON



CURVE NO. <u>A-13-11</u>	REV NO. <u>0</u>
ORIGINATOR <u>Chad K. Hillier</u>	DATE <u>10/17/04</u>
SUPERVISOR <u>H. Michael</u>	DATE <u>10/23/04</u>
SUPERINTENDENT <u>CR Smith</u>	DATE <u>10/24/04</u>

EXCESSIVE PRIMARY PLANT LEAKAGE

Attachment 1

Sheet 1 of 6

Primary-To-Secondary Leak

INSTRUCTIONS

RESPONSE NOT OBTAINED

1. **NOTIFY** Chemistry to implement CRC-804, Primary-To-Secondary Leak Rate Monitoring, to accomplish the following: **[A.2]**

- quantify leak rate
- quantify leak rate trend
- determine leaking SG

NOTE

Condenser Vacuum Pump radiation monitor indication is sensitive to high temperature and may read higher than actual when the monitor cooler is not in service. The cooling water alignment is located in OP-139, Service Water System.

2. **ESTIMATE** Primary-To-Secondary leak rate every 15 minutes based on ONE of the following (no preferred method): **[C.5, 7]**

	Method
(1)	<ul style="list-style-type: none">• Condenser Vacuum Pump Rad Monitor, REM-01TV-3534 (Grid 2)• Curve H-X-15a, H-X-15b or H-X-15c (depending on the status of motivating air)
(2)	OSI PI plot (Chemistry tab) for Curve H-X-15a, H-X-15b or H-X-15c
(3)	Condenser Vacuum Pump Rad Monitor, REM-01TV-3534 (Grid 2) and conversion factor (Attachment 20), after Chemistry sampling has commenced

EXCESSIVE PRIMARY PLANT LEAKAGE

Attachment 1

Sheet 2 of 6

Primary-To-Secondary Leak

INSTRUCTIONS

RESPONSE NOT OBTAINED

- 3. **IF** measured leak rate becomes stable for one hour (less than or equal to 10% change in 1-hour), **THEN REDUCE** monitoring frequency to once every 2-hours or more frequently, as directed by the Unit SCO.

- 4. **DETERMINE** leaking SG(s) using the following information:
 - Individual SGBD samples
 - Main steam line radiation monitor levels
 - Local surveys of SGBD lines

EXCESSIVE PRIMARY PLANT LEAKAGE

Attachment 1

Sheet 3 of 6

Primary-To-Secondary Leak

INSTRUCTIONS

RESPONSE NOT OBTAINED

- * 5. **CHECK** the following radiation monitor readings indicating NOT IN ALARM:
- RM-01MS-3591 SB, Main Steam Line A
 - RM-01MS-3592 SB, Main Steam Line B
 - RM-01MS-3593 SB, Main Steam Line C
 - REM-01TV-3534, Condenser Vacuum Pump Effluent (Group 16 RM-11)
 - REM-1BD-3527, Steam Generator Blowdown (Group 16 RM-11)
 - RM-1TV-3536-1, Turbine Building Vent Stack Effluent (Group 16 RM-11)

5. **PERFORM** the following:
- a. **NOTIFY** Health Physics to survey the following outside the RCA:
- SG Blowdown piping
 - Vicinity of Main Steam piping
- b. **IF ANY** monitor is in HIGH ALARM, **THEN PERFORM** the following:
- (1) **SOUND** the local evacuation alarm.
 - (2) **ANNOUNCE** evacuation of the following areas:
 - Steam Tunnel
 - SG PORVs/SG Safety valves area
 - Turbine Building 314' elevation
 - (3) **REPEAT** sounding the local evacuation alarm AND the announcement.
 - (4) **IF ANY** Main Steam Line Monitor is in HIGH ALARM, **THEN PERFORM** an Offsite Dose Calculation (refer to PEP-340, Dose Assessment).

