Draft Submittal
(Pink Paper)

Senior Reactor Operator Written Exam

HARRIS JAN./FEB. 2006 EXAM

05000400/2006301

JANUARY 23 - FEBRUARY 2, 2006
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HARRIS INIITIAL LICENSE EXAM MATERIAL

January 2006 RO and SRO Exams

SRO WRITTEN EXAM BINDER

QUESTIONS REPORT
for Harris SRO Exam

1. 005 AA2.03 001/BANK/HIGHER/3/1/2/005AA2.03/SRO/

Given the following conditions:

- The unit is at 100% power
- One Control Rod in Bank (D) Group (1) was found stuck at 190 steps an hour ago.
- While aligning the remainder of the rods in Bank (D) to 190 steps an additional Control Rod in Bank (D) Group (2) was found stuck at 210 steps.
- It has been determined that both rods are mechanically bound.

In accordance with Technical Specifications, which one of the following describes the action required within one hour?

A. Determine that QPTR requirements are satisfied or enter the applicable action statement.

B. Align the remainder of rods in the affected banks within 12 steps of the stuck rod.

C. Determine that Shutdown Margin requirements are satisfied.

D. Place the unit in Hot Standby.

Technical Specifications Reactor control Systems 3 / 4.1.3 Movable Core Assemblies Group Height 3.1.3.1 Action a. Answer A, B, and D are wrong because operation may not continue must be in hot shutdown within six hours.
SRO 82

Tier 1 Group 2
K/A Importance Rating - SRO 4.4

Ability to determine and interpret the following as they apply to the Inoperable / Stuck Control Rod: Required actions if more than 1 rod is stuck or inoperable

Reference(s) - TS 3.1.3.1
Proposed References to be provided to applicants during examination - NONE
Learning Objective - LPAOP3-1, Obj 6.c.1
Question Source - Bank
Question History - Salem 2002 NRC
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b) item 1,2
Comments -

005 AA2.03

REACTIVITY CONTROL SYSTEMS

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

GROUP HEIGHT

LIMITING CONDITION FOR OPERATION

3.1.3.1 All shutdown and control rods shall be OPERABLE and positioned within ± 12 steps (indicated position) of their group step counter demand position.

APPLICABILITY: MODES 1* and 2*.

ACTION:

a. With one or more rods inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour and be in HOT STANDBY within 6 hours.

b. With more than one rod misaligned from the group step counter demand position by more than ± 12 steps (indicated position), be in HOT STANDBY within 6 hours.

c. With more than one rod inoperable, due to a rod control urgent failure alarm or obvious electrical problem in the rod control system existing for greater than 36 hours, be in HOT STANDBY within the following 6 hours.

d. With one rod trippable but inoperable due to causes other than addressed by ACTION a., above, or misaligned from its group step counter demand height by more than ± 12 steps (indicated position), POWER OPERATION may continue provided that within 1 hour:

1. The rod is restored to OPERABLE status within the above alignment requirements, or

2. The rod is declared inoperable and the remainder of the rods in the group with the inoperable rod are aligned to within ± 12 steps of the inoperable rod while maintaining the rod sequence and insertion limits of Specification 3.1.3.6. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, or

3. The rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. POWER OPERATION may then continue provided that:

a) A reevaluation of each accident analysis of Table 3.1-1 is performed within 5 days; this reevaluation shall confirm that the previously analyzed results of these accidents

*See Special Test Exceptions Specifications 3.10.2 and 3.10.3.

2. 005 G2.1.12 002/BANK/HIGHER/3/2/1/005G2.1.12/SRO/

Given the following conditions:

- The plant is in MODE 1, 100% power.
- The "B" RHR Pump was taken OOS yesterday for maintenance.
- "A" CSIP is declared INOPERABLE due to NPSH calculation concerns.
- "B" CSIP and "A" RHR pumps are OPERABLE

Which ONE (1) of the following describes the required actions for these conditions?

LCO...

A. 3.5.2 must be entered. Restore one ECCS Train to service within 6 hours.

B. 3.5.2 must be entered. Restore both ECCS Trains to service within 72 hours.

C✔ 3.0.3 must be entered. Place the plant in Mode 3 within 7 hours.

D. 3.0.3 must be entered. Place the plant in Mode 3 within 13 hours.

C. Correct. TS 3.0.3 if at least one full flow train of ECCS not operable
D. Incorrect. Too much time
A&B Incorrect. As long as you have 100% flow capability for a single train of ECCS, you do not have to enter 3.0.3, but if not, enter 3.0.3
SRO 86

Tier 2 Group 1
K/A Importance Rating - SRO 4.0

Conduct of Operations: Ability to apply Technical Specifications for a system

Reference(s) - TS 3.5.2, 3.0.3
Proposed References to be provided to applicants during examination - None
Learning Objective - LPSIS3-0, Obj 6
Question Source - Bank
Question History - 2004 Audit Retake
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).2
Comments -

005 G 2.1.12

LIMITING CONDITION FOR OPERATION

3.0.1 Compliance with the Limiting Conditions for Operation contained in the succeeding specifications is required during the OPERATIONAL MODES or other conditions specified therein; except that upon failure to meet the Limiting Conditions for Operation, the associated ACTION requirements shall be met.

3.0.2 Noncompliance with a specification shall exist when the requirements of the Limiting Condition for Operation and associated ACTION requirements are not met within the specified time intervals. If the Limiting Condition for Operation is restored prior to expiration of the specified time intervals, completion of the ACTION requirements is not required unless otherwise noted in the ACTION statement.

3.0.3 When a Limiting Condition for Operation is not met, except as provided in the associated ACTION requirements, within 1 hour action shall be initiated to place the unit in a MODE in which the specification does not apply by placing it, as applicable, in:

a. At least HOT STANDBY within the next 6 hours,
b. At least HOT SHUTDOWN within the following 6 hours, and
c. At least COLD SHUTDOWN within the subsequent 24 hours.

Where corrective measures are completed that permit operation under the ACTION requirements, the action may be taken in accordance with the specified time limits as measured from the time of failure to meet the Limiting Condition for Operation. Exceptions to these requirements are stated in the individual specifications.

This specification is not applicable in MODE 5 or 6.

3.0.4 Entry into an OPERATIONAL MODE or other specified condition shall not be made when the conditions for the Limiting Conditions for Operation are not met and the associated ACTION requires a shutdown if they are not met within a specified time interval. Entry into an OPERATIONAL MODE or specified condition may be made in accordance with ACTION requirements when conformance to them permits continued operation of the facility for an unlimited period of time. This provision shall not prevent passage through or to OPERATIONAL MODES as required to comply with ACTION requirements or that are part of a shutdown of the unit. Exceptions to these requirements are stated in the individual specifications.

3.0.5 Equipment removed from service or declared inoperable to comply with ACTIONS may be returned to service under administrative control solely to perform testing required to demonstrate its OPERABILITY or the OPERABILITY of other equipment. This is an exception to 3.0.1 above for the system returned to service under administrative control to perform the testing required to demonstrate OPERABILITY.

3/4.5.2 ECCS SUBSYSTEMS - T_{avg} GREATER THAN OR EQUAL TO 350°F

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent Emergency Core Cooling System (ECCS) subsystems shall be OPERABLE with each subsystem comprised of:

a. One OPERABLE Charging/safety injection pump.

b. One OPERABLE RHR heat exchanger.

c. One OPERABLE RHR pump, and

d. An OPERABLE flow path capable of taking suction from the refueling water storage tank on a Safety Injection signal and, upon being manually aligned, transferring suction to the containment sump during the recirculation phase of operation.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected Safety Injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

1. Verifying that the following valves are in the indicated positions with the control power disconnect switch in the "OFF" position, and the valve control switch in the "PULL TO LOCK" position:

3. 006 A2.10 001/NEW/HIGHER/3/2/1/006A2.10/SRO/

Chemistry sample has determined the following:

- "A" SI Accumulator boron concentration is 2466 ppm.
- "B" SI Accumulator boron concentration is 2402 ppm.
- "C" SI Accumulator boron concentration is 2577 ppm.
- RWST boron concentration is 2388 ppm.

Which ONE (1) of the following describes the impact of this condition, and the action required?

A. RWST Boron concentration may not adequately counterract the reactivity effects of an uncontrolled RCS cooldown. Immediately initiate a plant shutdown in accordance with GP-006, Plant Shutdown to Hot Standby.

B. RWST Boron concentration may not adequately counterract the reactivity effects of an uncontrolled RCS cooldown. Restore boron concentration within limits in 1 hour or initiate a plant shutdown in accordance with GP-006, Plant Shutdown to Hot Standby.

C. "C" SI Accumulator Boron solubility concerns may adversely affect ECCS flow analysis assumptions. Immediately initiate a plant shutdown in accordance with GP-006, Plant Shutdown to Hot Standby.

D. "C" SI Accumulator Boron solubility concerns may adversely affect ECCS flow analysis assumptions. Restore boron concentration within limits in 1 hour or initiate a plant shutdown in accordance with GP-006, Plant Shutdown to Hot Standby.

TS 3.5.4 basis states that boron concentration of the RWST is designed to ensure subcriticality is maintained with uncontrolled cooldown coincident with most reactive rod stuck fully out.

C Accumulator boron concentration is high, but within limits of TS 3.5.1

QUESTIONS REPORT
for Harris SRO Exam

SRO 87

Tier 2 Group 1
K/A Importance Rating - SRO 3.9

Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Low boron concentration in SIS.

Reference(s) - TS 3.5.4 and basis
Proposed References to be provided to applicants during examination - None
Learning Objective - LP SIS3-0, Obj 6
Question Source - New
Question History -
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).2, 5
Comments -

3/4.5.4 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.4 The refueling water storage tank (RWST) shall be OPERABLE with:

a. A minimum contained borated water volume of 436,000 gallons, which is equivalent to 92% indicated level.

b. A boron concentration of between 2400 and 2600 ppm of boron.

c. A minimum solution temperature of 40°F, and

d. A maximum solution temperature of 125°F.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the RWST inoperable, restore the tank to OPERABLE status within 1 hour* or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.4 The RWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the contained borated water volume in the tank, and

2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the RWST temperature when the outside air temperature is less than 40°F or greater than 125°F.

* Except that while performing surveillance 4.4.6.2.2, the tank must be returned to OPERABLE status within 12 hours.

ECCS SUBSYSTEMS (Continued)

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained. Surveillance Requirements for throttle valve position and flow balance testing provide assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses.

3/4.5.4 REFUELING WATER STORAGE TANK

The OPERABILITY of the refueling water storage tank (RWST) as part of the ECCS ensures that a sufficient supply of borated water is available for injection into the core by the ECCS. This borated water is used as cooling water for the core in the event of a LOCA and provides sufficient negative reactivity to adequately counteract any positive increase in reactivity caused by RCS cooldown. RCS cooldown can be caused by inadvertant depressurization, a LOCA, or a steam line rupture.

The limits on RWST minimum volume and boron concentration assure that: (1) sufficient water is available within containment to permit recirculation cooling flow to the core and (2) the reactor will remain subcritical in the cold condition following mixing of the RWST and the RCS water volumes with all shutdown and control rods inserted except for the most reactive control assembly. These limits are consistent with the assumption of the LOCA and steam line break analyses.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 8.5 and 11.0 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

An RWST allowed outage time of 12 hours is permitted during performance of Technical Specification surveillance 4.4.6.2.2 with a dedicated attendant stationed at valve 1CT-22 in communication with the Control Room. The dedicated attendant is to remain within the RWST compartment whenever valve 1CT-22 is open during the surveillance. The dedicated attendant can manually close valve 1CT-22 within 30 minutes in case of a line break caused by a seismic event. Due to the piping configuration, a break in the non-seismic portion of piping during this surveillance could result in draining the RWST below the minimum analyzed volume.

4. 007 EA2.04 001/NEW/HIGHER/2/1/1/007EA2.04/SRO/

Given the following conditions:

- A manual reactor trip was performed.
- All DRPI indication is extinguished.
- Reactor Trip breakers indicate red lights on, green lights off.
- Power Range indication is 8%.
- Intermediate Range indication is 2×10^{-5} amps.
- Intermediate Range Start Up Rate (SUR) is + 0.1 dpm.

Which one of the following describes the plant condition and the action required?

A. The reactor is tripped. Continue in PATH-1 to determine if SI is required.

B. The reactor is tripped. Transition to EPP-004, Reactor Trip Response to initiate RCS boration.

C. The reactor is NOT tripped. Continue in PATH-1 to initiate RCS boration.

D. The reactor is NOT tripped. Transition to FRP-S.1, Response to Nuclear Power Generation/ATWS to shut down the reactor.

If Trip Breaker lights are red with power at 8%, then the reactor has not tripped. If reactor trip has not occurred, then FRP-S.1 is the appropriate procedure to use.
SRO 76

Tier 1 Group 1
K/A Importance Rating - SRO 4.6

Ability to determine or interpret the following as they apply to a reactor trip: If reactor should have tripped but has not done so, manually trip the reactor and carry out actions in ATWS EOP

Reference(s) - PATH-1
Proposed References to be provided to applicants during examination - NONE
Learning Objective - LPEOP3-1, Obj 3.a
Question Source - New
Question History -
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).5
Comments -

007EA2.04

Instructions	Response Not Obtained

NOTE: Steps 1 through 4 are immediate action steps.

1. Verify Reactor Trip:

a. Automatic OR manual reactor trip - SUCCESSFUL: o Check for any of the following: o Trip breakers RTA AND BYA - OPEN o Trip breakers RTB AND BYB - OPEN o Rod bottom lights - LIT o Neutron flux - DECREASING	a. Manually trip reactor. (MCB switch #1 AND/OR switch #2 as required) GO TO Step 1c.
b. GO TO Step 2.	
c. Manual reactor trip - SUCCESSFUL (Either Switch)	c. GO TO FRP-S.1, "RESPONSE TO NUCLEAR POWER GENERATION/ATWS", Step 1.

5. 008 G2.4.4 002/BANK/HIGHER/4//1/008G2.4.4/SRO/

Given the following conditions:

- A LOCA has occurred
- The crew is performing PATH-1
- The following parameters exist:
  - All SG pressures – 800 psig and slowly trending down
  - All SG levels – being controlled at 42% NR
  - PRZ level – off-scale high
  - RVLIS Upper Head indicates 20%
  - Containment Pressure – 8 psig
  - RWST level – 74% and decreasing slowly
  - ONE CSIP has been stopped in accordance with PATH-1
  - RCS pressure – 950 psig and decreasing

Based on these indications, which ONE (1) of the following procedures will the crew enter next?

A. EPP-008, "SI Termination" to stop ECCS pumps

B. ✓ EPP-009, "Post-LOCA Cooldown and Depressurization" to cooldown and reduce RCS pressure

C. EPP-010, "Transfer to Cold Leg Recirculation" to allow for long term recirculation of the RCS

D. EPP-012, "Loss of Emergency Coolant Recirculation" to initiate makeup and minimize SI flow

A-Incorrect. RCS Pressure not stable, and RCS inventory too low
B-Correct.
C-Incorrect. RWST level is high. Entry to EPP-010 is 23.4% RWST level.
D-Incorrect. No indication that equipment needed for recirc is not available

QUESTIONS REPORT
for Harris SRO Exam

SRO 77

Tier 1 Group 1
K/A Importance Rating - SRO 4.3

Emergency Procedures / Plan Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

Reference(s) - PATH-1
Proposed References to be provided to applicants during examination - None
Learning Objective - LP EOP3-5, Objective 1.a
Question Source - Bank
Question History - 2004 Harris retake
Question Cognitive Level - Comprehension
10 CFR Part 55 Content - 43(b).5 because the SRO must evaluate plant conditions and determine a course of action
Comments -

008 G 2.4.4

Instructions	Response Not Obtained
18. Check SI Termination Criteria:	
a. RCS subcooling - GREATER THAN 10°F - C 20°F - M	a. GO TO Step 28.
b. Check secondary heat sink by observing any of the following: o Level in at least one SG - GREATER THAN 25% o Total feed flow to SGs - GREATER THAN 210 KPPH	b. GO TO Step 28.
c. RCS pressure - STABLE OR INCREASING	c. GO TO Step 28.
d. PRZ level - GREATER THAN 10%	d. Stabilize RCS pressure with normal spray. GO TO Step 28.

