
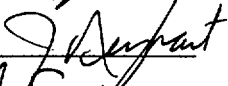
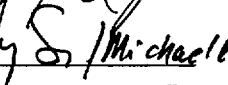
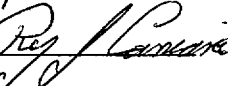
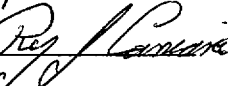


FINAL AS-ADMINISTERED WRITTEN EXAMINATION

FOR THE BRAIDWOOD INITIAL EXAMINATION - NOVEMBER 1, 2000

Facility: <u>Braidwood</u> Units <u>1+2</u> Date of Exam: <u>11-1-00</u> Exam Level: <u>RO/SRO</u>			
Item Description	Initials		
	a	b	c
1. Answer key changes and question deletions justified and documented	<u>✓</u>	<u>✓</u>	<u>MEB</u>
2. Applicants' scores checked for addition errors (reviewers spot check > 25% of examinations)	<u>✓</u>	<u>✓</u>	<u>MEB</u>
3. Grading for all borderline cases (80% +/- 2%) reviewed in detail	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
4. All other failing examinations checked to ensure that grades are justified	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
5. Performance on missed questions checked for training deficiencies and wording problems; evaluate validity of questions missed by half or more of the applicants	<u>✓</u>	<u>✓</u>	<u>MEB</u>
Printed Name / Signature		Date	
a. Grader	<u>William J Spahr</u> 	<u>11-1-00</u>	
b. Facility Reviewer(*)	<u>John NEYHART</u> 	<u>11-2-00</u>	
c. NRC Chief Examiner (*)	<u>Michael E. Bully</u>  / <u>Michael E. Bully Sr.</u> 	<u>11/2/00</u>	
d. NRC Supervisor (*)	<u>Roy J. Canino</u> 	<u>11/2/00</u>	
(*) The facility reviewer's signature is not applicable for examinations graded by the NRC; two independent NRC reviews are required.			

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c. NRC Chief Examiner (*)	<u>Michael E. Bielby Sr</u> / <u>Michael E. Bielby Sr</u>	<u>11/27/00</u>	
d. NRC Supervisor (*)	<u>Roy J. Caniano</u> <u>[Signature]</u>	<u>11/27/00</u>	
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**U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination****Applicant Information**

Name: MASTER EXAMINATION	Region: III
Date: November 1, 2000	Facility/Unit: Braidwood Units 1 and 2
License Level: RO	Reactor Type: W
Start Time:	Finish Time:

Instructions

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

Applicant Certification

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

Applicant's Signature

Results

Examination Value _____ Points

Applicant's Score _____ Points

Applicant's Grade _____ Percent

Reactor Operator Examination

1. Surveillance 1BwOSR 3.7.5.4-1 "Unit One Train A Auxiliary Feedwater Valve Emergency Actuation Signal Verification Test" is being performed. The personnel performing the surveillance are stationed at the Main Control Room, Aux. Electrical Room and the AF Pump Area.

In accordance with 1BwAP 390-1 "Operating Department Surveillance Program" how are operator actions directed while performing the surveillance?

- a. US directs operator actions for the surveillance and will inform the NSO of any changes in the status of plant evolutions.
 - b. Assigned management person (other than shift operations) will provide direction to the operators and will directly inform the US of the status of plant evolutions.
 - c. NSO directs the operator's actions for the surveillance and is directly informed of the status of plant evolutions.
 - d. Operator at the AF pump area is in charge of actions being performed and will inform the Unit Supervisor of any changes in the status of plant evolutions.
2. In accordance with OP-AA-101-110, "Reactivity Management Controls," which of the following NON-LICENSED individuals can manipulate the controls of the reactor?

Under the direct supervision of the Reactor Operator,

- a. an individual that is enrolled in an approved training program.
 - b. a System Engineer during surveillance testing.
 - c. a Non-Licensed Operator during surveillance testing.
 - d. an individual under the direct supervision of the Shift Manager.
3. Per Technical Specification Definitions, a MODE is determined by power level
- a. core reactivity, and average RCS temperature.
 - b. core reactivity, and auctioneered high RCS temperature.
 - c. decay heat, and average RCS temperature.
 - d. decay heat, and auctioneered high RCS temperature.

Reactor Operator Examination

4. Mechanical Maintenance has completed work on the 1B SI pump bearings and the pump is ready to be tested. The OOS is in the process of being cleared when it is discovered that the Personnel Protection Card has not been removed. All work is complete, but the lead worker has left the site and cannot be reached.

Who can authorize the removal of the Personnel Protection Card?

- a. Shift Manager (SM).
 - b. Unit Supervisor (US).
 - c. Work Control Supervisor.
 - d. Holder releasing the OOS.
5. Which of the following is a responsibility of the NSO during refueling operations in the main control room?
- a. Checking source range counts while a fuel assembly is being placed in the core.
 - b. Verifying proper operation of the Containment Evacuation alarm shiftly.
 - c. Maintaining a 1/M plot while reloading fuel during a core shuffle.
 - d. Updating the Control Room tag board per the Nuclear Component Transfer List shiftly.
6. Concerning 1BwGP 100-2, "Plant Startup," Limitations and Actions, the overlap of the Rod Control Banks shall be
(Assume current fuel cycle)
- a. 113 steps.
 - b. 115 steps.
 - c. 116 steps.
 - d. 118 steps.

Reactor Operator Examination

7. An operator received radiation exposures at BOTH Braidwood and LaSalle Stations during the year.

The exposure record to date this year is:

	Braidwood	LaSalle
- Deep Dose Equivalent (DDE)	180 mrem	40 mrem
- Lens Dose Equivalent (LDE)	10 mrem	5 mrem
- Committed Effective Dose Equivalent (CEDE)	105 mrem	0 mrem
- Shallow Dose Equivalent (SDE)	10 mrem	10 mrem
-Committed Dose Equivalent (CDE)	20 mrem	0 mrem

The operator at Braidwood Station has been requested to work in an area where the known radiation rate is 160 mR/hr. The source of the radiation is a nearby HOT SPOT inside a pipe trap where crud has collected and has been determined to be totally gamma radiation.