EXCESSIVE PRIMARY PLANT LEAKAGE

Attachment 1

Sheet 4 of 6

Primary-To-Secondary Leak

INSTRUCTIONS

RESPONSE NOT OBTAINED

- * 6. **CHECK BOTH** of the following:
 - Turbine Building vent stack radiation monitor reading below the high alarm setpoint
 - SG tube leakage is less than Tech Spec limits.
- * 7. **CHECK** the following radiation monitor reading indicating **NOT IN ALARM**:
 - REM-21AC-3525, Aux Steam Condensate Tank (Group 4, RM-11)
 - REM-21AC-3543A, WPB Aux Stm Condensate (Group 19, RM-11)
 - REM-21AC-3543B, WPB Aux Stm Condensate (Group 19, RM-11)

- 6. **START CVPETS** (refer to OP-133, Main Condenser Air Removal System).
- 7. **NOTIFY** Radwaste to perform the following:
 - a. **VERIFY** the following valves are **SHUT**:
 - 1AC-151, AS Condensate Return to Condenser MOV
 - 1AC-371, Aux Condensate Return to Aux Boiler MOV
 - b. **VERIFY** the following pumps are **STOPPED**:
 - WPB Auxiliary Condensate Pump 1-4A (216' elev. WPB)
 - WPB Auxiliary Condensate Pump 1-4B (216' elev. WPB)
 - RAB Auxiliary Condensate Pump 1-2A (216' elev. RAB, access to FHB south)
 - RAB Auxiliary Condensate Pump 1-2B (216' elev. RAB, access to FHB south)

EXCESSIVE PRIMARY PLANT LEAKAGE

Attachment 1

Sheet 5 of 6

Primary-To-Secondary Leak

INSTRUCTIONS

RESPONSE NOT OBTAINED

- 8. **NOTIFY** Chemistry to sample the Auxiliary Steam System for activity.

- 9. **IF** Chemistry reports activity, **THEN ISOLATE** the Auxiliary Steam System to minimize contamination (refer to OP-130.01, Auxiliary Steam and Condensate System).

EXCESSIVE PRIMARY PLANT LEAKAGE

Attachment 1

Sheet 6 of 6

Primary-To-Secondary Leak

INSTRUCTIONS

RESPONSE NOT OBTAINED

NOTE

For initial leakage reports, where no previous leakage existed, leakage should be assumed to have changed from zero to the current value in the last hour.

*** 10. MONITOR BOTH of the following:**

- Primary-to-Secondary leak rate
- Rate of increase reports from Chemistry

AND PERFORM the required actions based on the following: [C.5, 7]

Leak Rate (gpd) in any SG	+	Rate of Increase (gpd/hr) in any SG	=	Required Action
Increased Monitoring				
5 to less than 30	+	N/A	=	• Perform Attachment 9
Action Level 1				
30 to less than 75	+	N/A	=	• Perform Attachment 10
Action Level 2				
Greater than or equal to 75 sustained for 1 hour	+	Less than 30	=	• Perform Attachment 11 • Be in Mode 3 within 24 hours
Action Level 3				
Greater than or equal to 75	+	Greater than or equal to 30	=	• Perform Attachment 11 • Reduce power to 50% within 1 hour • Be in Mode 3 within the next 2 hours (3 hours total time)
Greater than or equal to 75 AND LOSS of REM-01TV-3534, Condenser Vacuum Pump Rad Monitor (Grid 2)	+	N/A	=	• Perform Attachment 11 • Be in Mode 3 in less than 6 hours
Greater than or equal to 150	+	Less than 30	=	• Perform Attachment 11 • Be in Mode 3 in less than 6 hours • Be in Mode 5 within the next 30 hours (36 hours total)

-- END OF ATTACHMENT 1 --

INSTRUMENTATION

3/4.3.3 MONITORING INSTRUMENTATION

RADIATION MONITORING FOR PLANT OPERATIONS

LIMITING CONDITION FOR OPERATION

3.3.3.1 The radiation monitoring instrumentation channels for plant operations shown in Table 3.3-6 shall be OPERABLE with their Alarm/Trip Setpoints within the specified limits.

APPLICABILITY: As shown in Table 3.3-6.