Instructions	Response Not Obtained
19. Reset SI.	
20. Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. (Refer to Attachment 2.)	
21. Stop All But One CSIP.	
22. Check RCS Pressure - STABLE OR INCREASING	GO TO EPP-009, "POST LOCA COOLDOWN AND DEPRESSURIZATION", Step 1.
23. Isolate High Head SI Flow:	
a. Open normal miniflow isolation valves: 1CS-182 1CS-196 1CS-210 1CS-214	a. Observe NOTE prior to Step 24 AND GO TO Step 24.
b. Shut BIT outlet valves: 1SI-3 1SI-4	b. Locally shut OR isolate valves.
c. Verify cold leg AND hot leg injection valves - SHUT 1SI-52 1SI-86 1SI-107	c. Locally shut valves.
d. Observe CAUTION prior to Step 25 AND GO TO Step 25.	

6. 011 G2.1.7 001/NEW/HIGHER/3/2/2/011G2.1.7/SRO/

Given the following conditions:

- The plant is at 100% power.
- The following alarms are received in the sequence listed, approximately 10 seconds apart:
  - APP-ALB-009-2-1, PRESSURIZER HIGH LEVEL DEVIATION AND HEATERS ON
  - APP-ALB-009-4-1, PRESSURIZER HIGH LEVEL
  - APP-ALB-009-4-2, PRESSURIZER HIGH LEVEL ALERT

The RO determines that PRZ Level indicates the following:

- LI-459 indicates 95% and rising
- LI-460 indicates 56% and lowering
- LI-461 indicates 55% and lowering

Which ONE (1) of the following actions will be directed by the USCO?

A. Trip the reactor and go to PATH-1.

B. Lower Charging flow and select unaffected PRZ level channels in accordance with the applicable alarm response procedures.

C. Raise Charging flow and select unaffected PRZ level channels in accordance with the applicable alarm response procedures.

D. Isolate Letdown and control Charging as necessary to maintain PRZ level in accordance with OP-107, Charging and Volume Control System.

Failed channel is LI-459. Actual PRZ level will be lowering, so raising charging flow will raise level to program. Reactor trip criteria is not met. One channel failed high does not meet the trip logic. Would not isolate letdown if charging flow can be raised. Lowering charging flow would make the situation worse.

QUESTIONS REPORT
for Harris SRO Exam

SRO 91

Tier 2 Group 2
K/A Importance Rating - SRO 4.4

Conduct of Operations: Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.

Reference(s) - APP-ALB-009-4-1, 4-2
Proposed References to be provided to applicants during examination - NONE
Learning Objective - LP PZRLC3-0, Obj 8
Question Source - New
Question History -
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).5
Comments -

011 G2.1.7

4-1

DEVICES: LS-01RC-0460CW (LB-460C)

SETPOINT: 70%

PRESSURIZER HIGH LEVEL

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   a. Pressurizer level LI-459A1, LI-460 and LI-461.1
   b. Letdown flow FI-150.1
   c. Charging flow FI-122A1
   d. Generator load

2. **VERIFY** Automatic Functions: None

3. **PERFORM** Corrective Actions:

   a. **IF** necessary,
   THEN manually adjust charging or letdown flow to return PRZ level to normal.

   b. **IF** due to load decrease,
   THEN verify Tave and Tref matched.

   c. **IF** the alarm is due to a failed level instrument,
   THEN perform the following:
      (1) Using the PRESSURIZER LEVEL CONTROLLER SELECTOR, **SELECT** a position which places the two operable channels into service (for example: if 459 fails, place the selector switch to 460/461).
      (2) At the MCB recorder panel, ensure that the failed channel is not selected.

   d. If maintenance is to be performed, refer to OWP-RP.

CAUSES:

1. Charging flow greater than letdown flow.
2. Malfunction of pressurizer level controller.
3. Large step load decrease.
4. Alarm circuit or instrument malfunction.

REFERENCES:

1. Tech Specs 3.3.1, 3.3.3.5, 3.3.3.6 and 3.4.3
2. 6-B-401 0936
3. OWP-RP

DEVICES: LS-01RC-0459AW (LB-459A)
LS-01RC-0460AW (LB-460A)
LS-01RC-0461AW (LB-461A)

SETPOINT: 92% (1 out of 3 logic)

PRESSURIZER HIGH LEVEL ALERT

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   a. Pressurizer level LI-459A1, LI-460 and LI-461.1
   b. Letdown flow FI-150.1
   c. Charging flow FI-122A1
   d. Generator load

2. **VERIFY** Automatic Functions:
   a. A reactor trip will occur at 92% level in pressurizer (2 out of 3 coincidence) unless less than 10% reactor power.

3. **PERFORM** Corrective Actions:
   a. **IF** necessary,
   THEN manually adjust charging or letdown flow to return PRZ level to normal.
   b. **IF** due to load decrease,
   THEN verify Tave and Tref matched.
   c. **IF** the alarm is due to a failed level instrument,
   THEN perform the following:
      (1) Using the PRESSURIZER LEVEL CONTROLLER SELECTOR, **SELECT** a position which places the two operable channels into service (for example: if 459 fails, place the selector switch to 460/461).
      (2) At the MCB recorder panel, ensure that the failed channel is not selected.
   d. If maintenance is to be performed, refer to OWP-RP.

CAUSES:

1. Charging flow greater than letdown flow.
2. Malfunction of pressurizer level controller.
3. Large step load decrease.
4. Alarm circuit or instrument malfunction.

REFERENCES:

1. Tech Specs 3.3.1, 3.3.3.5, 3.3.3.6 and 3.4.3
2. 6-B-401 0635
3. OWP-RP

7. 013 G2.2.22 001/BANK/HIGHER/3/2/1/013G2.2.22/SRO/

Given the following conditions:

- The Unit is at 100% power.
- All systems are in normal alignments.
- A Steam Line Break occurs downstream of MSIV "A".
- A Main Steam Line Isolation Signal is generated.

Which ONE (1) of the following describes the maximum allowable closure time of the MSIVs and the associated reason?

A. The MSIVs must close within 5 seconds to minimize the reactivity effects of the RCS cooldown.

B. The MSIVs must close within 5 seconds to limit the pressure rise inside Containment.

C. The MSIVs must close within 30 seconds to limit the pressure rise inside Containment.

D. The MSIVs must close within 30 seconds to minimize the reactivity effects of the RCS cooldown.

A Correct.
B incorrect because the break is downstream of MSIVs
C incorrect because of break location and closure time is for FWIVs
D incorrect because closure time is out of limit
SRO 88

Tier 2 Group 1
K/A Importance Rating - SRO 4.1

Equipment Control Knowledge of limiting conditions for operations and safety limits.

Reference(s) - TS 3.7.1.5 and basis
Proposed References to be provided to applicants during examination - NONE
Learning Objective - LPMSSS3-0, Obj 5
Question Source - Bank
Question History - SONGS 4/2005 NRC Exam
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).2
Comments -

AUXILIARY FEEDWATER SYSTEM

operation. The AFW System provides decay heat removal immediately following a station blackout event, and is required to mitigate the Loss of Normal Feedwater and Feedwater Line break accidents analyzed in FSAR Chapter 15. The minimum pump performance requirements are based upon a maximum allowable degradation of the pump performance curves. Pump operation at this level has been demonstrated by calculation to deliver sufficient AFW flow to satisfy the accident analysis acceptance criteria.

With regard to the periodic AFW valve position verification of Surveillance Requirement 4.7.1.2.1 Sub-paragraph b.1, this requirement does not include in its scope the AFW flow control valves inline from the AFW motor-driven pump discharge header to each steam generator when they are equipped with an auto-open feature. The auto open logic feature is designed to automatically open these valves upon receipt of an Engineered Safety Features System AFW start signal. As a consequence, valves with an auto-open feature do not have a "correct position" which must be verified. The valves may be in any position, in any MODE of operation thereby allowing full use of the AFW System for activities such as to adjust steam generator water levels prior to and during plant start-up, as an alternate feedwater system during hot standby, for cooldown operations, and to establish and maintain wet layup conditions in the steam generators.

3/4.7.1.3 CONDENSATE STORAGE TANK

The OPERABILITY of the condensate storage tank with the minimum water volume ensures that sufficient water is available to maintain the RCS at HOT STANDBY conditions for 6 hours with steam discharge to the atmosphere concurrent with total loss-of-offsite power. The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics, and the value has also been adjusted in a manner similar to that for the RWST and BAT, as discussed on page B 3/4 1-3.

3/4.7.1.4 SPECIFIC ACTIVITY

The limitations on Secondary Coolant System specific activity ensure that the resultant offsite radiation dose will be limited to a small fraction of 10 CFR Part 100 dose guideline values in the event of a steam line rupture. This dose also includes the effects of a coincident 1 gpm reactor-to-secondary tube leak in the steam generator of the affected steam line. These values are consistent with the assumptions used in the safety analyses.

3/4.7.1.5 MAIN STEAM LINE ISOLATION VALVES

The OPERABILITY of the main steam line isolation valves ensures that no more than one steam generator will blow down in the event of a steam line rupture. This restriction is required to: (1) minimize the positive reactivity effects of the Reactor Coolant System cooldown associated with the blowdown, and (2) limit the pressure rise within containment in the event the steam line rupture occurs within containment. The OPERABILITY of the main steam isolation valves within the closure times of the Surveillance Requirements are consistent with the assumptions used in the safety analyses.

3/4.7.2 STEAM GENERATOR PRESSURE/TEMPERATURE LIMITATION

The limitation on steam generator pressure and temperature ensures that the pressure-induced stresses in the steam generators do not exceed the maximum allowable fracture toughness stress limits. The limitations of 70°F and 200 psig are based on a steam generator RT_{NDT} of 50°F (a generic maximum) and are sufficient to prevent brittle fracture. The Shearon Harris specific RT_{NDT} is limited to a maximum value of 10°F.

8. 015 G2.1.23 002/BANK/HIGHER/4/1/1/015G2.1.23/SRO/

Given the following conditions:

- The plant is at 100% power
- RCP "B" seal No. 1 leakoff high-low flow alarm is in.
- "B" RCP No. 1 seal leakoff flow indicates 7 gpm
- NLO has been sent to read "B" RCP #2 seal leakoff flow
- VCT pressure is 26 psig.
- "B" RCP seal injection flow is 9.5 gpm
- "B" RCP No. 2 seal leakoff high flow alarm has just been received

Which ONE (1) of the following describes the action required?

A. ✔ Trip the reactor and go to EOP-Path -1.

B. Reduce power to less than 49% and secure the "B" RCP within 4 hours.

C. Power operation may continue provided that seal injection flow to "B" RCP is maintained greater than 9 gpm.

D. Initiate a plant shutdown per GP-006, stop "B" RCP within 8 hours.

With #1 seal leakoff greater than 7 GPM and the #2 seal leakoff flow alarm in, total seal leakage is higher than allowed to operate. With power >49%, the reactor and RCP will be tripped. The other actions may be taken for different circumstances for RCP failures.
SRO 78

Tier 1 Group 1
K/A Importance Rating - SRO 4.0

Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Reference(s) - AOP-018 Att 2
Proposed References to be provided to applicants during examination - NONE
Learning Objective - LPAOP018 Obj 3
Question Source - Bank
Question History - AOP-3.18-31
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).5
Comments -

015 G 2.1.23

Attachment 2
Sheet 1 of 1

Specific Symptoms of Seal Malfunctions

Seal Malfunction	Symptoms
#1 Seal Failed	ANY of the following conditions exist for the affected RCP: • Total #1 seal flow greater than 6.5 gpm with RCP seal water inlet or radial bearing temperature steadily rising (See Notes 1-3) • Total #1 seal flow greater than or equal to 8 gpm (See Notes 1-3) • Total #1 seal flow less than 0.8 gpm with RCP seal water inlet or radial bearing temperature steadily rising (See Notes 1-3)
#1 Seal degraded	Total #1 seal flow greater than 6.5 gpm but less than 8 gpm with both RCP seal water inlet and radial bearing temperature stable (See Notes 1-3)
#1 Seal blocked	Total #1 seal flow less than 0.8 gpm with RCP seal water inlet or radial bearing temperature stable (See Notes 1-3) (Assumes normal operating pressure and #2 seal leakoff flow is zero or negligible. At low RCS pressures, seal parameters are given in OP-100, Reactor Coolant System).
#2 Seal failed	High #2 seal leakoff flow condition with a corresponding reduction in #1 seal leakoff flow. #3 seal leakoff should remain fairly constant.
#3 Seal failed	Frequent (more often than every 14 hours) need for filling the standpipe. May also detect an increase in CNMT sump level.

Notes	
1	Total #1 seal flow is defined as the sum of #1 (computer point or strip chart recorder value) and #2 seal leakoff flows. When calculating total #1 seal flow with #1 seal leakoff flow greater than 6.5 gpm, #2 seal leakoff flow should be considered negligible until it can be read locally. If #2 high leakoff flow alarm is in, assume total seal flow is greater than 8 gpm.
2	• A rise in RCP seal water inlet and RCP radial bearing temperatures is indicative of a #1 seal failure. Normal 100% power values for these temperatures are 140°F to 150°F. A rise in #1 seal leakoff flow may result in a rise in these temperatures but the rise should taper off and stabilize well below 230°F. • "Steadily rising" - A rise at a constant or rising rate that will result in exceeding 230°F. • "Stable" - A slow rise in temperature or a rise in temperature but at a lowering rate and well below 230°F. Under these conditions, additional time is available to evaluate the trend and contact Engineering. In the absence of additional guidance, if temperature has risen to greater than 190°F and is still rising, it should be considered "steadily rising".
3	Every available indication should be used to validate readings.

-- END OF ATTACHMENT 2 --

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.3 Reactor Coolant Pump Seal Malfunctions

✸ 1. **CHECK** ANY of the following conditions exist: **[A.1, C.6]**

- ☐ • ANY RCP #1 Seal FAILS as defined in Attachment 2 (Page 29)
- ☐ • ANY RCPs operating outside the limits of Attachment 1 (Page 27)

☐1. **GO TO** Step 12.

☐2. **CHECK** Rx power greater than P-8 (49%).

☐2. **GO TO** Step 4.

☐3. **GO TO** Step 5.

☐4. **CHECK** more than ONE RCP affected.

☐4. **PERFORM** the following:

- ☐ a. **STOP** the affected RCP.
- ☐ b. **REFER TO** Attachment 7, Operation With Two RCPs.
- c. **SHUT** the affected RCP Seal Water Return Valve(s) **between three and five minutes** after securing the RCP:
  - ☐ • 1CS-355, RCP A #1 Seal Water Return
  - ☐ • 1CS-396, RCP B #1 Seal Water Return
  - ☐ • 1CS-437, RCP C #1 Seal Water Return
- ☐ d. **GO TO** Step 12.

☐5. **VERIFY** the Reactor is TRIPPED **AND GO TO** EOP PATH-1. (Perform Steps 6 through 11 as time permits.)

☐6. **STOP** affected RCP(s).

✸☐7. **CHECK** that ANY RCP was SECURED due to a #1 seal failure.

☐7. **GO TO** Step 9.

9. 027 AA2.09 001/BANK/HIGHER/3/1/1/027AA2.09/SRO/

Given the following conditions:

- The plant is initially operating at 70% Power.
- APP-ALB-009-3-2, PRESSURIZER HIGH PRESS DEVIATION CONTROL is received in the control room.
- Pressurizer Pressure Indicator PI-444 indicates 2320 psig and INCREASING.
- Pressurizer Pressure Indicator PI-445.1 indicates 2225 psig and DECREASING.

Based on the indications above, which ONE (1) of the following describes plant status and what actions are immediately required?

A. Reactor power is 0%. Enter and perform actions of PATH-1. When directed by PATH-1, CLOSE PORVs 445A and 445B AND/OR their associated Block Valves.

B. Reactor power remains at approximately 70%. Place Master Pressure Controller PK-444A in Manual and raise controller output to restore RCS pressure IAW APP-ALB-009-3-2.

C. Reactor power is 0%. Enter and perform actions of PATH-1. When directed by PATH-1, ensure PORVs 445A and 445B close when pressure is reduced below the setpoint, OR close PORV Block Valves IAW APP-ALB-009-3-2.

D. Reactor power remains at approximately 70%. Enter AOP-019, Malfunction of RCS Pressure Control, and place Master Pressure Controller PK-444A in Manual, reducing controller output to close spray valves.