If the work task takes 30 minutes to complete, what is the individual's Total Effective Dose Equivalent (TEDE) for the year?

- a. 365 mrem
 - b. 405 mrem
 - c. 460 mrem
 - d. 485 mrem
8. What are the MINIMUM requirements for unconditional release of a wrench that has been used in a Radiological Posted Area (RPA)?

A survey indicates the wrench is...

- a. free of both smearable and fixed contamination.
- b. free of smearable contamination but is allowed up to 1000 dpm/100cm² fixed contamination.
- c. allowed up to 20 dpm/100cm² smearable contamination and is allowed up to 5000 dpm/100cm² fixed contamination.
- d. allowed up to 100 dpm/100cm² of either smearable or fixed contamination.

Reactor Operator Examination

9. Given the following plant conditions:

- Unit 1 is at 100% power.
- Unit 2 is at 100% power.
- OPR09J "CC HX Outlet Unit 0 Radiation Monitor" is in HIGH Alarm.
- A confirmed High Alarm has been determined by chemistry.
- The 0 CC HX has been subsequently isolated.

The crew should verify...

- a. Only 1CC017 is closed and enter the LCOAR for Unit 1.
- b. Only 2CC017 is closed and enter the LCOAR for Unit 2.
- c. Both 1CC017 and 2CC017 are closed and enter the LCOAR for both units.
- d. Both 1CC017 and 2CC017 are closed and do not enter a LCOAR.

10. An automatic reactor trip has occurred requiring entry to BwEP-0, REACTOR TRIP OR SAFETY INJECTION. During performance of Step 4, the operator has determined that SI has NOT actuated.

What is the NEXT action required of the operator?

- a. Manually actuate SI.
- b. Transition to 1BwEP ES-0.1, "REACTOR TRIP RESPONSE."
- c. Proceed with Step 5 of BwEP 0.
- d. Check if SI is required.

11. As discussed in BwAP 340-1, "Use of Procedures for Operating Department," the required operator action while implementing a Critical Safety Function would be to suspend...

- a. a lower priority RED BwFR to address a higher priority ORANGE condition.
- b. a higher priority ORANGE BwFR to address a lower priority RED condition.
- c. the Status Tree pass prior to completion to address an ORANGE condition.
- d. BwCA-0.0, "Loss of All AC Power."

Reactor Operator Examination

12. The following plant conditions exist:

- Unit 2 is in the process of starting up from a refueling outage.
- Reactor power is at 3% and has been stabilized to perform a power history surveillance.
- Indicated intermediate range start up rate is 0 dpm.

A loss of the Unit 2 station auxiliary transformer occurs.

The Unit Supervisor directs a reactor trip.

The reactor operator attempts to trip the reactor at 2PM05J and 2PM06J with no results.

The Unit Supervisor has entered 2BwEP-0 and is at Step 1 RNO.

The next procedure action will be to...

- continue with 2BwEP-0, Step 2.
- transition to 2BwCA-0.0, "Loss of All AC Power."
- transition to 2BwFR-S.1, "Response to Nuclear Power Generation/ATWS."
- transition to 2BwOA ELEC-3, "Loss of 4KV ESF Bus."

13. The following alarms have actuated:

- Unit Two Area Fire
- CO2 Storage Tank Trouble
- On ~~1~~²PM09J, the Zone Light for the 2B DG Room is illuminated

The fire brigade has been dispatched.

The fire brigade can expect CO2 actuation in the...

- 2B DG Room ONLY.
- 2B DG Day Tank Room ONLY.
- 2B DG Room and 2B DG Day Tank Room.
- NO actuation due to low CO2 Storage Tank Pressure.

Reactor Operator Examination

14. The following plant conditions exist:

- | | |
|---|---------|
| - Rod D-4 rod bottom light | LIT |
| - PWR RANGE FLUX RATE RX TRIP ALERT annunciator | LIT |
| - Reactor Power | 95% |
| - ROD CONTROL URGENT FAILURE annunciator | NOT LIT |
| - 1BwOA ROD-3 "Dropped or Misaligned Rod" has been entered. | |

While the crew is taking data for the dropped rod per step 7 of 1BwOA ROD-3, the following indications occur:

- | | |
|----------------------------|-----|
| - Rod D-8 rod bottom light | LIT |
|----------------------------|-----|

Which of the following describes the action required?

- Reset rate trip and perform dropped rod recovery per 1BwOA ROD-3.
- Trip the reactor and enter 1BwEP-0.
- Restore Tave/Tref, then calculate QPTR.
- Perform SDM surveillance and reduce reactor power to less than 70%

15. Given the following plant conditions on Unit 1:

- 80% reactor power.
- CBD is 175 steps.
- Core Age is 5200 EFPH.
- RCS Tave is 575°F.
- RCS Boron Concentration is 600 ppm.

What will RCS Tave be following a withdrawal of CBD to 200 steps? Assume new stable plant conditions exist.

- 576.5°F
- 578.5°F
- 580.5°F
- 581.5°F

Reactor Operator Examination

16. Given the following plant conditions on Unit 1:

- The plant is operating at 75% power with normal lineup for performing a calorimetric.
- During the calorimetric, the NSO is in the process of adjusting N-44 when a turbine runback occurs.
- 1PT-505, turbine first stage impulse chamber pressure, fails high when the turbine runback.
- Tavg is 584°F and increasing.

Based on these conditions, the NSO should ...

- a. Drive rods in manual until rod speed drops below 48 steps/min, then switch to AUTO until temperature is restored.
- b. Drive rods in manual and continuously insert rods until temperature is restored.
- c. Allow automatic insertion until rod speed drops below 48 steps/min, then insert rods in manual until temperature is restored.
- d. Allow automatic insertion until rod speed drops below 64 steps/min, then insert rods in manual until temperature is restored.

17. The following plant conditions exist during a small-break LOCA:

- Core exit TC's read approximately 532°F
- RCS pressure is 885 psig
- S/G levels are 25% narrow range
- Steam pressure is 1092 psig
- RCS wide range cold leg temperatures are all 525°F

Based on the above conditions, the RCS is ...