ACTION:

- a. With a radiation monitoring channel Alarm/Trip Setpoint for plant operations exceeding the value shown in Table 3.3-6, adjust the Setpoint to within the limit within 4 hours or declare the channel inoperable.
- b. With one or more radiation monitoring channels for plant operations inoperable, take the ACTION shown in Table 3.3-6.
- c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.3.1 Each radiation monitoring instrumentation channel for plant operations shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and DIGITAL CHANNEL OPERATIONAL TEST for the MODES and at the frequencies shown in Table 4.3-3.

TABLE 3.3-6

RADIATION MONITORING INSTRUMENTATION FOR PLANT OPERATIONS

<u>INSTRUMENT</u>	<u>CHANNELS TO TRIP</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABLE MODES</u>	<u>ALARM/TRIP SETPOINT</u>	<u>ACTION</u>
1. Containment Radioactivity--					
a. Containment Ventilation Isolation Signal Area Monitors	2	3	1, 2, 3, 4, 6	#	27
b. Airborne Gaseous Radioactivity					
1) RCS Leakage Detection	1	1	1, 2, 3, 4	$\leq 1.0 \times 10^{-3} \mu\text{Ci}/\text{m}^3$	26, 27
2) Pre-entry Purge	1	1	##	$\leq 2.0 \times 10^{-3} \mu\text{Ci}/\text{m}^3$	30
c. Airborne Particulate Radioactivity					
1) RCS Leakage Detection	1	1	1, 2, 3, 4	$\leq 4.0 \times 10^{-8} \mu\text{Ci}/\text{m}^3$	26, 27
2) Pre-entry Purge	1	1	##	$\leq 1.5 \times 10^{-8} \mu\text{Ci}/\text{m}^3$	30
2. Spent Fuel Pool Area-- Fuel Handling Building Emergency Exhaust Actuation					
a. Fuel Handling Building Operating Floor--South Network	1/train***	1/train 2 trains	**	$\leq 100 \text{ mR}/\text{hr}$	28
b. Fuel Handling Building Operating Floor--North Network	1/train***	1/train 2 trains	*	$\leq 100 \text{ mR}/\text{hr}$	28
3. Control Room Outside Air Intakes--					
a. Normal Outside Air Intake Isolation	1	2	1, 2, 3, 4, 5, 6 and during movement of irradiated fuel assemblies and movement of loads over spent fuel pools.	$\leq 4.9 \times 10^{-6} \mu\text{Ci}/\text{m}^3$	29

TABLE 3.3-6 (Continued)
RADIATION MONITORING INSTRUMENTATION FOR PLANT OPERATIONS

<u>INSTRUMENT</u>	<u>CHANNELS TO TRIP</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABLE MODES</u>	<u>ALARM/TRIP SETPOINT</u>	<u>ACTION</u>
3. Control Room Outside Air Intakes-- (Continued)					
b. Emergency Outside Air Intake Isolation--South Intake	1	2	1, 2, 3, 4, 5, 6 and during movement of irradiated fuel assemblies and movement of loads over spent fuel pools.	$\leq 4.9 \times 10^{-6} \mu\text{Ci/ml}$	29
c. Emergency Outside Air Intake Isolation--North Intake	1	2	1, 2, 3, 4, 5, 6 and during movement of irradiated fuel assemblies and movement of loads over spent fuel pools.	$\leq 4.9 \times 10^{-6} \mu\text{Ci/ml}$	29

TABLE 3.3-6 (Continued)

TABLE NOTATIONS

- * With irradiated fuel in the Northend Spent Fuel Pool or transfer of irradiated fuel from or to a spent fuel shipping cask.
- ** With irradiated fuel in the Southend Spent Fuel Pool or New Fuel Pool.
- *** Each channel consists of 3 detectors with 1 of 3 logic. A channel is OPERABLE when 1 or more of the detectors are OPERABLE.
- # For MODES 1, 2, 3 and 4, the setpoint shall be less than or equal to three times detector background at RATED THERMAL POWER. During fuel movement the setpoint shall be less than or equal to 150 mR/hr.
- **# Required OPERABLE whenever pre-entry purge system is to be used.