A-Incorrect. PORVs 445A/B will not be open because they are controlled from PT-445.
B-Incorrect. Would not act to restore pressure until after Spray Valves are closed
C-Incorrect. PORVs should not be open because their input is at 2225 psig. Otherwise, would be an appropriate action, except performed in AOP
D-Correct. Spray valves will be going open because the failed channel is providing input to the controller. Placing controller in Manual and reducing output will act to close the valves. Reactor should not have tripped

QUESTIONS REPORT
for Harris SRO Exam

SRO 79

Tier 1 Group 1
K/A Importance Rating - SRO 3.6

Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Reactor power.

Reference - AOP-019, APP-ALB-009-3-2
Proposed References to be provided to applicants during examination - None
Learning Objective - LP PZRPC3-0, Objectives 1 and 5
Question Source - Bank
Question History - 2004 Harris SRO Retake
Question Cognitive Level - Comprehension
10 CFR Part 55 Content - 43.5 because the SRO must evaluate plant conditions and determine a course of action
Comments -

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.0 OPERATOR ACTIONS

NOTE

Steps 1 through 3 are immediate actions.

CAUTION

A pressure transmitter or indicator malfunction may exist. When referred to throughout this procedure, actual RCS pressure should be obtained by cross-checking of diverse instrumentation, such as PI-455.1, PI-456, and PI-457.

☐1. **CHECK** that a bubble exists in the PRZ.	1. **PERFORM the following:** ☐ a. **IF** PRZ pressure is GREATER THAN 360 PSIG, **THEN STOP** the running charging pump. ☐ b. **GO TO** Section 3.2, Pressure Control Malfunctions During Solid Plant Operation.
	NOTE Failure of a PRZ PORV to fully reseat after operation may require initiation of the Emergency Plan.
☐2. **VERIFY** ALL PRZ PORVs **AND** associated block valves properly positioned for current PRZ pressure and plant conditions.	☐2. **IF** ANY PRZ PORV will not shut when required, **THEN SHUT** its associated block valve.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.0 OPERATOR ACTIONS

☐ 3. **CHECK** BOTH PRZ spray valves properly positioned for current PRZ pressure and plant conditions.

3. **CONTROL** PRZ spray valves in MANUAL using ONE of the following (listed in order of preference):

☐ **a.** PK-444A, Master Pressure Controller

OR

☐ **b.** BOTH individual spray valve controllers

☐ 4. **GO TO** Section 3.1, Pressure Control Malfunctions While Operating With a Pressurizer Bubble.

—END OF SECTION 3.0—

DEVICES: PS-01RC-0444EW **SETPOINT**: 100 psi greater than reference pressure

PRESSURIZER HIGH PRESS DEVIATION CONTROL

REFLASH: NO

OPERATOR ACTIONS:

1. **CONFIRM** alarm using:
   a. PI-445.1, Pressurizer Pressure
2. **VERIFY** Automatic Functions: None
3. **PERFORM** Corrective Actions:
   a. **VERIFY** that spray valves are open and heaters are de-energized.
   b. **IF** necessary to return PRZ pressure to normal,
      THEN OPEN the spray valves or de-energize the heaters.
   c. **IF** pressure control has failed,
      THEN GO TO AOP-019, Malfunction of RCS Pressure Control.
   d. **IF** maintenance is to be performed,
      THEN REFER TO OWP-RP, Reactor Protection.

CAUSES:

1. Malfunction of pressurizer pressure control
2. Malfunction of pressurizer spray valve
3. Load rejection
4. Alarm circuit or instrumentation malfunction

REFERENCES:

1. Tech Specs 3.3.1, 3.3.2
2. AOP-019, Malfunction of RCS Pressure Control
3. OWP-RP, Reactor Protection
4. 2166-B-401 0934

10. 037 G2.1.2 002/MODIFIED/HIGHER/4/1/2/037G2.1.2/SRO/

Given the following conditions:

- The plant is at 100 % power.
- The following conditions have been observed:
  - Condenser Vacuum Pump Rad monitor (REM-01TV-3534) went into alert 4 and 1/2 hours ago.
  - Primary to Secondary leakage into "B" SG has been identified as follows:
    - 21 gallons per day 4 hours ago.
    - 41 gallons per day 3 hours ago.
    - 62 gallons per day 2 hours ago.
    - 82 gallons per day for the last 60 minutes.

Which ONE (1) of the following describes the required actions?

A. Hold power stable while performing AOP-016, Excessive Primary Plant Leakage, Attachment 11

B. ✔ Perform AOP-016, Attachment 11, and shutdown the plant in accordance with GP-006. Be in Mode 3 within 24 hours

C. Perform AOP-016, Attachment 10, and shutdown the plant in accordance with GP-006. Be in Mode 3 in less than 6 hours

D. Reduce power to 50% within 1 hour in accordance with GP-006. Be in Mode 3 within the the next 2 hours

B is correct in accordance with the procedure.
All other actions may be taken for tube leakage of different magnitudes or different rates of change

SRO 83

Tier 1 Group 2
K/A Importance Rating - SRO 4.0

Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.

Reference(s) - AOP-016
Proposed References to be provided to applicants during examination - AOP-016, Attachment 1
Learning Objective - LPAOP3-16, Obj 4
Question Source - Modified
Question History - AOP-3.16-3 001
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).2, 5
Comments -

ORIGINAL

037G2.1.2

QUESTIONS REPORT
for PROCEDURES

1. AOP-3.16-3 001/////////

(Provide AOP-016 Attachment 1)

The plant is at 100 % power, steady state operation, and the following conditions have been observed: (1) Condenser Vacuum Pump Rad monitor (REM-01TV-3534) went into alert, 4 and 1/2 hours ago (2) Primary to Secondary leakage into B SG has been identified and readings show leakage increasing from 20 gpd (4 hours ago), to 40 gpd (3 hours ago), to (60 gpd 2 hours ago), and has been stable at 76 gpd for the last 90 minutes.

What are your Required Actions?

A. No down power required

B. ✔ Be in Mode 3 within 24 hours

C. Be in Mode 3 in less than 6 hours

D. Reduce power to 50% within 1 hour and be in Mode 3 within the the next 2 hours

037G2.1.2

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 --

11. 045 G2.1.23 001/BANK/HIGHER/3/2/2/045G2.1.23/SRO/

Given the following conditions:

- The plant is operating at 100% power.
- The following alarm is received in the Control Room:
  - APP-ALB-022-4-3, GENERATOR VOLT/FREQ RATIO HIGH OR UNDER FREQ

The System Operator calls and reports grid instabilities and other area generating facilities tripped off line.

- He reports that a low frequency condition is expected for the next 2 hours.
- Upon receiving the information, you are informed by the CO that grid frequency has dropped to 58.2 Hz and has stabilized.

Which ONE (1) of the following actions is required?

A. Reduce Turbine Load to maintain reactor power less than 100% IAW AOP-028, Grid Instability.

B. Raise Generator Excitation to maintain within the limits of the generator capability curve IAW AOP-028.

C. Monitor the low frequency condition, and if it exists for 5 minutes, initiate a reactor shutdown IAW GP-006, Normal Plant Shutdown from Power Operation to Hot Standby.

D. Immediately trip the reactor and enter PATH-1.

A-Incorrect. May perform if frequency was higher than 59 hz
B-Incorrect. May REDUCE excitation if required if frequency was greater than 59 hz
C-Incorrect. Would manually trip the reactor if condition existed for 5 minutes
D-Correct.

QUESTIONS REPORT
for Harris SRO Exam

SRO 92

Tier 2 Group 2
K/A Importance Rating - SRO 4.0

Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Reference(s) - APP-ALB-022-4-3, AOP-028
Proposed References to be provided to applicants during examination - None
Learning Objective - LP-AOP3-28 Objective 2
Question Source - Bank
Question History -
Question Cognitive Level - HIGHER
10 CFR Part 55 Content - 43(b).5 because the SRO must evaluate plant conditions and determine a course of action
Comments -

045 G 2.1.23

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.0 OPERATOR ACTIONS

NOTE

- This procedure contains no immediate actions.
- The loss of Off-Site power may require the initiation of the Emergency Plan **[C.1]**

☐1. **REFER TO** PEP-110, Emergency Classification and Protective Action Recommendations, **AND** enter EAL Network at entry point X. **[C.1]**

NOTE

- If frequency drops suddenly and power is greater than P-7, the reactor will trip automatically when RCP frequency decreases to 57.5 Hz, resulting in a turbine trip.
- An undervoltage or underfrequency condition may degrade plant equipment. The longer voltage or frequency is outside the normal band and the greater the difference to the normal band, the greater the potential exists for equipment damage.

CAUTION

- Operation of the unit between 59.0 and 58.4 Hz should be limited to 5 minutes, after which time the generator must be taken off-line.
- Operation below 58.4 Hz is not allowed and the generator must be taken off-line immediately.

✸ 2. **CHECK** Main Generator indications for ANY of the following conditions:

☐ • Generator frequency less than 59 Hz for greater than or equal to 5 minutes

☐ • Generator frequency less than 58.4 Hz

☐ • Turbine speed less than or equal to 1752 RPM

☐ a. **TRIP** the Reactor, **AND GO TO** EOP PATH-1.

☐2. **GO TO** Step 3.

12. 051 G2.4.45 001/NEW/HIGHER/3/1/2/051G2.4.50/SRO/

Given the following conditions:

- The plant is at 69% power.
- Plant load increase is in progress in accordance with GP-005.
- The following alarms are received:
  - APP-ALB-020-2-4A, CONDSR PRE TRIP LOW VACUUM
  - APP-ALB-021-8-5, COMPUTER ALARM CIRC WATER SYSTEMS
- The BOP determines that condenser backpressure is 6.6 inches Hg in Zone 2 and rising slowly.
- Computer alarm indicates Vacuum Pump "A" Vibration HIGH.

Which ONE (1) of the following actions is required?

A. Reduce turbine load to less than 60% in accordance with GP-005 to stabilize condenser vacuum.

B. ✔ Enter AOP-012, Partial Loss of Condenser Vacuum, to perform actions for vacuum restoration.

C. Trip the reactor and enter PATH-1

D. Trip the turbine and enter AOP-006, Turbine Generator Trouble

A is incorrect. Reducing load will place the plant outside of operating limits.
B is correct. Enter AOP-012
C is incorrect. Trip criteria not met
D is incorrect. Power level too high for turbine trip, and criteria not met
SRO 84

Tier 1 Group 2
K/A Importance Rating - SRO 3.6

Emergency Procedures / Plan Ability to prioritize and interpret the significance of each annunciator or alarm.

Reference(s) - AOP-012, APP-ALB-020-2-4A
Proposed References to be provided to applicants during examination - NONE
Learning Objective - LPAOP3-12, Obj 1
Question Source - New
Question History -
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).5
Comments -

051 G 2.4.45

CNDSR PRE TRIP LOW VACUUM

AUTO ACTIONS

1. None Applicable

CAUSES

1. Loss of vacuum pump
2. High hotwell level
3. Loss of gland seal steam
4. Loss of circ. water
5. Steam dump with one CW pump in service
6. Condenser air in leakage
7. Alarm circuit or instrument malfunction

OBSERVATIONS

1. Circ. water pump run indication
2. Vacuum pump run indication
3. Condenser hotwell level on LI-1900
4. Gland seal steam on PI-1842
5. Steam dump valve position indication
6. Vacuum Breaker valve position indication

ACTIONS

1. Monitor condenser vacuum to ensure it is less than:
   a. 5 inches Hg when less than 60%, or
   b. 7.5 inches Hg when greater than 60%.
2. If vacuum low:
   a. Reference AOP-12, Partial Loss OF Condenser Vacuum.
   b. If Reactor trips reference EOP PATH-1
3. Prepare W/O for malfunctioning equipment.

DEVICE/SETPOINTS

1. PS-01TA-4131EV, Lo Vac Trip Alarm, 63-5/LV:

   a. 4 inches Hg when turbine 1st stage pressure (PS-01MS-1005) is less than 333.4 PSIG
   (nominal 60%)

   b. 6.5 inches Hg when turbine 1st stage pressure (PS-01MS-1005) is greater than 333.4 PSIG (nominal 60%)

POSSIBLE PLANT EFFECTS

1. Turbine trip
2. RX trip
3. Loss of steam dump capability

REFERENCES

1. AOP-12
2. 6-B-401 1446
3. EOP PATH-1
4. EPT-093, Turbine First Stage Pressure Data

13. 059 G2.4.49 002/BANK/HIGHER/2/2/1/059G2.4.49/SRO/

Given the following conditions:

- The plant was operating at 95 percent power, steady state conditions, when multiple feed system annunciators were received.
- The following plant conditions are observed and communicated by the BOP operator:
  - "A" MFP control switch indicates green
  - ALB-16 /1-4 "FW Pump A/B - O/C Trip, GND, OR Bkr Fail TO Close" is lit.
  - ALB-20 /2-2 "Turbine Runback Operative" is lit
  - Steam Generator Levels 52 percent and lowering
  - FRV M/A controllers output rising
  - Reactor power at 93 percent and lowering.

Which ONE (1) of the following actions is the USCO required to perform?

A. ✔ Enter AOP-010, Feedwater Malfunctions. Direct the RO to trip the reactor and go to EOP-PATH-1.

B. Enter AOP-010, Feedwater Malfunctions. Direct performance of Section 3.2, Loss of Running Pumps.

C. Enter AOP-010, Feedwater Malfunctions, and direct the BOP to Isolate SG Blowdown

D. Enter AOP-006, Turbine Generator Trouble. Direct the crew to manually control SG levels 52 percent to 62 percent in accordance with OP-134.01, Feedwater System.

A is coirrect. Feedwater Pump trip greater than 90% power requires rx trip
B is incorrect. Trip is required. Would only use section if trip not required
C is incorrect. Immediate action that is performed if trip is not required.
D is incorrect. Wrong procedure for feed pump trip, even though a runback is occurring. Levels should be maintained >52%

QUESTIONS REPORT
for Harris SRO Exam

Common 89

Tier 2 Group 1
K/A Importance Rating - SRO 4.0

Emergency Procedures / Plan Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.

Reference(s) - AOP-010
Proposed References to be provided to applicants during examination - NONE
Learning Objective - LPAOP3-10 Obj 1
Question Source - Bank
Question History - AOP-3.10-R4 004
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).5
Comments -

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.0 OPERATOR ACTIONS

NOTE

Steps 1 through 3 are immediate actions.

☐1. **CHECK** ANY Main Feedwater Pump TRIPPED.	☐1. **GO TO** Step 5.
☐2. **CHECK** initial Reactor power less than 90%.	☐2. **TRIP** the Reactor **AND GO TO** EOP Path-1.
☐3. **CHECK** initial Reactor power less than 80%.	☐3. **ISOLATE** Steam Generator Blowdown.

NOTE

- Turbine runback will automatically terminate at approximately 50% power with DEH in AUTO.
- Turbine runbacks are quickly identified by ALB-020-2-2, TURBINE RUNBACK OPERATIVE, in alarm and RUNBACK OPER light flashing on DEH Panel A.

☐4. **CHECK** initial Reactor power less than 60%.	☐4. **CHECK** turbine runback OCCURS.
✱☐5. **CHECK** DEH controlling Turbine Valves PROPERLY.	☐5. **GO TO** Step 6.
GO TO Step 7.	

6. **PLACE** DEH in MANUAL, as follows:

NOTE

HOLD is only effective in the GO Mode.

☐ a. **CHECK** DEH in GO Mode.	☐ a. **GO TO** Step 6.c.
☐ b. **PLACE** DEH in HOLD.	

(Continued on Next Page)

14. 062 AA2.03 002/BANK/HIGHER/4/1/1/062AA2.03/SRO/

Given the following plant conditions:

- The plant is operating at 55% power.
- The following annunciators are received in the Control Room:
    - APP-ALB-002-7-2, SERV WTR PUMPS DISCHARGE LOW PRESS
    - APP-ALB-002-6-1, SERV WTR SUPPLY HEADER A LOW PRESS
    - APP-ALB-002-5-5, SERV WTR HEADER A HIGH/LOW FLOW
- The BOP notes that Cooling Tower Basin Level is decreasing.
- "A" ESW Pump automatically starts.
- APP-ALB-007-7-2, SERV WTR PUMPS DISCHARGE LOW PRESS alarm clears.
- Cooling Tower Basin level stabilizes. .

The crew enters AOP-022, Loss of Service Water and completes the immediate actions. .

Which ONE (1) of the following describes the action required, if any, based on current plant conditions?