- a. saturated. Decreasing RCS pressure will aid in establishing subcooling.
- b. subcooled. Increasing S/G pressure will aid in increasing subcooling.
- c. subcooled. Decreasing RCS pressure will aid in increasing subcooling.
- d. saturated. Decreasing S/G pressure will aid in establishing subcooling.

Reactor Operator Examination

18. Given the following plant conditions on Unit 2:

- Mode 1
- 2A and Unit 0 CC pumps are OOS
- A fault occurs de-energizing ESF Bus 242

Which of the following actions must occur for the above plant conditions?

- a. Trip the reactor when CC heat exchanger outlet temperature is 105°F.
- b. Trip the reactor when RCP lower radial bearing temperature is 205°F.
- c. Trip the reactor when RCP upper motor bearing temperature is 195°F.
- d. No reactor trip is required, CC temperatures should remain constant.

19. The following conditions exist on Unit 1:

- Reactor power 36%
- Pzr pressure 2235 psig
- Pzr level 35%

RCP 1A breaker trips due to sensed undervoltage from bus 157. What is expected as a result of the trip of the RCP?

- a. The reactor will automatically trip due to the open RCP breaker.
- b. The reactor will automatically trip due to RCS loop low flow condition.
- c. The reactor must be manually tripped by the operator.
- d. A normal plant shutdown will be initiated.

Reactor Operator Examination

20. The following plant conditions exist:

- | | |
|----------------|----------------------|
| - Reactor | Tripped |
| - All RCPs | Running |
| - PZR level | 48% increasing |
| - RCS pressure | 1700 psig decreasing |

Which of the following leak locations is consistent with the plant conditions above?

- Failure of charging header connection to the RCS.
- Weld failure on pressurizer liquid space sample line.
- Failure of pressurizer PORV in an intermediate position.
- Weld failure on RCP B discharge piping.

21. The following plant conditions exist on Unit 1:

- 100% power
- RCS Tave is 582°F
- PZR Pressure is 2235 psig

All systems were operating normally in Automatic when the 1A CV pump trips. Which of the following actions are required per BWAR 1-9-A3, "CHG PUMP TRIP?"

- Place 1CV121, "Cent Chg Pumps Flow Cntrl Vlv", in manual and close, then start 1B CV pump.
- Verify suction source, then start 1B CV pump.
- Isolate letdown, then start 1B CV pump.
- Close 1HCV182, "Chg Hdr Back Press Cntrl Vlv", then start 1B CV pump.

Reactor Operator Examination

22. The following plant conditions exist on Units 1 and 2:

- Unit 1 is in Mode 5
- 1A RH pump is running supplying S/D Cooling
- 1B DG is OOS for maintenance
- Unit 2 is in Mode 6 for a Refueling Outage
- Unit 2 SATs are OOS for repairs
- 2A RH pump is running supplying S/D Cooling
- Unit 2 ESF Busses are being supplied by Unit 1

Annunciator 1-20-C3, "SAT 142-1 SUDDEN PRESS", actuates concurrent with an overcurrent condition on Bkr 1412.

Concerning the RH systems, what method would the control room operators use to remove decay heat?

Unit 1	Unit 2
a. Steam SGs	Steam SGs
b. Bleed and Feed	Steam SGs
c. Start an RH pump	Bleed and Feed
d. Steam SGs	Start an RH pump

23. What are the parameters and values used by the operator to ensure the temperature difference between the PZR and the spray fluid are within the specified limit(s) in the PRESSURE AND TEMPERATURE LIMIT REPORT when initiating PZR spray?

For normal spray, the difference between ...

- a. RCS hot leg loop temperature and PZR vapor space temperature limit is 50°F, and for aux spray, the difference between Regenerative Hx charging inlet temperature and PZR vapor space limit is 320°F.
- b. RCS cold leg loop temperature and PZR vapor space temperature limit is 50°F, and for aux spray, the difference between Regenerative Hx charging outlet temperature and PZR vapor space limit is 320°F.
- c. RCS hot leg loop temperature and PZR vapor space temperature limit is 320°F, and for aux spray, the difference between Regenerative Hx charging inlet temperature and PZR vapor space limit is 320°F.
- d. RCS cold leg loop temperature and PZR vapor space temperature limit is 320°F, and for aux spray, the difference between Regenerative Hx charging outlet temperature and PZR vapor space limit is 320°F.

Reactor Operator Examination

24. The unit is at 100% power, steady state, NOP/NOT. The Pressurizer Pressure Master Controller setpoint fails to 2185 psig. Assume a step change in the setpoint and assume that pressurizer pressure control remains in automatic.

Which of the following is the immediate automatic response of the system?

- a. Spray valves open, Variable Heaters deenergize
- b. PORV 455A opens, Spray valves open, Variable Heaters energize.
- c. Spray valves open, Variable Heaters energize.
- d. Spray valves close, Variable Heaters deenergize.

25. Which of the following Reactor Protection System Trips protects against DNB accidents?

- a. IR High Flux
- b. High Pressurizer Pressure
- c. High Pressurizer Level
- d. Power Range High Negative Rate

26. The Status light for 1SI8801B is DARK following a SI actuation. 1SI8801B is...

- a. FULL OPEN and is NOT in its required safeguards position.
- b. CLOSED and is NOT in its required safeguards position.
- c. FULL OPEN and is in its required safeguards position.
- d. CLOSED and is in its required safeguards position.

Reactor Operator Examination

27. A normal Unit 1 heatup is in progress per 1BwGP 100-1 with the following plant conditions:

-RCS pressure	1850 psig
-RCS pressurization rate	15 psig/min
-RCS temperature	485°F
-RCS heat up rate	10°F/hr
-S/G pressure	575 psig

If the current trend continues, which of the following occurs FIRST?

- a. MSIVs close.
- b. PZR PORV opens.
- c. Lowest setpoint S/G safety valve opens.
- d. First group of steam dumps throttle open.