ACTION STATEMENTS

- ACTION 26 - Must satisfy the ACTION requirement for Specification 3.4.6.1.
- ACTION 27 - With less than the Minimum Channels OPERABLE requirement, operation may continue provided the containment purge makeup and exhaust isolation valves are maintained closed.
- ACTION 28 - With less than the Minimum Channels OPERABLE requirement, declare the associated train of Fuel Handling Building Emergency Exhaust inoperable and perform the requirements of Specification 3.9.12.
- ACTION 29 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, within 1 hour initiate isolation of the respective air intake. With no outside air intakes available, maintain operation of the Control Room Emergency Filtration System in the Recirculation Mode of Operation.
- ACTION 30 - With less than the Minimum Channels OPERABLE requirement, pre-entry purge operations shall be suspended and the containment pre-entry purge makeup and exhaust valves shall be maintained closed.

REFUELING OPERATIONS

3/4.9.12 FUEL HANDLING BUILDING EMERGENCY EXHAUST SYSTEM

LIMITING CONDITION FOR OPERATION

3.9.12 Two independent Fuel Handling Building Emergency Exhaust System Trains shall be OPERABLE.*

APPLICABILITY: Whenever irradiated fuel is in a storage pool.

ACTION:

- a. With one Fuel Handling Building Emergency Exhaust System Train inoperable, fuel movement within the storage pool or crane operation with loads over the storage pool may proceed provided the OPERABLE Fuel Handling Building Emergency Exhaust System Train is capable of being powered from an OPERABLE emergency power source and is in operation and discharging through at least one train of HEPA filters and charcoal adsorber.
- b. With no Fuel Handling Building Emergency Exhaust System Trains OPERABLE, suspend all operations involving movement of fuel within the storage pool or crane operation with loads over the storage pool until at least one Fuel Handling Building Emergency Exhaust System Train is restored to OPERABLE status.
- c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.12 The above required Fuel Handling Building Emergency Exhaust System trains shall be demonstrated OPERABLE:

- a. At least once per 31 days on a STAGGERED TEST BASIS by initiating from the control room, flow through the HEPA filters and charcoal adsorbers and verifying that the system operates for at least 10 continuous hours with the heaters operating;
- b. At least once per 18 months or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following significant painting, fire, or chemical release in any ventilation zone communicating with the system by:
 1. Verifying that the cleanup system satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% and uses the test procedure guidance in Regulatory Positions C.5.a, C.5.c, and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978, and the unit flow rate is 6600 cfm \pm 10% during system operation when tested in accordance with ANSI H510-1980.

* The Fuel Handling Building Emergency Exhaust System boundary may be opened intermittently under administrative controls.

REFUELING OPERATIONS

FUEL HANDLING BUILDING EMERGENCY EXHAUST SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

4.9.12 (Continued)

2. Verifying, within 31 days after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, has a methyl iodide penetration of $\leq 2.5\%$ when tested at a temperature of 30°C and at a relative humidity of 70% in accordance with ASTM D3803-1989.
- c. After every 720 hours of charcoal adsorber operation by verifying, within 31 days after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, has a methyl iodide penetration of $\leq 2.5\%$ when tested at a temperature of 30°C and at a relative humidity of 70% in accordance with ASTM D3803-1989.
- d. At least once per 18 months by:
 1. Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber bank is not greater than 4.1 inches water gauge while operating the unit at a flow rate of $6600 \text{ cfm} \pm 10\%$.
 2. Verifying that, on a High Radiation test signal, the system automatically starts and directs its exhaust flow through the HEPA filters and charcoal adsorber banks.
 3. Verifying that the system maintains the spent fuel storage pool area at a negative pressure of greater than or equal to $1/8$ inch water gauge, relative to the outside atmosphere, during system operation at a flow rate of $6600 \text{ cfm} \pm 10\%$, and
 4. Deleted
 5. Verifying that the heaters dissipate $40 \pm 4 \text{ kW}$ when tested in accordance with ANSI N510-1980.
- e. After each complete or partial replacement of a HEPA filter bank, by verifying that the unit satisfies the in-place penetration leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a DOP test aerosol while operating the unit at a flow rate of $6600 \text{ cfm} \pm 10\%$.