A. Trip the reactor and go to PATH-1. Ensure the Emergency Service Water system is aligned in accordance with PATH-1

B✔ Locate and isolate the leak on ESW Train "A". When the leak is isolated, restore "A" ESW header to service using ESW or NSW in accordance with OP-139, Service Water System.

C. Locate and isolate the leak on the NSW header. When the leak is isolated, shutdown Train "A" ESW and restore normal NSW flow in accordance with OP-139, Service Water System.

D. No additional actions are required because the leak is isolated. Verify ESW is properly aligned to equipment listed in AOP-022, Attachment 1, Equipment Alignment due to Loss of an ESW Header.

A Correct. Cooling Tower level decreasing indicates a leak on NSW. Because suction cannot be maintained, and power is >P-10, the reactor will be tripped.
B Incorrect. Immediate actions would isolate the ESW header from the NSW header. With the alarm still standing, the leak would have to be in the NSW header.
C Incorrect. Action in AOP-022 is for ESW alignment in case of an ESW leak
D Incorrect. Would be correct if the leak was ESW

QUESTIONS REPORT
for Harris SRO Exam

SRO 80

Tier 1 Group 1
K/A Importance Rating - SRO 2.9

Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The valve lineups necessary to restart the CCWS while bypassing the portion of the system causing the abnormal condition.

Reference(s) - AOP-022, section 3.2 APP-ALB-002-7-2
Proposed References to be provided to applicants during examination - None
Learning Objective - LPAOP3-22 OBJ 5
Question Source - Bank
Question History - 2004 Harris SRO Retake
Question Cognitive Level - Comprehension
10 CFR Part 55 Content - 43(b).5 Because the SRO must evaluate plant conditions and determine a course of action
Comments -

062 AA2.03

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Loss Of Normal Service Water Pump And/Or Header

✱☐ 1. **CHECK** Turbine trip required by ANY of the following conditions - EXIST: • No NSW Pump can be operated • Non-isolable leak exists in the NSW system • Major isolable leak exists on the Turbine Building NSW header **AND** time does not permit a controlled plant shutdown	☐ 1. **OBSERVE** Note prior to Step 13 AND **GO TO** Step 13.
☐ 2. **CHECK** Reactor power greater than P-10 (10%).	☐ 2. **IF** Turbine is operating, **THEN TRIP** Turbine **AND GO TO** Step 4.
☐ 3. **TRIP** the Reactor **AND GO TO** EOP-Path-1. (Perform steps 4 through 11 as time allows.)	
☐ 4. **VERIFY** BOTH NSW Pumps - STOPPED.	
☐ 5. **VERIFY** BOTH ESW Pumps - STARTED.	
☐ 6. **START** BOTH Motor Driven AFW Pumps.	
7. **ALIGN** the following Turbine Building components:	
☐ a. **STOP** Main Feed Pumps.	
☐ b. **STOP** Heater Drain Pumps.	
☐ c. **STOP** Condensate Booster Pumps.	
☐ d. **STOP** Condenser Vacuum Pumps.	

(Continued on Next page)

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Loss Of Normal Service Water Pump And/Or Header

7. (Continued)

☐ **e. STOP** Condensate Pumps.

☐ **f. PLACE** BOTH DEH Pumps in Pull To Lock.

☐ **g. VERIFY** ALL MSIVs – SHUT.

☐ **h. VERIFY** ALL MSIV Bypass Valves – SHUT.

☐ **8. CHECK** for leak on Turbine Building header - ANY EXISTING.

☐ **8. GO TO** Step 10.

9. Locally SHUT the following valves to isolate NSW to the Turbine Building:

☐ • 1SW-302, Turbine Bldg NSW Supply

☐ • 1SW-654, Turbine Bldg NSW Return

✸ **10. WHEN** BOTH of the following are satisfied:

- Turbine has coasted down
- Turning Gear is engaged

THEN:

☐ **a. BREAK** Condenser vacuum per OP-133, Main Condenser Air Removal System.

☐ **b. WHEN** Condenser vacuum has dissipated,
THEN SHUT DOWN gland seal steam per OP-131.03, Gland Seal System.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Loss Of Normal Service Water Pump And/Or Header

11. PERFORM the following:

☐ **a. NOTIFY** Radwaste Control Room to shut down WPB equipment cooled by NSW.

☐ **b. NOTIFY** Chemistry that NSW has been shut down AND direct them to isolate affected secondary sampling points per CRC-156, Secondary System Chemistry and Steam Generator Wet Layup Sample Panel Line-Ups.

☐ **c. VERIFY** proper operation of ESW System per OP-139, Service Water System.

☐ **12. GO TO** Step 26.

NOTE

Steps 13 through 19 address leaks on NSW turbine building header. Leaks on individual components supplied by turbine building header are addressed by steps 20 through 21.

☐ **13. CHECK** for minor isolable leak on Turbine Building header - ANY EXISTING.

☐ **13. GO TO** Step 20.

☐ **14. CHECK** time permits a controlled plant shutdown.

☐ **14. RETURN TO** Step 2.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Loss Of Normal Service Water Pump And/Or Header

15. **PERFORM** the following:

☐ a. **CHECK** Turbine is in operation.

☐ a. **GO TO** Step 16.

☐ b. **SHUTDOWN** Turbine using ONE of the following:

- GP-006, Normal Plant Shutdown from Power Operation to Hot Standby
- AOP-038, Rapid Downpower

☐ c. **WHEN** Turbine is shutdown, **THEN CONTINUE** with this procedure.

☐ 16. **START** BOTH Motor Driven AFW Pumps.

17. **ALIGN** the following Turbine Building components:

☐ a. **STOP** Main Feed Pumps.

☐ b. **STOP** Heater Drain Pumps.

☐ c. **STOP** Condensate Booster Pumps.

☐ d. **STOP** Condenser Vacuum Pumps.

☐ e. **STOP** Condensate Pumps.

☐ f. **PLACE** BOTH DEH Pumps in Pull To Lock.

☐ g. **VERIFY** ALL MSIVs – SHUT.

☐ h. **VERIFY** ALL MSIV Bypass Valves – SHUT.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Loss Of Normal Service Water Pump And/Or Header

18. ISOLATE NSW to the Turbine Building as follows:

a. Locally SHUT the following valves:

☐ • 1SW-302, Turbine Bldg NSW Supply

☐ • 1SW-654, Turbine Bldg NSW Return

b. WHEN Turbine Building isolation valves are SHUT,
THEN PERFORM the following per OP-139, Service Water System:

☐ **(1) START** ONE NSW Pump.

☐ **(2) RE-ESTABLISH** NSW flow to ESW header(s).

19. WHEN BOTH of the following are satisfied:

- Turbine has coasted down
- Turning Gear is engaged

THEN:

☐ **a. BREAK** Condenser vacuum per OP-133, Main Condenser Air Removal System.

☐ **b. WHEN** Condenser vacuum has dissipated,
THEN SHUT DOWN gland seal steam per OP-131.03, Gland Seal System.

☐ **20. CHECK** for leak in an individual component - ANY EXISTING.

☐ **20. GO TO** Step 22.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Loss Of Normal Service Water Pump And/Or Header

21. PERFORM the following:

☐ **a. CHECK** power level allows stopping affected component.

☐ **a. REDUCE** power using ONE of the following:

- GP-006, Normal Plant Shutdown from Power Operation to Hot Standby
- AOP-038, Rapid Downpower

☐ **b. STOP** affected component.

☐ **c. ISOLATE** NSW to affected component.

☐ **22. CHECK** for leak on WPB header - ANY EXISTING.

☐ **22. GO TO** Step 24.

23. NOTIFY Radwaste Control Room to perform the following:

☐ **a. SHUT DOWN** WPB equipment cooled by NSW:

- WPB CCW HXs
- WPB HVAC Chiller
- WPB Evaporative Air Coolers

☐ **b. REQUEST** Health Physics perform a confined space determination for valve pits for the following valves:

- 1SW-301, Waste Processing Bldg NSW Supply
- 1SW-655, Waste Processing Bldg NSW Return

(Continued on Next page)

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Loss Of Normal Service Water Pump And/Or Header

23. (Continued)

☐ **c. REQUEST** Maintenance provide access to these valves, by opening pit covers:

- 1SW-301 (SW of TB Yard Pit)
- 1SW-655 (NW of CT Circ Water Pumps)

d. Locally SHUT the following valves:

☐ • 1SW-301, Waste Processing Bldg NSW Supply

☐ • 1SW-655, Waste Processing Bldg NSW Return

☐ **24. CHECK** that NSW Pump(s) - MALFUNCTIONED.

☐ **24. GO TO** Step 26.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Loss Of Normal Service Water Pump And/Or Header

25. **PERFORM** the following for affected NSW Pump(s):

☐ a. **CHECK** NSW Pump breaker(s) - MALFUNCTIONED.

☐ (1) **NOTIFY** Maintenance to investigate reason for breaker malfunction.

☐ (2) **GO TO** Step 26.

☐ a. **GO TO** Step 25.b.

☐ b. **CHECK** adequate pump suction inventory EXISTS:

- LI-9300.1, Service Water PMP A CHMBR LVL, 51% (ERFIS LSW9300)
- LI-9302, Service Water PMP B CHMBR LVL, 51% (ERFIS LSW9302)
- LI-1931, Cooling Tower Basin Level, 31 inches

☐ b. **REFER TO** APP-ALB-002-5-2, SERV WTR PUMPS CHAMBER LOW LEVEL.

c. **Locally VERIFY** the following for the affected NSW Pump per OP-139, Service Water System:

☐ • Proper cooling and seal water supply to NSW Pumps.

☐ • Proper operation of NSW strainer backwash.

☐ d. **Locally CHECK** NSW Pump(s) for signs of damage (shaft shear or other obvious problems).

☐ 26. **INITIATE** appropriate corrective action for the loss of NSW.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Loss Of Normal Service Water Pump And/Or Header

☐27. **CHECK** Reactor thermal power changed by less than 15% in any one hour period. **[C.1]**

☐27. **NOTIFY** Chemistry to initiate surveillances specified in applicable sections of the following: **[C.1]**

- RST-204, Reactor Coolant System Chemistry and Radiochemistry Surveillance.
- RST-211, Gaseous Effluent Radiochemistry Surveillance.

☐28. **IF** ESW Pump(s) were placed in service by this procedure, **THEN NOTIFY** Chemistry to sample the return to the Auxiliary Reservoir per CRC-155, Chemistry Control of Circulating Water, Service Water, and Cooling Tower Basin.

☐29. **EXIT** this procedure.

--END OF SECTION 3.2 --

15. 068 A2.04 001/NEW/HIGHER/4/2/2//SRO/

Given the following conditions:

- A release of Treated Laundry and Hot Shower Tank "A" is in progress.
- A HIGH ALARM is received on REM-*1WL-3540, Treated Laundry and Hot Shower Tank Pump discharge radiation monitor.
- Discharge flow indicated on the Waste Processing computer is approximately 28 GPM.

Which ONE (1) of the following describes the impact on the plant and the action required?

A. The release must be terminated. Isolate the release path in accordance with AOP-008, Accidental Release of Liquid Waste, and/or AOP-005, Radiation Monitoring.

B. The release is terminated. Waste Processing computer indication is a setpoint, not actual flow, indicated by the liquid waste release permit. Verify isolation in accordance with AOP-005, Radiation Monitoring.

C. The release may continue because the release permit provides actual sample data of the tank contents. Determine cause of the alarm in accordance with OP-119, Radwaste Radiation Monitoring System.

D. The release may continue provided that 2 independent samples of the release are taken and analyzed by qualified individuals and verified to be within limits.

High alarm on an effluent release monitor requires the release to be terminated. In this case, automatic action did not occur, so the action is required manually. With flow indicated, the release is ongoing. Any time the alarm is lit, the release should be stopped. D is wrong because it denotes action for a failed monitor, not an alarming monitor

SRO 93

Tier 2 Group 2
K/A Importance Rating - SRO 3.3

Ability to (a) predict the impacts of the following malfunctions or operations on the Liquid Radwaste System ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of automatic isolation

Reference(s) - AOP-005, AOP-008
Proposed References to be provided to applicants during examination - None
Learning Objective - LPAOP3-8 OBJ 3
Question Source - New
Question History -
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).4, 5
Comments -

068 A2.04

Attachment 9
Sheet 1 of 3
Liquid Waste Effluent Monitors

1. **REFER TO** the following table to determine applicable step(s):

	IF ANY of the following monitors are in HIGH ALARM,	**THEN GO TO** Step(s):
☐	REM-01MD-3528, Turbine Building Drains	2
☐	REM-01MD-3530, Tank Area Drain Transfer Pumps	3
☐	REM-*1WL-3540, Treated Laundry and Hot Shower Tank Pump Discharge	4
☐	REM-21WL-3541, WST Tank Discharge	5
☐	REM-21WS-3542, Secondary Waste Sample Tank Pump Discharge	6

2. **PERFORM** the following for REM-01MD-3528, Turbine Building Drains Monitor, in HIGH ALARM:

☐ a. **VERIFY** 1MD-285, TB Indus Waste to Yard Oil Separator valve, SHUT.

b. **IF** 1SWT-420, TB Indus Waste to WS Treatment Isol Vlv, is SHUT, **THEN VERIFY** ALL of the following pumps STOPPED:

☐ • TB Condensate Pump Area Sump Pump 1A

☐ • TB Condensate Pump Area Sump Pump 1B

☐ • TB Industrial Waste Sump Pump 1A

☐ • TB Industrial Waste Sump Pump 1B

☐ • TB Industrial Waste Sump Pump 1C

☐ • TB Industrial Waste Sump Pump 1D

☐ c. **REFER TO** OP-124, Secondary Drains and Oily Waste Collection and Separation System (Section 5.6, Turbine Building Drains Startup).

☐ d. **GO TO** Step 7.

Attachment 9
Sheet 2 of 3
Liquid Waste Effluent Monitors

3. **PERFORM** the following for REM-01MD-3530, Tank Area Drain Transfer Pumps Monitor, in HIGH ALARM:

☐ a. **IF** aligned to the Storm Drain System,
THEN VERIFY the Tank Area Drain Transfer Pump STOPPED.

☐ b. **REFER TO** OP-120.09.01, Radioactive Floor Drain Collection (Section 5.15, Tank Area Drain Transfer Pump 1X Startup).

☐ c. **GO TO** Step 7.

4. **PERFORM** the following for REM-*1WL-3540, Treated Laundry and Hot Shower Tank Pump Discharge Monitor, in HIGH ALARM:

☐ a. **VERIFY** 3LHS-296, Treated LHS Tk Disch Isol Valve, SHUT.

☐ b. **REFER TO** OP-120.10.04, Treated Laundry and Hot Shower Tanks (Section 5.15, Discharging the Contents of the Treated L&HS Tank A(B) to Cooling Tower Discharge).

☐ c. **GO TO** Step 7.

5. **PERFORM** the following for REM-21WL-3541, WST Tank Discharge Monitor, in HIGH ALARM:

☐ a. **VERIFY** 3FD-421, FD Wst Mon Tks Disch Isol Valve, SHUT.

☐ b. **REFER TO** OP-120.06.02, Waste Evaporator Condensate Tanks (Section 5.2, Discharging the Contents of the WECT A(B) to Cooling Tower Discharge).

☐ c. **GO TO** Step 7.

6. **PERFORM** the following for REM-21WS-3542, Secondary Waste Sample Tank Pump Discharge Monitor, in HIGH ALARM:

☐ a. **VERIFY** 3SWT-149, Sec WST Smple Tk Disch Isol Valve, SHUT.

☐ b. **REFER TO** OP-120.01.02, Secondary Waste Sample Tank (Section 5.2, Batch Discharge of the Secondary Waste Sample Tank to Cooling Tower Discharge).

☐ c. **GO TO** Step 7.

☐ 7. **REFER TO** Offsite Dose Calculation Manual.

Attachment 9
Sheet 3 of 3
Liquid Waste Effluent Monitors

☐8. **GO TO** AOP-008, Accidental Release of Liquid Waste.

-- END OF ATTACHMENT 9 --

16. 078 A2.01 001/NEW/HIGHER/4/2/1/078A2.01/SRO/

Given the following conditions:

- The plant is at 100% power.
- The Compressed Air System (CAS) Control Panel is set for 1C Air Compressor in LEAD (Sequence 3).
- A Valve Shift Error occurs on Air Dryer 1C-NNS.