28. Rods are being withdrawn in manual during a reactor startup, with all systems operable.

For the Control Banks, which of the following describes the status of the DRPI rod bottom lights at the moment the ROD AT BOTTOM annunciator alarm clears?

- a. Banks A, B, C, & D -- OFF.
- b. Banks A, B, C, & D -- ON.
- c. Banks A, B, C -- OFF; Bank D -- ON.
- d. Bank A -- OFF; Banks B, C, & D -- ON.

29. Which of the following components is being DIRECTLY adjusted by the gain adjust at the NI panel potentiometer following a calorimetric calibration?

- a. Summing and level amplifier
- b. Detector output current
- c. Upper and Lower Detector Averaging Circuit
- d. Detector high voltage power supply

Reactor Operator Examination

30. A plant start-up is in progress. The P-10 permissive light has just ~~come "ON"~~
gone "OFF,"
No operator actions have been taken.

Which of the following will result in an automatic reactor trip?

- a. Trip of one RCP.
 - b. Power range channel N41 fails HIGH.
 - c. Intermediate Range channel N35 fails HIGH.
 - d. The NSO places the Block/Reset Switch for SR channel 31 to the "Reset" position.
31. Which of the following is correct for an OPEN in a RVLIS or CETC thermocouple after steady state conditions are reached?
- a. RVLIS will indicate core uncover.
 - b. Subcooling Margin Monitor will indicate increased subcooling.
 - c. Control Board indication for the affected thermocouple will indicate less than 35°F.
 - d. Control Board indication for the affected thermocouple will indicate greater than 2300°F.

Reactor Operator Examination

32. Given the following plant conditions on Unit 1:

- 100% power.
- Train A CETC power supply (MCC 131x1 ckt15) has been deenergized for breaker replacement.
- Train B CETC has only 10 thermocouples operable which are currently indicating:
 - 1-610°F 6-613°F
 - 2-610°F 7-612°F
 - 3-613°F 8-612°F
 - 4-640°F 9-611°F
 - 5-613°F 10-613°F
- MCB display for train B CETC indicates 615°F

CETC #4 fails high.

MCB temperature would indicate

- a. 612°F
- b. 615°F
- c. 731°F
- d. 781°F

33. Given the following Unit 2 conditions:

- 2A and 2C Reactor Containment Fan Coolers (RCFC) are operating in HIGH speed.
- 2B and 2D RCFCs are stopped and in standby.
- Normal cooling water lineup for the RCFCs exists.

What will be the status of the RCFCs 15 seconds after an SI signal occurs concurrent with a loss of offsite power?

- a. Only 2A and 2B RCFCs running in HIGH speed.
- b. Only 2B and 2D RCFCs running in LOW speed.
- c. ALL RCFCs running in LOW speed.
- d. NO RCFCs are running.

Reactor Operator Examination

34. The plant has just tripped from 100% power. Which of the following will result in the RCFCs automatically shifting to low speed?
- a. Two channels of containment pressure reading 3.5 psig.
 - b. Two channels of pressurizer pressure reading 1880 psig.
 - c. Two channels of containment temperature reading 125°F.
 - d. Two undervoltage conditions sensed on the 6.9 KV buses.
35. During initial actuation of the Containment Spray System during a LOCA, radiation levels in the RWST are expected to....
- a. increase due to spray add tank recirculation to the RWST.
 - b. increase due to containment recirc. sump recirculation to the RWST.
 - c. stay the same due to NO recirculation aligned to the RWST.
 - d. stay the same due to spray add tank recirculation to the RWST.
36. A fire has occurred in the 2B Containment Charcoal Filter Unit. Deluge is actuated at ...
- a. 0PM02J in the Main Control Room.
 - b. 1PM09J, Fire Panel in the Main Control Room.
 - c. 2B Containment Charcoal Filter Unit.
 - d. 2VP01J on 426' Electrical Penetration Area.

Reactor Operator Examination

37. The following plant conditions exist:

- A LOCA has occurred on Unit 1
- E-0 has been completed and the crew has transitioned to E-1
- From E-1 the crew transitioned to FR-C.1
- The Post-LOCA Purge Exhaust Fan is de-energized due to an electrical fault on Bus 134V4.

Which of the following containment hydrogen concentrations is the MAXIMUM concentration which the Hydrogen Recombiners may be placed in service WITHOUT CONSULTATION WITH THE TSC?

- a. 0.5%
- b. 4.0%
- c. 6.0%
- d. 8.0%

38. The following conditions exist:

- Unit 1 is at 100% power
- Unit 2 is currently off loading fuel to the Spent Fuel Pool
- Current Spent Fuel Pool temperature is 105°F
- 1FC01P "SFP Cooling Pump" is OOS for maintenance
- 2FC01P "SFP Cooling Pump" was running and tripped for unknown reasons

Per 0BWOA REFUEL-3, which of the following actions should take place:

- a. Start one FHB Charcoal Booster Fan and two Aux Building Charcoal Booster Fans.
- b. Align a RWST to the SFP and start one Aux Building Charcoal Booster Fan.
- c. Align Recycle Hold Up Tank to the SFP.
- d. Place the Skimmer Loop in Service.

Reactor Operator Examination

39. The plant is operating at 100% power when the Controlling S/G Level Channel on 'A' S/G fails to 100%.

If no operator action is taken, what is the expected plant response?

- a. Feedwater flow to 'A' S/G will INITIALLY INCREASE, then DECREASE causing S/G level to STABILIZE at a level HIGHER THAN PROGRAM.
 - b. Feedwater flow to 'A' S/G will INITIALLY DECREASE, then INCREASE causing S/G level to STABILIZE at a level LOWER THAN PROGRAM.
 - c. Reactor trip will occur on Lo-Lo S/G level.
 - d. Reactor trip will occur due to turbine trip.
40. Which of the following will close the MSIVs?
- a. 3.4 psig Cnmt pressure on 2/3 channels.
 - b. 640 psig steam line pressure > P-11 on 1/3 channels on 1/4 lines.
 - c. -100 psi/50sec < P-11 with SI blocked on 1/3 channels on 1/4 lines.
 - d. 8.2 psig Cnmt pressure on 2/3 channels.
41. All steam generator pressures increase following a transient event. Steam generator pressures are being maintained by all twenty steam generator safety valves. The LOWEST approximate discharge pressure of the MFW pumps necessary to provide flow to the steam generators would be...
- a. 1115 psig.
 - b. 1175 psig.
 - c. 1205 psig.
 - d. 1235 psig.