Which ONE (1) of the following describes the impact of this failure, and the action required?

A. High Air Dryer DP may cause a Loss of Instrument Air. Bypass Air Dryer 1C-NNS in accordance with AOP-017, Loss of Instrument Air.

B. Instrument Air may have a higher than desired moisture content. Shift the CAS Control Panel to 1A Air Compresor in LEAD (Sequence 1) and isolate Air Dryer 1C-NNS in accordance with OP-151.01, Compressed Air.

C. Instrument Air may have a higher than desired moisture content.. Isolate Air Dryer 1C-NNS and place Air Dryer 1A-NNS in service on Air Compressor 1C in accordance with OP-151.01, Compressed Air.

D. High Air Dryer DP may cause a Loss of Instrument Air. Manually perform the valve shift on Air Dryer 1C-NNS in accordance with AOP-017, Loss of Instrument Air.

B is correct. Per procedure P&L, when a valve shift error occurs, place the other compressors and dryers in service. AOP-017 entry is not necessary. Would not perform a manual valve shift either
SRO 90

Tier 2 Group 1
K/A Importance Rating - SRO 2.9

Ability to (a) predict the impacts of the following malfunctions or operations on the IAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Air dryer and filter malfunctions.

Reference(s) - OP-151.01, P&Ls
Proposed References to be provided to applicants during examination - NONE
Learning Objective - LP ISA3-0 11c
Question Source - NEW
Question History -
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).5
Comments -

078 A2.01

4.0 PRECAUTIONS AND LIMITATIONS (continued)

5. The following conditions indicate an alarm on the Air Dryers:

   - Tower Overtemp (600°F) - High heater temperature or open thermocouple.
   - Tower Undertemp (150°F) - Tower does not reach 150°F within 1 hour from the start of the regenerative cycle. Alarm is only active for 30 minutes.
   - Valve Shift failure - Towers are not in the correct pressure state. This alarm defeats heater operation.
   - High Dewpoint - Alarm is set at -4°F at normal operating pressure.

6. Normally, the CAS (Compressed Air System)Control Panel will control the sequence of Air compressor Operation.

   - In Sequence 1: Air Compressor 1A will be the lead compressor with Air Compressor 1B cycling as necessary to maintain normal loads (Air Compressors 1A and 1B are each rated for 50% of normal air system load). Air Compressor 1C will serve as backup and start on excessive loads or upon failure of 1A or 1B Compressor.
   - In Sequence 2: Air Compressor 1B will be the lead compressor with Air Compressor 1A cycling as necessary to maintain normal loads (Air Compressors 1B and 1A are each rated for 50% of normal air system load). Air Compressor 1C will be isolated from the CAS but will serve as backup and start if system header pressure drops below 101 psig.
   - In Sequence 3: Air Compressor 1C will be the lead compressor (Air Compressors 1C is rated for 100% of normal air system load). Air Compressor 1A will cycle on first during excessive loads. Air Compressor 1B will serve as backup and start on extremely excessive loads or upon failure of 1A or 1C Compressor.

7. If the Valve Shift failure is present on Air Dryer 1C-NNS, then Air Dryers 1A-NNS and 1B-NNS should be placed in service and the CAS Controller Sequence changed to Sequence 1 and Air Dryer 1C-NNS removed from service until corrective actions may be performed. If a valve shift failure is present on Air Dryer 1A-NNS or 1B-NNS, then Air Dryers 1C-NNS should be placed in service and the CAS Controller Sequence changed to Sequence 3 with Air Dryer 1A-NNS and 1B-NNS removed from service until corrective actions may be performed.

17. E04 G2.1.20 001/BANK/HIGHER/4/1/1/E04G2.1.20/SRO/

Given the following conditions:

- A LOCA Outside Containment has occurred.
- The crew has completed performing the actions of EPP-013, LOCA Outside Containment.
- RCS pressure is 1450 psig and lowering slowly.

Which ONE (1) of the following describes the action that will be performed?

A. Return to EPP-013, Step 1, and repeat steps to isolate the leak

B. Return to PATH-1, entry point C, to rediagnose the event in progress.

C. Transition to EPP-009, Post LOCA Cooldown and Depressurization.

D✓ Transition to EPP-012, Loss of Emergency Coolant Recirculation

For a LOCA Outside Containment, if isolation cannot be verified, then EPP-012 must be entered to conserve inventory, because the leak may be unisolable
SRO 81

Tier 1 / Group 1
K/A Importance Rating - SRO 4.2

Conduct of Operations: Ability to execute procedure steps

Reference(s) - EPP-13
Proposed References to be provided to applicants during examination - None
Learning Objective -
Question Source - Bank
Question History -
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).5 because the SRO must evaluate plant conditions and determine a course of action
Comments -

E04 G 2.1.20

Instructions	Response Not Obtained
6. Isolate Break:	
a. Shut valves identified in Step 3 to isolate the break.	
7. Check Break Isolated:	
a. Check RAB radiological conditions SAFE FOR ENTRY	a. GO TO Step 7d.
b. Check for both of the following: o RCS pressure - INCREASING o Check break isolated by local observation.	b. Continue attempts to isolate break. GO TO EPP 012, "LOSS OF EMERGENCY COOLANT RECIRCULATION", Step 1.
c. GO TO PATH 1, entry point C.	
d. Check RCS pressure - INCREASING	d. Continue attempts to isolate break. GO TO EPP 012, "LOSS OF EMERGENCY COOLANT RECIRCULATION", Step 1.
e. Consult plant operations staff for recommended actions AND continue with this procedure.	
f. GO TO PATH 1, entry point C.	

END

18. E10 EA2.1 001/BANK/HIGHER/3/1/2/E10 EA2.1/SRO/

Given the following conditions:

- A reactor trip has occurred due to a loss of offsite power.
- The operating crew is performing actions of EPP-005, Natural Circulation Cooldown.
- Train "A" of RVLIS is out of service.
- The crew has commenced RCS cooldown and depressurization.
    - RCS pressure is 1780 psig and trending DOWN.
    - RCS Tavg is 448 deg. F and trending DOWN.
    - RCS cooldown rate MUST be performed at approximately 60 deg F/Hr. due to secondary inventory concerns.
    - Pressurizer level is 35% and trending UP slowly.

Which one of the following actions will be required in accordance with EPP-005?

A. Repressurize the RCS to minimize void growth.

B. Actuate safety injection and transition to EPP-014, Faulted Steam Generator Isolation.

C. Transition to EPP-007, Natural Circulation Cooldown With Steam Void In Vessel (Without RVLIS).

D. Transition to EPP-006, Natural Circulation Cooldown With Steam Void In Vessel (With RVLIS).

A Incorrect. Do not raise pressure when cooldown is uncontrolled at this rate.

B Incorrect. No SI requirements met. Subcooling is high and PRZR level is high. Potential PTS event if SI is initiated.

C Incorrect. RVLIS is available (Train 'B').

QUESTIONS REPORT
for Harris SRO Exam

SRO 85

Tier 1 Group 2
K/A Importance Rating - SRO 3.9

Ability to determine and interpret the following as they apply to the (Natural Circulation with Steam Void in Vessel with/without RVLIS) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

Reference(s) - EPP-005
Proposed References to be provided to applicants during examination - NONE
Learning Objective - LP EOP3-8 4C
Question Source - Bank (46458)
Question History - BVPS-1 2002 NRC
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).5
Comments -

E10 EA2.1

Instructions	Response Not Obtained

NOTE: Foldout applies

1. Implement Function Restoration Procedures As Required.

2. Evaluate EAL Network Using Entry Point X.

NOTE: The RCS be may cooled down at a faster rate (greater than the 50°F/HR specified by this procedure) if a void is allowed to form in the vessel head.

3. Consult Plant Operations Staff To Evaluate the Following:

   - o Using contingency actions for loss of instrument air, offsite power or one safety bus.

     (Refer To Attachment 2.)

   - o Performing a natural circulation cooldown while allowing a void to form in the vessel head.

     (Refer to EPP-006, "NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL WITH RVLIS" and EPP-007, "NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL WITHOUT RVLIS".)

   - o Using emergency service water as an alternate feed source to the SGs.

FOLDOUT

- o EPP-006 AND EPP-007 TRANSITION CRITERIA

  IF any of the following occurs, THEN GO TO EPP-006, "NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL WITH RVLIS", Step 1, OR EPP-007, "NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL WITHOUT RVLIS", Step 1, based on RVLIS availability:

  - o It is necessary to cooldown and depressurize the RCS at a rate that exceeds the limits of this procedure.
  - o Unexpected large variations in PRZ level are observed AND RCS depressurization must continue.
  - o RVLIS upper range can NOT be maintained greater than 100% AND RCS depressurization must continue.

- o SI ACTUATION CRITERIA

  IF any of the following occurs, THEN actuate SI AND GO TO PATH-1, entry point A:

  - o RCS Subcooling - LESS THAN 10°F - C
    20°F - M
  - o PRZ Level - CAN NOT BE MAINTAINED GREATER THAN 10%

- o AFW SUPPLY SWITCHOVER CRITERIA

  IF CST level decreases to less than 10%, THEN switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

- o RCP RESTART CRITERIA

  IF at any time conditions for starting an RCP can be established, THEN RETURN TO Step 4.

19. G2.1.25 002/BANK/HIGHER/3/3/1/G2.1.25/SRO/

Given the following conditions:

- The plant was operating at 100% power when a reactor trip occurred on low pressurizer pressure.
- "C" S/G Tube Rupture was diagnosed, and PATH-2 was entered.
- RCS Cooldown and Depressurization is complete.

Given the following control room indications:

- SG "C" level is 32% and decreasing.
- SG "A" and "B" levels are stable.
- PRZ level is 63% and increasing.

Which ONE (1) of the following describes the required operator action IAW PATH-2?

A. Increase Charging Flow and Depressurize RCS.

B. Decrease Charging flow.

C. Energize Pressurizer heaters.

D. Depressurize RCS and Decrease Charging flow.

C is correct. See Reference
A would be correct if PRZ level was less than 25% with SG level increasing
B would be correct if PRZ level was greater than 75% with SG level increasing
D would be correct if PRZ level was 50% - 75% and SG level increasing
SRO 94

Tier 3 Group 1
K/A Importance Rating - SRO 3.1

Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.

Reference(s) - PATH-2 Table 1
Proposed References to be provided to applicants during examination - Path-2 Table 1
Learning Objective - LP EOP3-2 OBJ 1
Question Source - Bank
Question History - Vendor Bank
Question Cognitive Level - Application
10 CFR Part 55 Content - 43(b).5
Comments -

G 2.1.25

Instructions	Response Not Obtained

39. Control RCS Pressure AND Charging Flow To Minimize RCS-To-Secondary Leakage Using Table:

REQUIRED ACTION FOR PRESSURE CONTROL

Priority for RCS depressurization:

1. Normal spray
2. IF letdown in service, THEN use auxiliary spray.
3. One PRZ PORV

PRZ LEVEL	Ruptured SG Level		
	INCREASING	DECREASING	OFFSCALE HIGH
Less than 25% [40%]	Increase charging flow Depressurize RCS.	Increase charging flow	Increase charging flow Maintain RCS AND ruptured SG pressures equal.
Between 25% and 50% [40% and 50%]	Depressurize RCS.	Energize PRZ heaters.	Maintain RCS AND ruptured SG pressures equal.
Between 50% and 75% [50% and 60%]	Decrease charging flow Depressurize RCS.	Energize PRZ heaters.	Maintain RCS AND ruptured SG pressures equal.
Greater than 75% [60%]	Decrease charging flow	Energize PRZ heaters.	Maintain RCS AND ruptured SG pressures equal.

20. G2.1.4 001/NEW/LOWER/3/3/1/G2.1.4/SRO/

For the positions listed, which ONE (1) of the following describes the MINIMUM shift crew composition required by Technical Specifications in MODE 3?

	S-SO	USCO	RO	AO
A.	0	1	2	2
B.	1	1	2	2
C.	1	0	2	1
D.	1	1	1	2

B is correct in accordance with TS Table 6.2-1. Memory of TS minimum staffing SRO 95

Tier 3 Group 1
K/A Importance Rating - SRO 3.4

Knowledge of shift staffing requirements.

Reference(s) - TS Table 6.2-1
Proposed References to be provided to applicants during examination - NONE
Learning Objective - LPTS2-0 S1A
Question Source - NEW
Question History -
Question Cognitive Level - Lower
10 CFR Part 55 Content - 43(b).1
Comments -

G 2.1.4

TABLE 6.2-1

MINIMUM SHIFT CREW COMPOSITION

POSITION	NUMBER OF INDIVIDUALS REQUIRED TO FILL POSITION	
	MODE 1, 2, 3, or 4	MODE 5 or 6
S-SO	1	1
SRO	1	None
RO	2	1
AO	2	1
STA	1*	None

S-SO - Superintendent-Shift Operations with a Senior Operator license on Unit 1
SRO - Individual with a Senior Operator license on Unit 1
RO - Individual with an Operator license on Unit 1
AO - Auxiliary Operator - license not required
STA - Shift Technical Advisor

The shift crew composition may be one less than the minimum requirements of Table 6.2-1 for a period of time not to exceed 2 hours, in order to accommodate unexpected absence of on-duty shift crew members, provided immediate action is taken to restore the shift crew composition to within the minimum requirements of Table 6.2-1. This provision does not permit any shift crew position to be unmanned upon shift change due to an oncoming shift crewman being late or absent.

During any absence of the Superintendent-Shift Operations from the control room while the unit is in MODE 1, 2, 3, or 4, an individual (other than the Shift Technical Advisor) with a valid Senior Operator license shall be designated to assume the control room command function. During any absence of the Superintendent-Shift Operations from the control room while the unit is in MODE 5 or 6, an individual with a valid Senior Operator license or Operator license shall be designated to assume the control room command function.

* The STA position shall be manned in MODES 1, 2, 3, and 4 unless the Superintendent-Shift Operations or the individual with a Senior Operator license meets the qualifications for the STA as required by the NRC.

21. G2.2.11 002/BANK/LOWER/4/3/2/G2.2.11/SRO/

Which ONE of the below is a responsibility of the WCC-SRO concerning a Temporary Change (Plant Modification) in accordance with EGR-NGGC-0005, Engineering Change?

A. Identify the placement of Temporary Change Tags.

B. ✔ Verify proper annotation of affected Priority 0 drawings.

C. Initiate the Temporary Change Log (Form 2)

D. Perform a periodic audit verifying the hanging of the Temporary Change Tags and the state of the Temporary Change Tag integrity

The only task performed by Ops is the WCC-SRO verification of Priority 0 drawing annotation
SRO 96

Tier 3 Group 2
K/A Importance Rating - SRO 3.4

Knowledge of the process for controlling temporary changes.

Reference(s) - EGR-NGGC-005
Proposed References to be provided to applicants during examination - NONE
Learning Objective -
Question Source - Bank
Question History - PP-3.4-021
Question Cognitive Level - Lower
10 CFR Part 55 Content - 43(b).3
Comments -

G 2.2.11

9.7 Temporary Change

9.7.8.4. When notified that installation is complete, perform the following:

- Initiate independent verification of tagging, if not already accomplished.
- Complete the DOC REV REL-I Milestone and notify Operations to annotate Priority 0 drawings in the Control Room and Work Control Center (and Rad Waste Control Room (BNP)) and issue revised procedures (if required).
- If conditions allow, walk down the installation to confirm proper installation and tagging.
- Coordinate post-installation testing, if appropriate.
- Obtain Operations acceptance of the installed Temporary Change by signature on the Temporary Change log (Form 2).
- Ensure Temporary Change log is inserted into the Temporary Change logbook.
- Perform an initial audit of the Temporary Change and document using Form 3. Retain Form 3 for insertion in the EC Folder.
- Advance EC Status to INSTALLED.

5. If a (U)FSAR change has been developed because the Temporary Change is scheduled to be installed beyond the end of the next refueling outage, ensure the (U)FSAR change package is processed in accordance with applicable procedures.

6. While the Temporary Change is installed, the RE or other Engineering representative shall periodically verify the installation of the Temporary Change as follows:
   - Initiate an NTM AR with approximately quarterly actions for verification.
   - Document verification using Form 3.
   - Retain completed Forms for insertion into the EC Folder.