Reactor Operator Examination

42. The following conditions exist on Unit 2:

- Reactor Power is at 50%, steady state.
- The Steam Dumps are in the Tave MODE and in Automatic
- The Reactor Operator adjusts the steam dump controller potentiometer from 7.28 to 8.00

Which of the following is a correct plant effect of the potentiometer change?

Fuel Cladding Temperature...

- a. increases due to increased steam demand.
- b. decreases due to a decrease in steam demand.
- c. remains constant due to the potentiometer only in circuit during Manual Mode.
- d. remains constant due to the potentiometer only in the circuit during STEAM PRESSURE Mode.

43. Unit 2 is operating at 50% power ramping up to full power. Main Condenser pressure is slowly rising. Pressure is currently at 5"HgA and rising at 0.5"/min.

In 6 minutes the crew should ...

- a. Initiate a Turbine Runback.
- b. Increase turbine power to 620 MW.
- c. Manually trip the reactor and go to 2BwEP-0.
- d. Select MW OUT and ramp down @ 0.5 MW/min.

44. What is the SEQUENCE that occurs when a Main Feed pump LOW NPSH signal is actuated?

- a. The CD 152 valve (CD pump recirc) opens, the CD/CB aux oil pump starts, the CD/CB pump starts.
- b. The CD/CB pump starts then the CD 152 valve (CD pump recirc) opens.
- c. The CD 152 valve (CD pump recirc) closes, the CD/CB aux oil pump starts, the CD/CB pump starts.
- d. The CD/CB pump starts then the CD 152 valve (CD pump recirc) closes.

Reactor Operator Examination

45. Per Tech Specs, which of the following is a correct listing of Technical Specification Feedwater Isolation Valves associated with the Unit 2 Main Feed Water System?

2FW009, "FW Isolation Valve",
2FW035, "SG Feedwater Tempering Isolation Valve"
2FW510, "FW Regulating Valve",
2FW510A, "FW Regulating Bypass Valve",

AND...

- a. 2FW006A, "S/G FW Shutoff VLV" and 2FW043, "SG FWIV Bypass Isolation Valve."
- b. 2FW006A, "S/G FW Shutoff VLV" and 2FW046, "S/G FWIV Byp Flow Cont."
- c. 2FW034, "SG Tempering Flow Control Valve" and 2FW046, "S/G FWIV Byp Flow Cont."
- d. 2FW034, "SG Tempering Flow Control Valve" and 2FW043, "SG FWIV Bypass Isolation Valve."

46. The following conditions exist on Unit 1:

- Reactor power is 100%
- All systems are normal
- 1FT-512 is selected for steam flow input into SGWLC for S/G 1A

With NO OPERATOR ACTION, what is the effect of the pressure transmitter associated with FT-512 failing low?

1A S/G level will decrease, feed pump speed ...

- a. will decrease, and S/G level will decrease below the LO-2 setpoint.
- b. is unaffected, and S/G level will return to normal.
- c. will increase, and S/G level will return to normal.
- d. is unaffected, and S/G level will decrease below LO-2 setpoint.

Reactor Operator Examination

47. A Unit 1 RCS cooldown is in progress with the A auxiliary feedwater pump maintaining level in all steam generators. Instrument bus 111 is deenergized.

Auxiliary feedwater system flow control valves (1AF005a-d)

- a. Fail as is.
 - b. Fail Open.
 - c. Fail Closed.
 - d. Are not affected.
48. Which of the following will result in a shift of Unit 1 Auxiliary Feedwater (AF) System suction from the Condensate Storage Tank to the Essential Service Water System while in Mode 3 at NOT/NOP?

AF pump suction pressure of ...

- a. 17 psia coincident with a loss of offsite power.
 - b. 19 psia coincident with Lo-Lo level in ALL steam generators.
 - c. 17 psia coincident with Pressurizer pressure of 1850 psig.
 - d. 19 psia coincident with a phase B isolation.
49. A Reactor Trip has just occurred on Unit 1. Following the main generator trip, Automatic Bus Transfer failed to operate for Busses 156 and 157. Which ONE of the following describes the 6.9 KV Bus AND RCP status?
- a. All Feed and Load Breakers Open on Busses 156 and 157.
Only the 1A and 1B RCPs trip due to Bus Undervoltage.
 - b. All Load Breakers Open on Busses 156 and 157.
Only the 1A and 1B RCPs trip due to Bus Underfrequency.
 - c. All Load Breakers Open on Busses 156 and 157.
All RCPs trip due to Bus Undervoltage.
 - d. All Feed and Load Breakers Open on Busses 156 and 157.
All RCPs trip due to Bus Underfrequency.

Reactor Operator Examination

50. During operation at power with the Reactor Trip Breakers closed, a LOSS of 125 VDC control power to one of the Reactor Trip Breakers occurs.

Which of the following describes how that Reactor Trip Breaker will respond?

- a. Trips OPEN due to loss of power to the SHUNT coil.
- b. Trips OPEN due to loss of power to the UNDERVOLTAGE coil.
- c. Is NOT capable of tripping on a SHUNT trip.
- d. Is NOT capable of tripping on an UNDERVOLTAGE trip.

51. Given the following conditions:

- Unit 2 is in MODE 3 at 500°F
- The MCB indication for DC Bus 211 indicates 0 volts
- Pressurizer Spray Valve 2RY455B is stuck open
- RCS pressure is lowering

Which of the following will stop the RCS depressurization?

- a. Energize all Pressurizer heaters.
- b. Trip the 2D RCP locally at its breaker.
- c. Isolate Instrument Air to Containment.
- d. Secure the 2C RCP from the Main Control Room.

52. The 1A DG is not running.

Which of the following combinations of Diesel Generator Air Receiver pressures is sufficient to maintain the 1A Diesel Generator OPERABLE per BwOP DG-1 "Diesel Generator Alignment to Standby Condition?"

	Receiver A (PSIG)	Receiver B (PSIG)
a.	170	100
b.	0	240
c.	170	170
d.	0	170

Reactor Operator Examination

53. The 2A Diesel Generator is NOT running. The lead Fuel Oil Transfer pump starts in response to low level in the Fuel Oil Day Tank. This pump fails to develop adequate discharge pressure but continues to run.

The second Fuel Oil Transfer pump will ...

- a. NOT start because it is not selected to start on low level.
- b. NOT start unless DG engine speed reaches 100 RPM.
- c. start if in AUTO.
- d. start immediately if the running pump is placed in Pull Out.

54. The following plant conditions exist:

- A high flow liquid radioactive waste discharge is in progress IAW BwOP WX-501T1, "Liquid Radioactive Tank 0WX01T Release Form."
- Circulating water blowdown flow in the release header indicates 6500 gpm.

The operator should...

- a. Increase circulating water blowdown flow to greater than 8000 gpm.
- b. Verify 0AOV WX-353, Release Tank Outlet, is closed and ensure the release is terminated.
- c. Verify the release tank discharge high radiation header alarm is NOT lit.
- d. Check the high flow release rate less than the calculated value.

55. The waste gas discharge control modulating valve (RCV 014)....

- a. must be opened by first dialing the controller to 50%, then placing the open control switch to the OPEN position.
- b. will close automatically and an alarm will be activated when vent stack activity exceeds the high alarm setpoint on 0PR2J.
- c. controls pressure at 1.3 psig from a gas decay tank to the hold up tanks.
- d. maintains a constant downstream pressure to ensure a constant discharge flowrate.

Reactor Operator Examination

56. When aligned for normal operation (BwOP GW-1), what is the response to high pressure sensed at the in-service Gas Decay Tank?

An alarm is generated that...

- a. alerts the operator to manually place a standby Gas Decay Tank in service.
 - b. indicates auto swap of in-service Gas Decay Tank to selected standby Gas Decay Tank, and alerts the operator to align another standby Gas Decay Tank.
 - c. indicates auto swap of in-service Gas Decay Tank to selected standby Gas Decay Tank and auto swap of standby Gas Decay Tank to new standby Gas Decay Tank.
 - d. shuts down the Waste Gas Compressors and isolates the in-service Gas Decay Tank.
57. The Fuel Handling Incident FHB Monitors 0AR055/56 use which of the following detector types and detect which types of radiation?
- a. Geiger-Mueller (G-M) tube, gamma and beta
 - b. Geiger-Mueller (G-M) tube, gamma and alpha
 - c. Compensated Ion Chamber, gamma and beta
 - d. Uncompensated Ion Chamber, gamma and alpha
58. The Main Control Room Outside Air Intake Radiation Monitors (gaseous) are separated into Train A and Train B (0RE-PR031B and 0RE-PR032B for Train A and 0RE-PR033B and 0RE-PR034B for Train B).

Which of the following is correct regarding the Main Control Room Outside Air Inlet Radiation Monitors (gaseous)?

The MINIMUM conditions to initiate automatic actions are...

- a. 0RE-PR031B and 0RE-PR034B are in the OPERATE FAILURE condition.
- b. 0RE-PR031B and 0RE-PR033B are in the OPERATE FAILURE condition.
- c. 0RE-PR031B in HIGH alarm.
- d. 0RE-PR031B and 0RE-PR033B are in HIGH alarm.

Reactor Operator Examination

59. The unit is presently at 90% and shutting down due to a loss of Instrument Bus 114. All systems are in automatic.

A Loss of Coolant Accident (LOCA) occurs. Which of the following statements best describes response of the 1B SX pump?

- a. Will automatically start on low system pressure.
- b. Will have to be manually started.
- c. Cannot be started from the control room.
- d. Will automatically start on a Manual SI actuation.

60. Given the following Unit 1 conditions:

- Reactor power - 100%
- 1B D/G surveillance test in progress - full load
- 1B SX pump - running
- 1A SX pump - available

The 1B SX pump tripped due to electrical problem with Bus 142. The US directs a start of the 1A SX pump.

What is the SEQUENCE for starting the 1A SX pump in these conditions?

The operator will ...

- a. take the 1A SX pump switch to START and release. The pump will start after a delay.
- b. take the 1A SX pump switch to START and hold until the pump starts.
- c. start the auxiliary oil pump, take the 1A SX pump switch to START and release. The pump will immediately start.
- d. start the auxiliary oil pump, wait 5 seconds, take the 1A SX pump switch to START and hold until the pump starts.

Reactor Operator Examination

61. Which of the following would occur on a small tube leak in the Component Cooling Water (CC) Heat Exchanger?
- a. Automatic CC System makeup from the Primary Water System only would occur, providing the necessary level for CC pump operation.
 - b. CC System liquid inventory would increase, thus increasing the CC flowrate to components cooled by the CC System.
 - c. CC would leak into the Essential Service Water (SX) System, potentially contaminating the SX System.
 - d. CC surge tank level would increase, which would cause water to overflow through the vent valve.
62. When does the STBY station air compressor start?
- a. 85 psig.
 - b. 90 psig.
 - c. 95 psig.
 - d. 105 psig.

Reactor Operator Examination

63. Unit 1 is currently in Mode 4.

1A RH train is in service providing shutdown cooling.

RCS temp - 340°F

RCS pressure - 350 psig

Unit 2 is in Mode 1 at 100% power.

Equipment OOS for maintenance:

1B CW pump

"OC" WS pump

1A CC pump

U2 SA Compressor

A loss of the Unit 1 SAT occurs due to a sudden pressure actuation.

With NO operator action, Unit 1 will experience an uncontrolled _____ and Unit 2 will _____.