22. G2.3.1 003/BANK/HIGHER/2/3/3/G2.3.1/SRO/

A male employee who is 20 years old has received the following exposure:

-Current Total Effective Dose Equivalent (TEDE) for the year to date is 4200 mrem.
-Current Deep Dose Equivalent (DDE) for the year to date is 700 mrem.
-Current Committed Effective Dose Equivalent (CEDE) for the year to date is 3500 mrem.
-Current Total Organ Dose Equivalent (TODE) for the year to date is 300 mrem.

Assuming his exposure is properly documented and appropriate management approval is received, which of the following is the MAXIMUM additional whole body exposure the operator can receive this year without exceeding his 10CFR20 exposure limits?

A. 800 mrem

B. 1200 mrem

C. 500 mrem

D. 1500 mrem

5 Rem per year is the 10CFR20 limit for TEDE exposure. The employee currently has 4200 mRem, leaving 800 mRem exposure to reach his limit
SRO 97

Tier 3 Group 3
K/A Importance Rating - SRO 3.0

Knowledge of 10 CFR: 20 and related facility radiation control requirements.

Reference(s) - 10CFR20, DOS-NGGC-0004
Proposed References to be provided to applicants during examination - NONE
Learning Objective -
Question Source - BANK
Question History - Prairie Island SRO 2004
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).4
Comments -

G 2.3.1

Progress Energy	I Information Use

NUCLEAR GENERATION GROUP

STANDARD PROCEDURE

Volume 99

Book/Part 99

DOS-NGGC-0004

ADMINISTRATIVE DOSE LIMITS

REVISION 8

NGG Nuclear Generation Group

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1.0 PURPOSE

This procedure establishes the method for increasing or decreasing administrative dose limits from the default values in Total Exposure during non-emergency operations.

R2.1 This procedure details the occupational radiation dose limits established by the Nuclear Regulatory Commission and the administrative dose limits set by Progress Energy.

2.0 REFERENCES

R2.1 2.1 10 CFR Part 20, Standards for Protection Against Radiation

2.2 DOS-NGGC-0002, Dosimetry Issuance

2.3 PassPort Total Exposure Guides

2.4 Passport Total Exposure Work Flow Analysis Report

2.5 NGGM-PM-0002, Radiation Control & Protection Manual

3.0 DEFINITIONS

N/A

4.0 RESPONSIBILITIES

4.1 Radiation Control Personnel

4.1.1 Process administrative dose limit change requests.

4.1.2 Update Total Exposure.

4.2 Superintendent - Radiation Protection

Approve or cancel all requests.

4.3 Site Vice President or Designee

Approve all requests to exceed any administrative dose limits except during declared emergencies.

5.0 PREREQUISITES

N/A

6.0 PRECAUTIONS AND LIMITATIONS

N/A

7.0 SPECIAL TOOLS AND EQUIPMENT

N/A

8.0 ACCEPTANCE CRITERIA

N/A

9.0 INSTRUCTIONS

R2.1

9.1 Adult Occupational Dose Limits

9.1.1 Whole Body - The more limiting of a total effective dose equivalent equal to 5 rem or the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye equal to 50 rem.

9.1.2 Skin - A shallow dose equivalent equal to 50 rem.

9.1.3 Lens of Eye - A lens dose equivalent equal to 15 rem.

9.1.4 Extremities - A shallow dose equivalent equal to 50 rem.

9.2 Occupational Dose to Minors

Minors shall not be employed to work in radiation control areas, although they may enter as visitors.

9.3 Progress Energy Annual Administrative Dose Limits

9.3.1 0.5 rem Progress Energy dose if non-Progress Energy dose for the current year has not been determined. No dose extension is permitted.

9.3.2 2 rem Progress Energy dose not to exceed 4 rem total dose if non-Progress Energy dose for the current year has been determined.

9.4 Progress Energy Lifetime Administrative Dose Limits

9.4.1 Dose in rem should not exceed the individual's age in years as of the end of the year.

9.4.2 If the cumulative lifetime dose (TEDE) in rem upon employment or as of the beginning of the year, whichever is later, exceeds an individual's age in years, then an administrative limit of 0.5 rem per year on Progress Energy dose shall be imposed.

9.5 Emergency Exposure to Radiation

Exposure to radiation during emergencies is not covered in this procedure. GO TO NGGM-PM-0002, Radiation Control & Protection Manual.

9.6 Planned Special Exposure

Planned special exposures are not covered in this procedure. GO TO NGGM-PM-0002, Radiation Control & Protection Manual.

9.7 Administrative Dose Limit Changes

9.7.1 Ensure Attachment 1, Administrative Dose Limit Change Request, or equivalent has been completed and signed by the individual and Progress Energy supervisor or Progress Energy contract representative for contract employees.

1. A written request signed by an authorized representative of the individual's employer containing the individual's name, SSN, and authorized annual dose limit may be used in lieu of Attachment 1 when changing the administrative dose limit to a value less than the default value in Total Exposure.

2. An authorized representative of the contractor must sign any change request that would allow the individual to exceed employer dose limits previously provided to Progress Energy in writing.

9.7.2 Ensure the individual's prior dose has been documented on Form 4 in accordance with Reference 2.2.

9.7.3 If secondary dosimeter results for the current monitoring period exceed 500 mrem, then ensure the individual's primary dosimeter has been sent for processing.

9.7 Administrative Dose Limit Changes

NOTE:	Attachment 1 shall be completed before Attachment 2 is signed.

9.7.4 Initiate the change request by completing Attachment 2, Administrative Dose Limit Change or equivalent.

9.7.5 Notify radiation control supervision when the change request is ready for approval.

NOTE:	Supervision may give verbal approval by phone and an authorized Designee may complete the approval process on their behalf. In this case, Supervision should later sign Attachment 2 to authenticate their verbal approval.

9.7.6 Obtain Superintendent - Radiation Protection, or authorized designee, approval for any increase or decrease in the administrative dose limit from the defaults listed in Steps 9.1, 9.2, and 9.3.

9.7.7 Obtain Site Vice President or designee approval to exceed any administrative dose limits.

9.7.8 Update Administrative dose changes in Total Exposure.

10.0 RECORDS

Submit the following Vital records for processing:
- Attachment 1, Administrative Dose Limit Change Request
- Attachment 2, Manual Administrative Dose Limit Change form
- Employer dose limit authorization letters, if applicable

ATTACHMENT 1
Sheet 1 of 1

Administrative Dose Limit Change Request

Name:_____ SSN:_____

Reason for increase/decrease (circle one):_____

_____

_____

Requested annual dose limit: _____ or Requested available dose:_____

Individual: _____ Date: _____

Progress Energy Supervision: _____ Date: _____

Contract Supervision: _____ Date: _____

(Form DOS-NGGC-0004-1-8)
Vital Record

ATTACHMENT 2
Sheet 1 of 1

Manual Administrative Dose Limit Change

TE Entry	

Name: _____ SSN: _____

		Dose (mrem)
1.	Lifetime administrative limit (age at end of year X 1000)	_____
2.	Lifetime dose (including current year)	_____
3.	Lifetime available dose (1 - 2)	_____
4.	Current year non-Progress energy dose	_____
5.	Current year Progress Energy dose	_____
6.	Current year total dose (4 + 5)	_____
7.	Current annual administrative limit	_____
8.	Current annual available dose (7 - 6)	_____
9.	New annual administrative limit (shall be < 5000 mrem)	_____
10.	New annual available dose (9 - 6)	_____

Calculations Performed By: _____ Date: _____

Approval:

Superintendent - Radiation Protection approval is required for any increase or decrease in the administrative dose limit from the defaults listed in Steps 9.1, 9.2, and 9.3.

Site Vice President approval required to authorize any of the following:

- An annual Progress Energy dose exceeding 2000 mrem (Line 5 + Line 10)
- An annual total dose exceeding 4000 mrem (Line 6 + Line 10 > 4000).
- A Progress Energy annual dose that would cause the lifetime dose to exceed the individual's age in years as of the end of the calendar year (Line 2 + Line 10 > Line 1).
- An annual dose greater than 500 mrem if the lifetime dose upon employment or at the start of the calendar year exceeds the individual's age in years (Line 5 + Line 10 > 500 **and** Line 3 $\leq$ 0).

Superintendent - Radiation Protection (or designee): _____ Date: _____

Site Vice President (or designee): _____ Date: _____

(Form DOS-NGGC-0004-2-8)
Vital Record

REVISION SUMMARY

The following changes were made in this revision (PRR#152597):

Deleted reference to PassPort Total Exposure Training Tool
Changed Attachments 1 and 2 to VITAL records

23. G2.3.9 001/BANK/LOWER/2/3/3/2.3.9/SRO/

A Normal Containment Purge is planned following an outage.

Which ONE (1) of the following describes the release permit requirements for the planned evolution?

A. ✔ A Batch Release Permit MUST be prepared per CRC-853.

B. If the purge is within 30 days of the Pre-Entry Purge, the release permit for Pre-Entry Purge may be used.

C. If all 4 Containment Ventilation Isolation monitors and both RCS leak detection monitors are OPERABLE, a Batch Release Permit is NOT required.

D. A Batch Release Permit must ONLY be prepared if the previous purge was secured for radiological reasons. If not, a release permit is NOT required.

A-Correct
B-Incorrect. Startup after outage requires new permit
C-Incorrect. Monitors required to be operable, but permit still required.
D-Incorrect. Previous purge radiological problem is one reason that a batch release permit must be prepared, but if there was no problem, a permit still must be prepared.
SRO 98

Tier 3 Group 3
K/A Importance Rating - SRO 3.4

Knowledge of the process for performing a containment purge.

Reference(s) - OP-168, sections 5.1.1 and 5.1.2
Proposed References to be provided to applicants during examination - None
Learning Objective - LP CVS3-0 R4
Question Source - BANK
Question History -
Question Cognitive Level - Memory
10 CFR Part 55 Content - 43(b).4 because misunderstanding of release permit requirements or improper operation of the Containment Purge system can result in unwanted radioactive release
Comments -

G 2.3.9

5.0 STARTUP

NOTE: This section describes the start-up of Train A fans, with Train B nomenclature in parenthesis.

5.1. Airborne Radioactive Removal and Normal Purge System Start-up

5.1.1. Initial Conditions

1. Attachment 1 is complete. _____

2. Attachment 2 is complete. _____

3. The following rad monitors are required to be operable to open containment purge makeup and exhaust isolation valves: (Reference 2.2.1)

   - Three Containment Ventilation Isolation Signal Area Monitors _____
   - One RCS Leakage Detection Airborne Gaseous Monitor _____
   - One RCS Leakage Detection Airborne Particulate Monitor _____

NOTE: The release permit for Pre-Entry Purge **CANNOT** be used for starting Normal Purge after an Outage. (Ref. AR 19444)

4. For initial start-up (that is, following an outage) or if purge was secured for radiological reasons, a Batch release permit is required per CRC-853. (Otherwise this step is N/A) _____

5. For initial startup, Steps 1 and 2 of Attachment 5 have been completed. (Otherwise this step is N/A) _____

24. G2.4.11 001/BANK/HIGHER/2/3/4/2.4.11/SRO/

Given the following conditions:

- A loss of Component Cooling Water has occurred.
- The reactor was tripped in accordance with AOP-014, Loss of Component Cooling Water.
- The crew has entered PATH-1.

Which ONE (1) of the following describes the continued use of AOP-014, Loss of Component Cooling Water?

A. Use of AOP-014 is NOT allowed during EOP performance.

B. May ONLY be used concurrently with actions of PATH-1, and ONLY where directed by the procedure.

C. May be used concurrently with EOPs ONLY if referring to the AOP does NOT result in delaying accident mitigation

D. May be used concurrently as necessary under all conditions of EOP use.

A-Incorrect. AOP-014 may be used concurrently on an 'as needed' basis
B-Incorrect. May also be used with other EPPs, EPP-4 for instance
C-Correct.
D-Incorrect. If steps performed from the AOP would result in delays for EPP use, it would not be performed
SRO 99
Tier 3
K/A Importance Rating - SRO 3.6

Knowledge of abnormal condition procedures.

Reference(s) - OMM-027, EOP User's Guide
Proposed References to be provided to applicants during examination - None
Learning Objective - LP EOP3-19 OBJ 1B
Question Source - Bank
Question History - 2004 NRC Retake SRO 25
Question Cognitive Level - Memory
10 CFR Part 55 Content - 43(b).5 because the SRO must evaluate plant conditions and determine a course of action by applying the proper procedural guidance in an emergency
Comments -

G 2.4.11

5.1.2 General Usage (continued)

During performance of the initial action of PATH-1, after SI has been actuated, there is little benefit to performing pre-emptive actions prior to reaching the diagnostic steps and transitioning to the appropriate recovery procedure. Performing steps out of sequence early in PATH-1 may actually delay implementation of other actions critical for optimal recovery.

Conditions may arise; however, where it may be advantageous to perform actions that are not specified in the EOPs or to perform actions prior to reaching the associated instructions in the EOPs. The following are examples of actions that experience has shown may be advantageous to perform prior to direction in the EOPs:

(1) If an AFW actuation occurs due to SG level shrink, the operator may throttle the AFW flow control valves and control AFW pumps to maintain intact SG levels between 25% and 50% [40% and 50%].

(2) If a SG is known to be faulted and at least one intact SG is available, AFW flow to faulted SG may be isolated.

(3) If a SG is known to be ruptured, feed flow to that SG may be secured when level in that SG is above the top of the tubes 25% [40%].

An example of an appropriate pre-emptive action is isolating feed flow to a faulted SG prior to transitioning to EOP-EPP-014, when the operator is in the process of implementing PATH-2 due to a ruptured SG. An example of an inappropriate pre-emptive action is reduction or termination of SI prior to the steps that check the SI termination criteria. These actions might be beneficial to prevent filling the PRZ if the only event were a spurious SI. However, premature termination of SI could result in further degradation of the plant, if other undiagnosed events are in progress. (Reference 2.2.2.9)

While implementing EOPs, it may be necessary to implement actions identified in the AOPs. This is acceptable assuming that referencing an AOP does not delay accident mitigation as outlined in the EOPs. Particular attention should be given to actions that will protect major plant equipment and/or enhance plant control.

25. G2.4.6 001/BANK/HIGHER/3/3/4/G2.4.6/SRO/

Given the following conditions:

- The plant is operating at 100% power.
- EDG 1B-SB is out of service and is expected to return to service in two (2) hours.
- Subsequently, the following events occur:
  - A loss of offsite power occurs.
  - The reactor is tripped and the crew enters PATH-1
  - SI is NOT actuated.
  - The crew made a transition to FRP-H.1, Loss Of Secondary Heat Sink based on a CSFST RED Path.

Subsequently, EDG 1A-SA output breaker trips on a bus fault.

Which ONE (1) of the following describes the actions that will be taken?

A. ✓ Immediately transition to EPP-001, Loss Of All AC Power to 1A-SA and 1B-SB Buses.

B. Restore feed in accordance with FRP-H.1, and then return to PATH-1 to restore EDG 1A-SA.

C. Remain in FRP-H.1 until directed to return to procedure in effect, and then transition to EPP-001.

D. Remain in FRP-H.1 unless a higher priority RED condition is observed. When directed to return to procedure in effect, return to PATH-1. Restore EDG 1A-SA or 1B-SB in EPP-004, Reactor Trip Response.

A. Correct.
B. Incorrect. No AC power is available, therefore transition to EPP-1 is required.
C. Incorrect. Transition to EPP-1 immediately, even if a RED condition exists.
D. Incorrect. This would be correct if only one EDG was tripped.

SRO 100

Tier 3 Group 4
K/A Importance Rating - SRO 4.0

Knowledge symptom based EOP mitigation strategies.

Reference(s) - EOP User's Guide, EPP-1
Proposed References to be provided to applicants during examination - None
Learning Objective - LP EOP3-7, OBJ 4
Question Source - Bank
Question History - BVPS-1 2005 NRC
Question Cognitive Level - Higher
10 CFR Part 55 Content - 43(b).5
Comments -

G 2.4.6

5.1.3 EOP Applicability

In general, the EOP Network is applicable for events initiated when the Reactor Coolant System is greater than 350°F. Certain individual procedures within the EOP Network are applicable for events initiated less than 350°F, but above 200°F. With initial conditions below 350°F, significant operator judgment is required when using the EOP Network to mitigate an event. Some steps will not be required and others will have to be modified to allow for existing conditions (i.e., on RHR). This situation is acceptable because a very small fraction of plant life is spent greater than 200°F but less than 350°F. Attachment 1 is a listing of the applicability of each EOP and the plant conditions assumed when entering the EOPs. The appropriate procedure for a LOCA that occurs while on RHR is AOP-020, "LOSS OF RCS INVENTORY OR RESIDUAL HEAT REMOVAL SYSTEM WHILE SHUTDOWN" since it contains all actions necessary to mitigate this type of event. The EOPs should not be used in this case except as directed by AOP-020.