- | | |
|-------------|--------------------------|
| a. cooldown | trip on Lo-Lo S/G level. |
| b. heatup | not be affected |
| c. cooldown | not be affected |
| d. heatup | trip on Lo-Lo S/G level. |

64. The design of the Containment Equipment Hatch...

- a. is sized to allow reactor vessel head "O" ring passage.
- b. will allow only 2 personnel to enter/exit containment at one time.
- c. has a door at each end; one of which has been tested to ensure containment integrity during a design basis accident.
- d. is equipped with pneumatically interlocked inner and outer doors.

Reactor Operator Examination

65. Unit 1 is at 36% power, when a rapid drop in reactor power occurs and a rod bottom light (DRPI panel) appears for a rod in Control Bank A. The crew enters 1BwOA ROD-3, Dropped or Misaligned Rod, for determining, correcting, and recovering a dropped control rod.

Which of the following actions will actuate the ROD CONT URGENT FAILURE (Annun. 1-10-C6) alarm during the dropped rod recovery?

- a. Resetting Group 1A step counter to ZERO.
- b. Resetting Control Bank A P/A Converter to ZERO.
- c. Withdrawing the dropped rod to its bank position.
- d. Opening the Lift Coil Disconnect switches for the unaffected rods in CB "A".

66. Given the following Unit 1 conditions:

Reactor power is at 100% steady state

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Power range NIS	102%	103%	102%	102%
PZR pressure	1880 psig(455)	1910 psig(456)	2500 psig(457)	1905 psig(458)
PZR level	90%(459)	92%(460)	90%(461)	72%(462)
Tave	584°F	585°F	582°F	586°F
SG levels	43%(1A)	34%(1B)	89%(1C)	40%(1D)
(all S/G instruments for a S/G read the same level)				

What is the FIRST required action for these conditions?

- a. Verify a turbine runback is initiated.
- b. Reduce power to LESS THAN 100% indicated to ensure 8 hour average does NOT exceed 100% power.
- c. Trip the reactor and initiate actions of 1BwEP-0.
- d. Initiate a MANUAL Safety Injection and initiate actions of 1BwEP-0.

Reactor Operator Examination

67. A reactor trip has occurred due to a turbine trip from full power. Narrow range steam generator levels are off scale low.

Why does 1BwEP ES-0.1, Reactor Trip Response, instruct the operator to feed the steam generators at greater than 500 GPM?

- a. Enhance natural circulation.
- b. Provide an adequate heat sink for decay heat removal.
- c. Ensure the steam generator U-tubes remain "wet" preventing dry steam generators.
- d. Prevent the formation of steam in the steam generator feed ring.

68. The plant is operating at 100% power when a pressurizer safety valve inadvertently lifts. The PRT pressure is 20 psig.

Which of the following most closely approximates the tail pipe temperature of the open safety valve?

- a. 235°F
- b. 265°F
- c. 295°F
- d. 325°F

69. Given the following plant conditions on Unit 1:

- 100% power.
- RCP No. 1 SEAL LEAKOFF FLOW HIGH alarm is received.
- No. 2 seal leakoff high flow alarm has been PRINTED.
- RCP No. 1 seal leakoff recorder indication is offscale high on the HIGH range.

Which of the following has occurred and what action is indicated?

- a. The No. 1 and No. 2 seals have failed and a controlled reactor shutdown is required.
- b. The No. 2 seal has failed and continued monitoring of RCP conditions is required.
- c. The No. 1 seal has failed and an immediate reactor trip is required.
- d. The No. 2 and No. 3 seals have failed and continued monitoring of RCP conditions is required.

Reactor Operator Examination

70. The following plant conditions exist:

- Unit 1 40% reactor power steady state conditions
- Rod Control Automatic
- Letdown 75 gpm through 1A L/D Hx

Temperature Control Valve (1CC130A), CC flow control valve, repositions due to a loss of IA to the valve positioner. Which of the following describes the plant response to the event?

- a. 1TCV-129 opens bypassing flow around the demineralizers.
- b. Control rods step out due to a reduction in RCS temperature.
- c. Control rods step in due to rising RCS temperature.
- d. RCS temperature falls requiring dilution to restore temperature.

71. Which of the following valve combinations and flows for emergency boration are allowed in accordance with 1BWOA PRI-2, "Emergency Boration?"

- a. 1CV112B, VCT Outlet Isolation Valve FULL OPEN and 1CV121, Charging Line Flow Control Valve, FULL OPEN with maximum charging header flow.
- b. 1CV112C, VCT Outlet Isolation Valve, CLOSED, and 1CV8104, Emergency Boration Valve, FULL OPEN with maximum charging header flow.
- c. 1CV112D, RWST to Cent Chg Pump Suction Valve, FULL OPEN, and 1CV8485A, CV Pump Disch Valve THROTTLED to balance high head SI flow and Letdown flow.
- d. 1CV8104, Emergency Boration Valve, FULL OPEN, and 1CV8485A, CV Pump Disch Valve THROTTLED to balance high head SI flow and Letdown flow.

Reactor Operator Examination

72. Given the following plant conditions on Unit 1:

- Reactor power 75%
- PZR pressure control selected to 455/456
- Pressure channel 1PT-457 fails LOW

1BWOA INST-2 "Operation With A Failed Instrument Channel" is entered and the required actions for the failed channel are performed.

How is the PZR PORV operation affected with the failed channel Out of Service?

- a. ONLY PORV PCV-456 will NOT CLOSE, if OPEN in AUTO, when PZR pressure decreases to the PORV blocking signal.
- b. Neither PORV will CLOSE, if OPEN in AUTO, when PZR pressure decreases to the PORV blocking signal.
- c. ONLY PORV PCV-456 will NOT OPEN when PZR pressure increases to its OPEN setpoint.
- d. Neither PORV will OPEN when PZR pressure increases to their OPEN setpoint.

73. While performing the immediate actions of BwFR-S.1, "Response to Nuclear Power Generation/ATWS", the operator was directed to verify a turbine trip. Subsequently, in Step 8, the operator is again directed to verify a turbine trip. If the main turbine has not tripped at this point, the crew is directed to trip the main turbine locally.

Why wasn't the operator directed to trip the main turbine locally during the immediate actions of the procedure?