5.1.4 Entry into EOP Network

Entry into the Emergency Operating Procedures is expected when any of the following conditions occurs:

- o If at any time a reactor trip or safety injection occurs or is required, the operator will enter PATH-1. This includes spurious or inadvertent SIs. The actions to diagnose and terminate a spurious SI are performed in PATH-1.

- o If at any time a complete loss of power on the AC Emergency Buses takes place, the operator will enter EPP-001, "LOSS OF AC POWER TO 1A-SA AND 1B-SB BUSES." This includes any time during the performance of any other EOP.

- o EPP-005, "NATURAL CIRCULATION COOLDOWN", may be entered whenever a natural circulation cooldown is required (and an accident is not in progress).

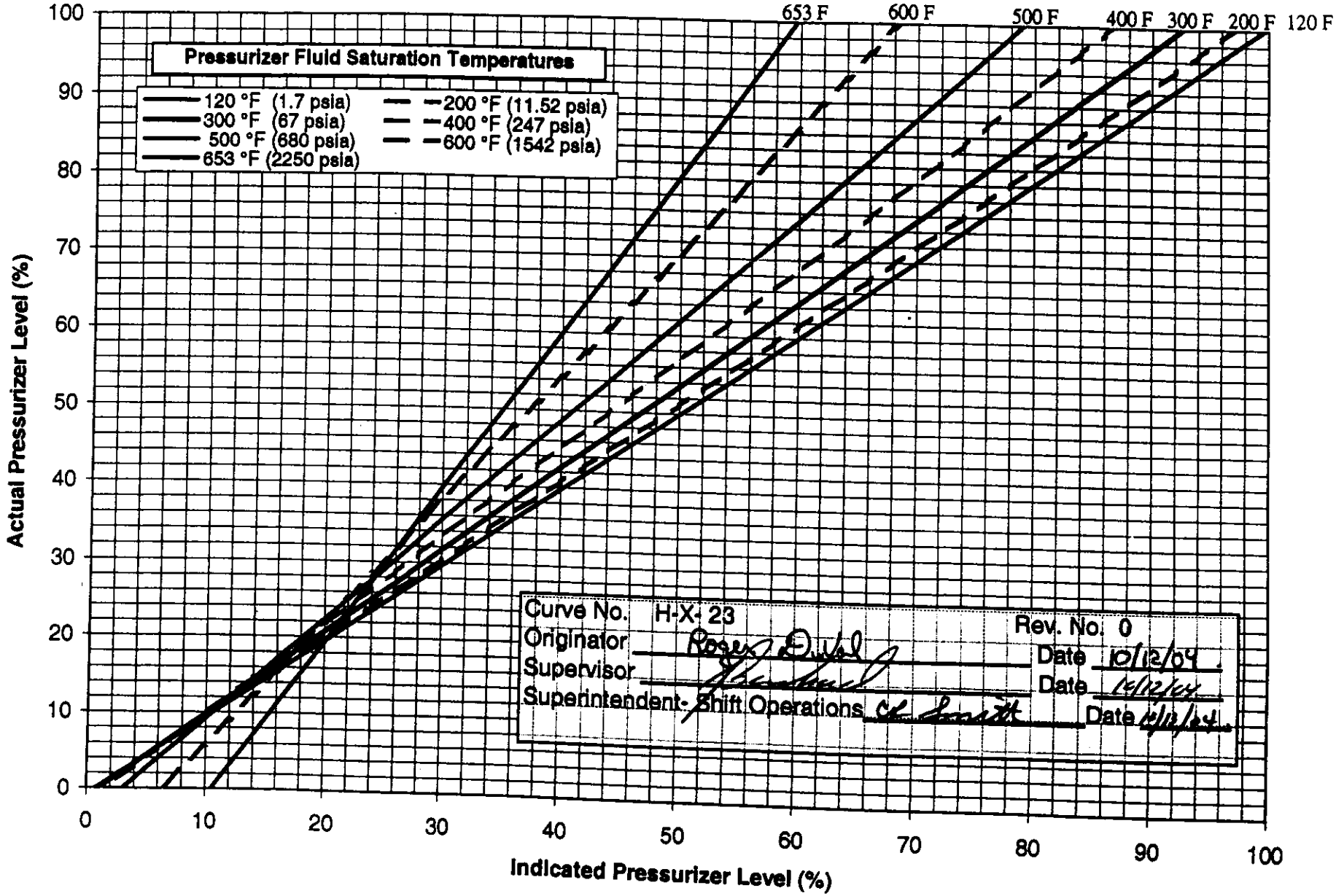
The entry into PATH-1 is expected to be the one more frequently used, so it is described first.

The operator enters at the top left of PATH-1 at the block which says "REACTOR TRIP OR SAFETY INJECTION". After performing the immediate actions, the operator is directed to monitor the CSFSTs to help recognize any potential degradation of plant status. The operator then proceeds through PATH-1 with two possible outcomes:

- o He remains in PATH-1 and is directed by an action step to begin implementing the FRPs as required, or

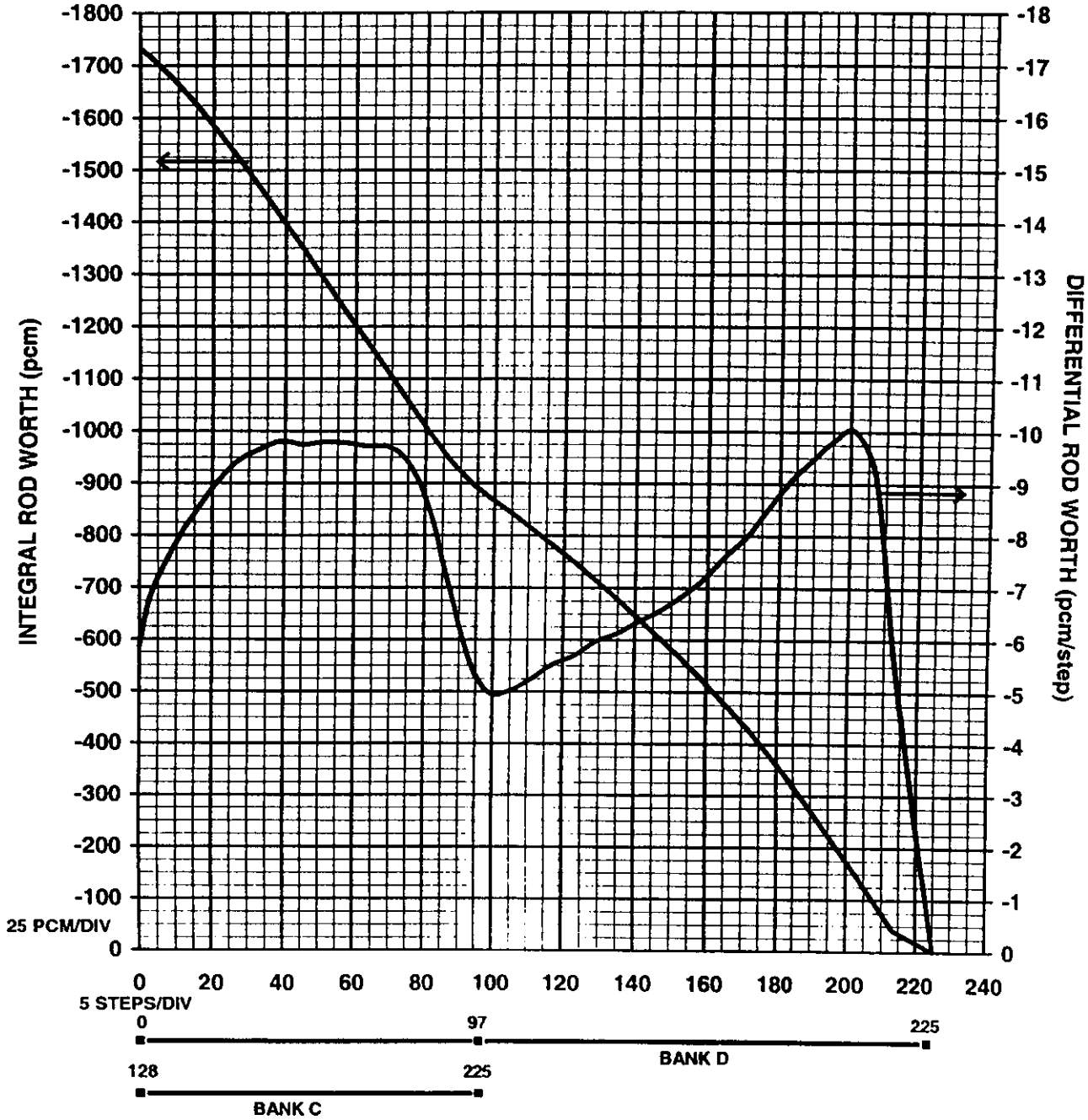
- o He transfers to some other EOP at which point he begins to implement the FRPs as required.

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



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

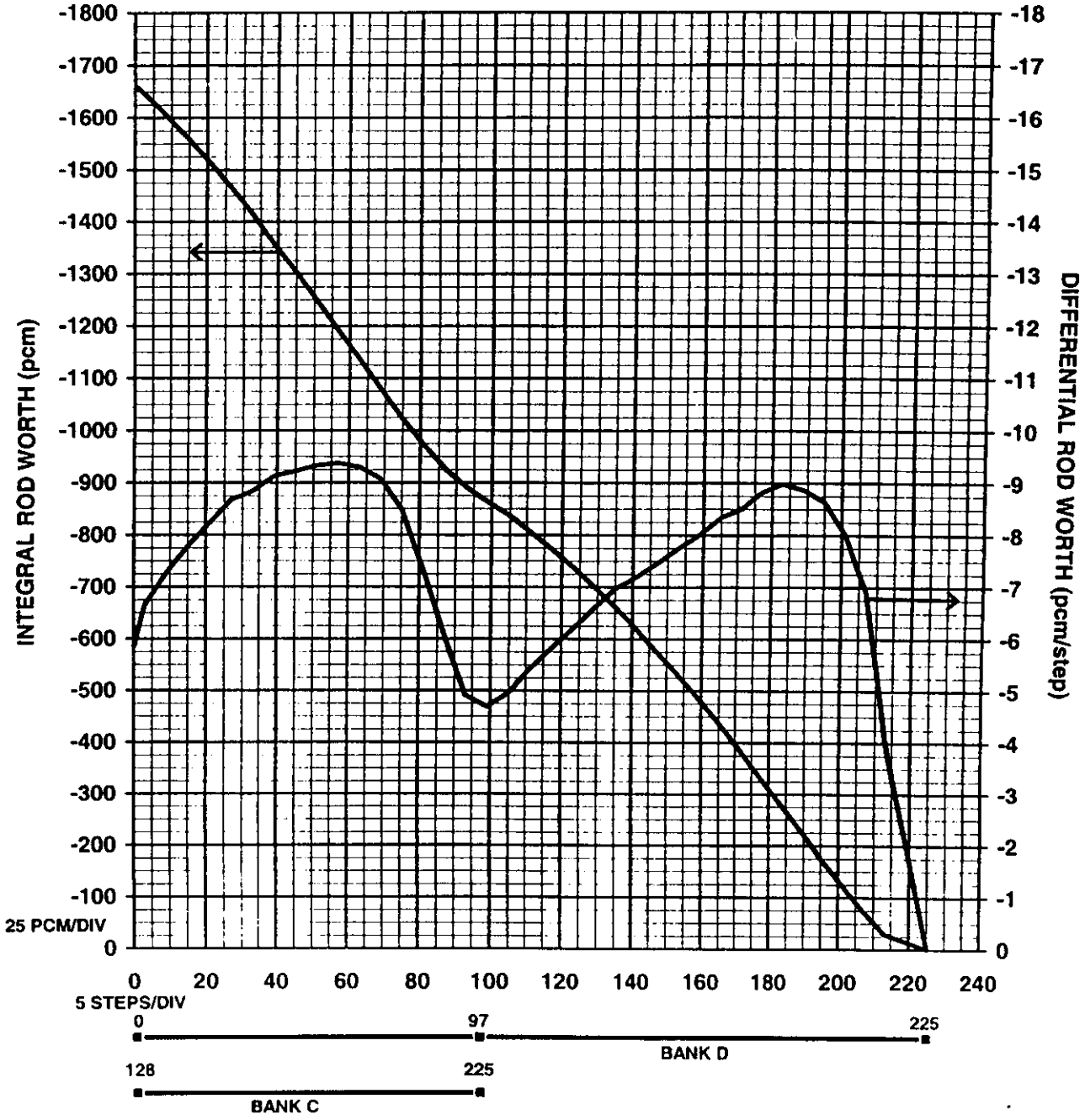
BOL (0 ≤ EFPD ≤ 161), HZP, WITH NO XENON



CURVE NO.	A-13-6	REV NO.	0
ORIGINATOR	Charles [illegible]	DATE	10/14/04
SUPERVISOR	[illegible]	DATE	10/23/04
SUPERINTENDENT - SHIFT OPERATIONS	CR Smith	DATE	10/24/04

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

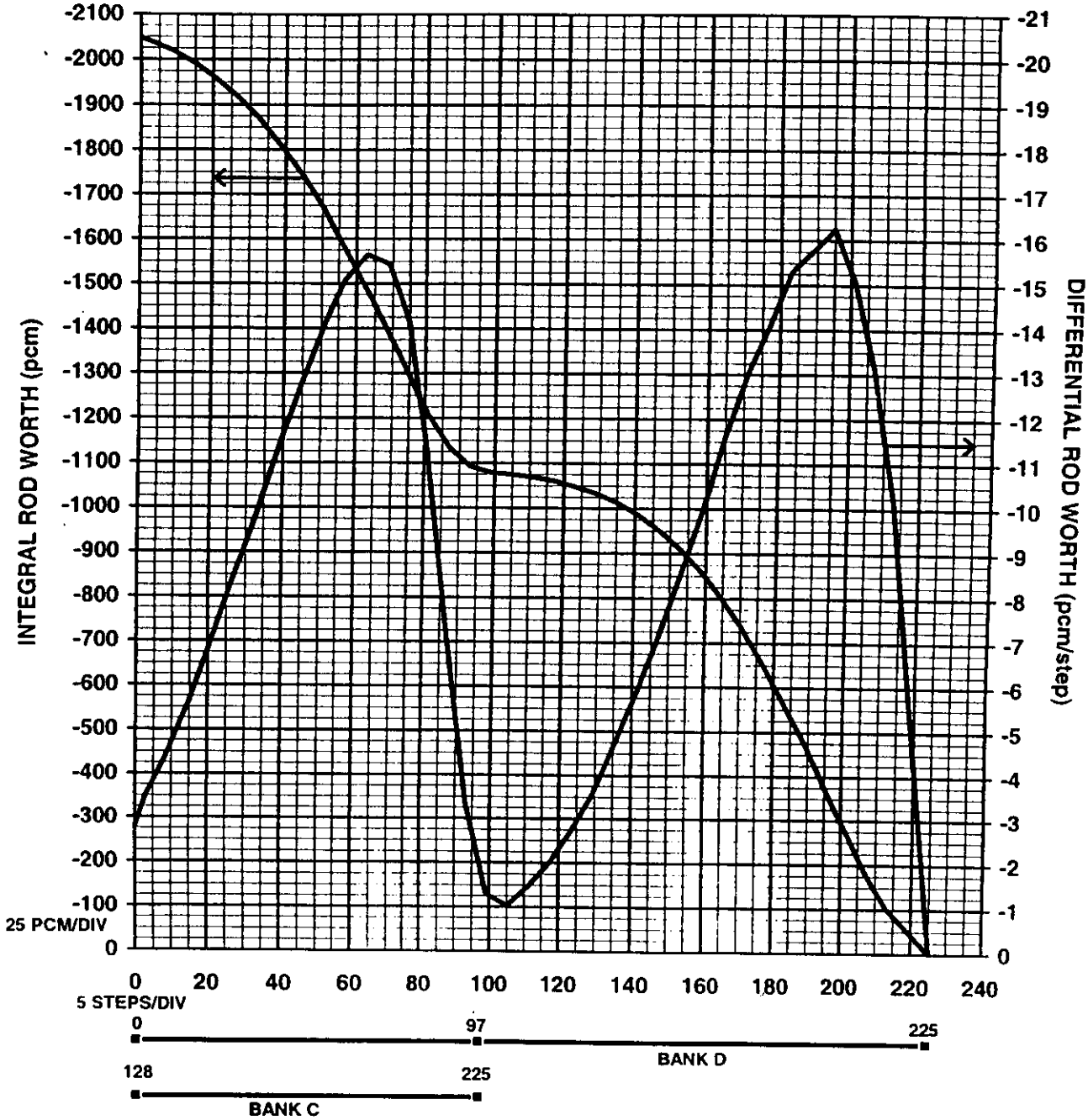
MOL (161 < EFPD ≤ 333), HZP, WITH NO XENON



CURVE NO.	A-13-7	REV NO.	0
ORIGINATOR	Charles A. Griffin	DATE	10/14/04 10/17/04
SUPERVISOR	R. Michael Wall	DATE	10/23/04
SUPERINTENDENT - SHIFT OPERATIONS	C R Smith	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), HZP, WITH NO XENON



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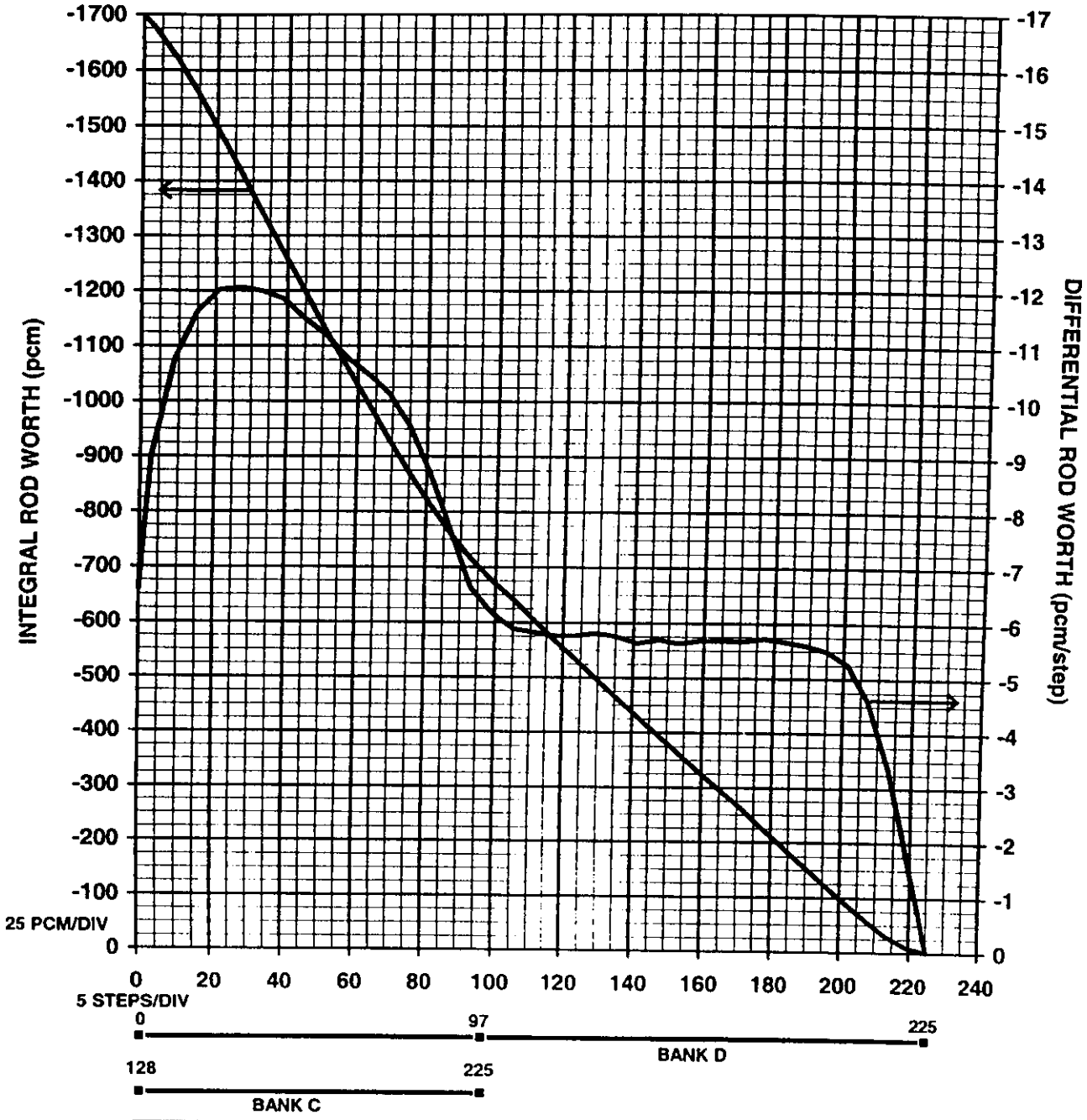
ORIGINATOR	Charles Griffin	DATE	10/14/04 10/17/04
SUPERVISOR	[signature]	DATE	10/23/04
SUPERINTENDENT - SHIFT OPERATIONS	CR Smith	DATE	10/24/04

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

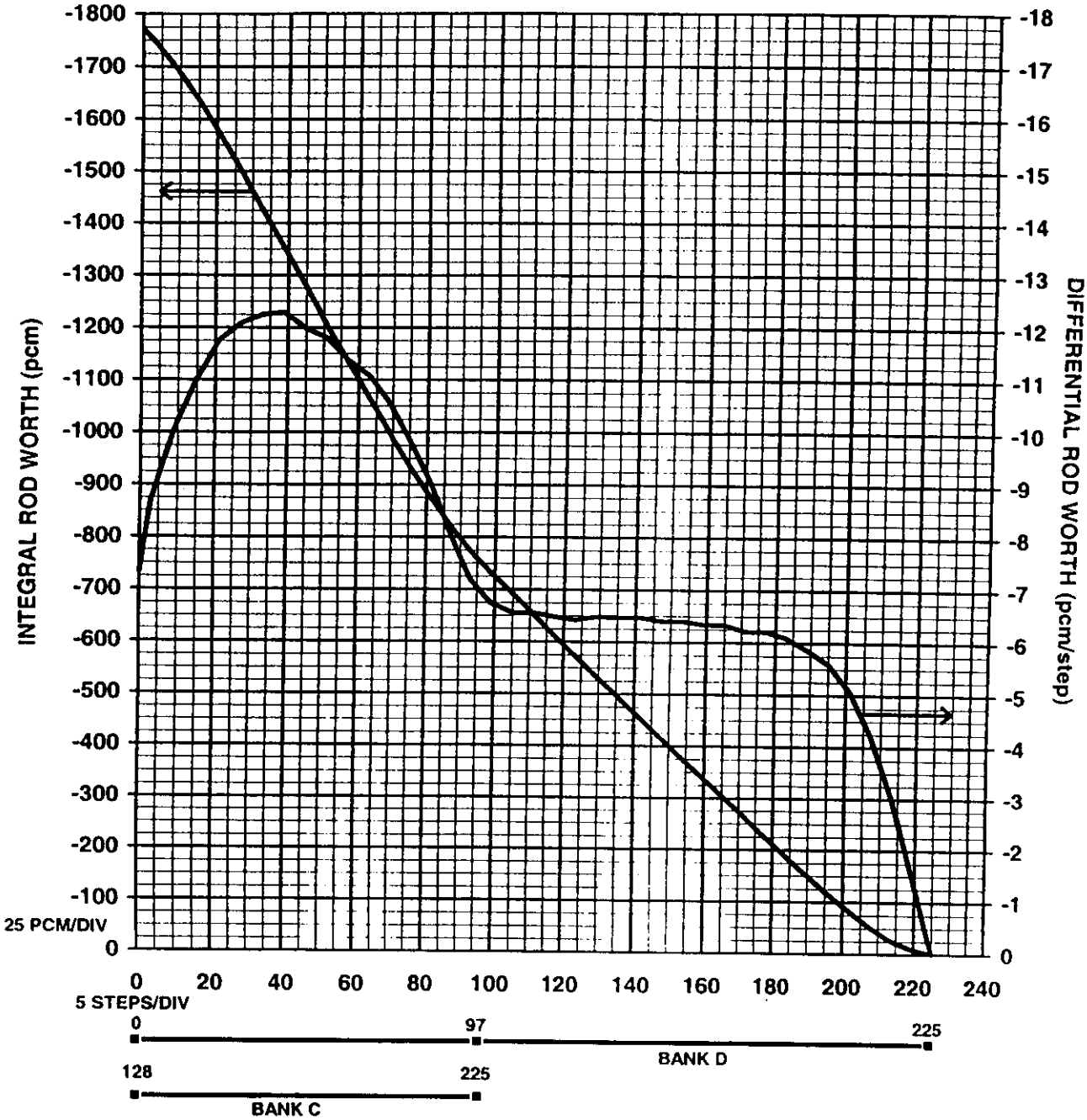
BOL (0 ≤ EFPD ≤ 161), HFP, EQUILIBRIUM XENON



CURVE NO.	A-13-9	REV NO.	0
ORIGINATOR	[signature]	DATE	10/24/04 10/27/04
SUPERVISOR	[signature]	DATE	10/23/04
SUPERINTENDENT - SHIFT OPERATIONS	[signature]	DATE	10/24/04

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

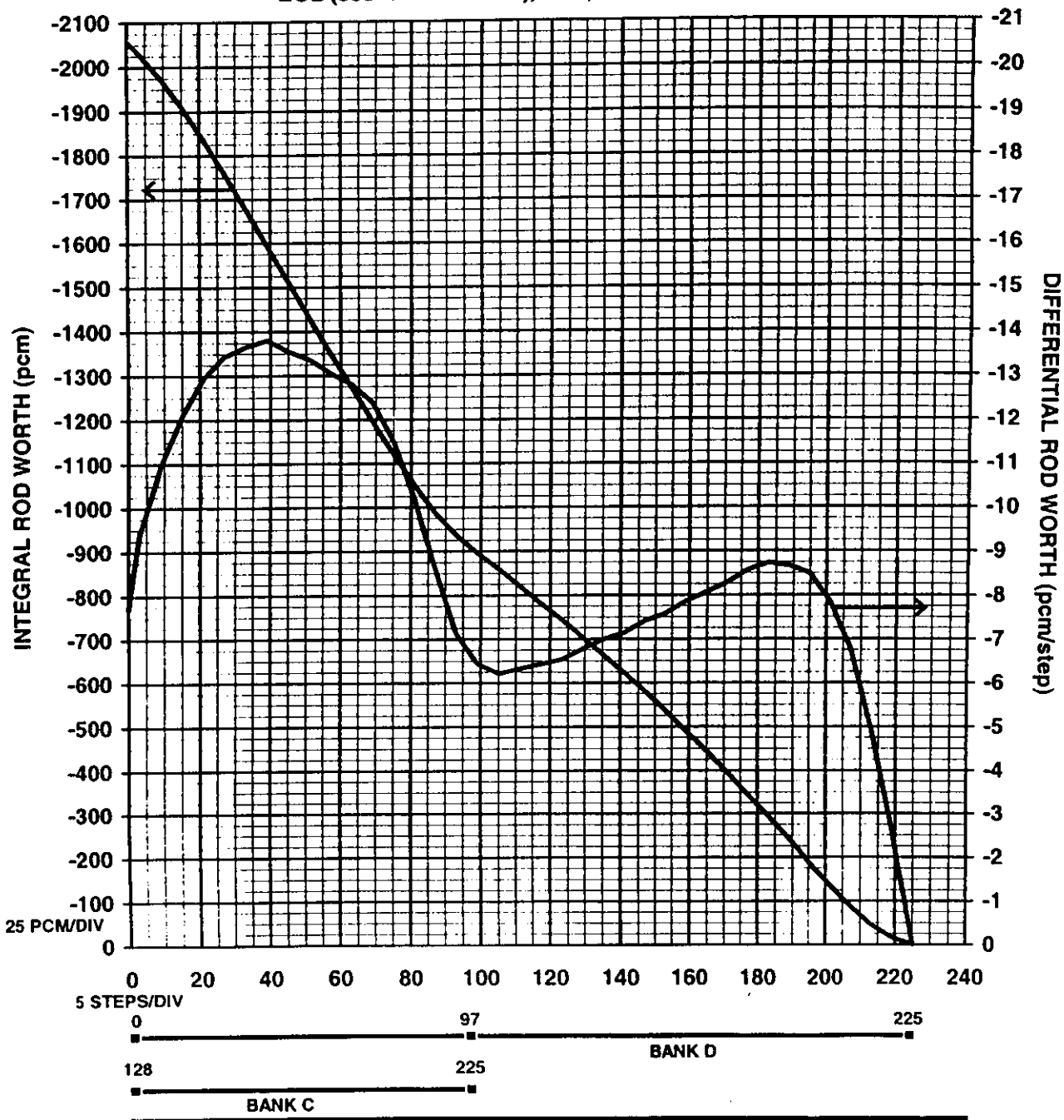
MOL (161 < EFPD ≤ 333), HFP, EQUILIBRIUM XENON



CURVE NO.	A-13-10	REV NO.	0
ORIGINATOR	[signature]	DATE	10/14/04 10/17/04
SUPERVISOR	[signature]	DATE	10/23/04
SUPERINTENDENT - SHIFT OPERATIONS	CR Smith	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.	A-13-11	REV NO.	0
ORIGINATOR	Charles K Giffin	DATE	10/14/04 10/17/04
SUPERVISOR	W. Richard Allen	DATE	10/23/04
SUPERINTENDENT - SHIFT OPERATIONS	CR Smith	DATE	10/28/04

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)	• 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

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

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).

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.	☐ **6. START** CVPETS (refer to OP-133, Main Condenser Air Removal System).
✸ **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)	**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)

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).

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 --

Instructions	Response Not Obtained

39. Control RCS Pressure AND Charging Flow To Minimize RCS-To-Secondary Leakage Using Table:

REQUIRED ACTION FOR PRESSURE CONTROL

Priority for RCS depressurization:

1. Normal spray
2. IF letdown in service, THEN use auxiliary spray.
3. One PRZ PORV

PRZ LEVEL	Ruptured SG Level		
	INCREASING	DECREASING	OFFSCALE HIGH
Less than 25% [40%]	Increase charging flow Depressurize RCS.	Increase charging flow	Increase charging flow Maintain RCS AND ruptured SG pressures equal.
Between 25% and 50% [40% and 50%]	Depressurize RCS.	Energize PRZ heaters.	Maintain RCS AND ruptured SG pressures equal.
Between 50% and 75% [50% and 60%]	Decrease charging flow Depressurize RCS.	Energize PRZ heaters.	Maintain RCS AND ruptured SG pressures equal.
Greater than 75% [60%]	Decrease charging flow	Energize PRZ heaters.	Maintain RCS AND ruptured SG pressures equal.

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

INSTRUMENT	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	ACTION
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	$\leq 1.0 \times 10^{-3}$ μCi/ml	26, 27
2) Pre-entry Purge	1	1	##	$\leq 2.0 \times 10^{-3}$ μCi/ml	30
c. Airborne Particulate Radioactivity					
1) RCS Leakage Detection	1	1	1, 2, 3, 4	$\leq 4.0 \times 10^{-8}$ μCi/ml	26, 27
2) Pre-entry Purge	1	1	##	$\leq 1.5 \times 10^{-8}$ μCi/ml	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 mR/hr	28
b. Fuel Handling Building Operating Floor--North Network	1/train***	1/train 2 trains	*	$\leq$ 100 mR/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	$\leq 4.9 \times 10^{-8}$ μCi/ml	29

TABLE 3.3-6 (Continued)

RADIATION MONITORING INSTRUMENTATION FOR PLANT OPERATIONS

INSTRUMENT	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	ACTION
7. Control Room Outside Air Intakes-- (Continued)					
a. 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	$\leq 4.9 \times 10^{-6}$ μCi/ml	29
b. 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	$\leq 4.9 \times 10^{-6}$ μCi/ml	29

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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 ± 10% during system operation when tested in accordance with ANSI N510-1980.

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

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 cfm ± 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 cfm ± 10%, and

4 Deleted

5. Verifying that the heaters dissipate 40 ± 4 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 cfm ± 10%.