- a. Local operators are busy isolating the steam dumps.
- b. The main turbine can still be used to draw steam for RCS temperature control.
- c. The main turbine can still be used to maintain S/G water level due to no MFW pump trip.
- d. Local operator actions are more time consuming to initiate and complete.

Reactor Operator Examination

74. Refueling is in progress on Unit 2. RCS boron concentration has been verified to be 1990 ppm (two samples analyzed).

The crew is required to ...

- a. suspend core alterations and establish containment integrity.
- b. suspend core alterations and positive reactivity changes, and initiate boration.
- c. suspend core alterations and remove all personnel from the containment building.
- d. remove all personnel from the containment building, establish containment integrity, and initiate boration.

75. The following plant conditions exist:

- A fuel assembly has just been removed from the core.
- Immediately after initiating transit to the upender, the refueling cavity level is reported to be a foot below normal and dropping at a visible rate.

Which of the following is the preferred course of action?

- a. Stop the refuel movement at the current location in transit to the upender.
- b. Place the fuel assembly back into the reactor vessel.
- c. Place the fuel assembly in the upender and lower it to the horizontal position.
- d. Position the mast over the deepest part of the cavity and lower the assembly to the bottom.

Reactor Operator Examination

76. A SGTR has occurred on Unit 1. Current conditions are:

- RCS pressure 1350 psig
- RCS temperature (CETCs) 545° F
- SG pressures 930 psig (A) 1145 psig (B) 940 psig (C) 940 psig (D)
- SG 1B has been confirmed as the SG with the rupture.

While performing the steps of 1BwEP-3, "Steam Generator Tube Rupture", the Unit Supervisor found ALL available copies of the procedure had an illegible page. This page contained the required temperatures for determining RCS cooldown temperatures.

The US directs you to use the steam tables to determine the required RCS (core exit) temperature with an allowance of 50° F for subcooling.

The required core exit temperature after the RCS cooldown is ...

- a. 513°F
- b. 518°F
- c. 534°F
- d. 538°F

77. The following plant conditions exist:

- An initial plant startup is in progress, per 1BwGP 100-3, from a refueling outage.
- The reactor is initially at 13% power.
- The Main Turbine is at 600 rpm.
- Trips associated with Permissive P-10 have been blocked.
- Fouling of the circ water traveling screens has caused a reduction in condenser CW flow.
- Condenser vacuum decreases to indicate 7.0 inches Hg absolute.

Assuming no operator action, choose the statement below which describes the effect on the plant.

- a. The reactor will trip due to a turbine trip.
- b. The reactor will trip on NIS IR FLUX HI Setpoint.
- c. RCS temperature will increase until steam dumps actuate.
- d. RCS temperature will increase until Steam Generator PORVs actuate.

Reactor Operator Examination

78. While at 35% power, a main feed water regulating valve fails open causing the affected SG level to exceed the hi-hi level setpoint. The reactor trips; however, NO SG level drops below the LO-LO level setpoint. Assuming NO operator action is taken, how many AF pump Lube Oil Pumps will be running 1 minute after the trip?

- a. None.
- b. One.
- c. Two.
- d. Three.

79. Given the following plant conditions on Unit 1:

- Reactor power is 90%.
- RCS Tave is stable at 579°F on all 4 loops.
- RCS pressure is stable at 2235 psig.
- Containment Pressure is INCREASING.
- 1C SG Feed Flow is pegged HIGH.
- 1C SG Main FW Reg Valve is full OPEN.
- 1C SG pressure is STABLE.
- 1C SG level is DECREASING.

Which of the following events is in progress?

- a. Main FW Reg Valve failed OPEN.
- b. Feed Flow Indicator failed HIGH.
- c. Feed Line Break INSIDE Containment.
- d. Main Feed Pump trip.

80. Which of the following signals will cause the Radwaste Release Tank Pump (0WX53P) to trip?

- a. High radiation condition on OPR01J "Liquid Radwaste."
- b. Low flow from the Circ Water system.
- c. Low level of 16% in the Radwaste Release Tank.
- d. High level of 90% in the Regeneration Waste Drain Tank.

Reactor Operator Examination

81. A waste gas decay tank release is in progress. Which of the following malfunctions occurring during the release could result in a release outside of permitted limits assuming no operator action?
- a. Loss of instrument air to OGWRCV014 "Gas Decay Tank Vent Stack Effluent Isolation Valve."
 - b. Gas Decay Tank Cover Gas Pressure reaches .7 psig.
 - c. OPR02J "Waste Gas Processing Rad Monitor" fails low.
 - d. In service Gas Decay Tank pressure reaches 95 psig.

82. The following plant conditions exist:

0B Gas Decay Tank is now in service.
0E Gas Decay Tank is in Standby.
0A Gas Decay Tank was in service and is currently isolated.

Previously while the 0A Gas Decay Tank was in service, Chemistry reported that the curie content was 7×10^4 curies with a pressure of 88 psig. 0BwOA RAD-3 was entered and the 0A Gas Decay Tank was taken off-line and isolated.

Transferring the 0A Gas Decay Tank to another Gas Decay Tank is required until 0A Gas Decay Tank pressure is ...

- a. 47 psig.
 - b. 58 psig.
 - c. 62 psig.
 - d. 73 psig.
83. Per Tech Spec Basis regarding high containment pressure, which of the following events could lead to the highest pressure/leakage out of containment?
- a. Design Basis LOCA.
 - b. Design Basis Steam Line Break inside Containment.
 - c. Inadvertant Containment Spray Initiation.
 - d. Pressurizer vapor space LOCA.

Reactor Operator Examination

84. Which of the following is NOT a high level action of 1BwFR-Z.1, "Response to Containment High Pressure?"
- a. Verify containment isolation.
 - b. Verify containment heat removal.
 - c. Reduce heat input to containment.
 - d. Check for and isolate faulted steam generator.
85. 2BwFR-C.1, "Inadequate Core Cooling" must be entered if CETCs are greater than or equal to...
- a. 700°F ONLY.
 - b. 1200°F ONLY.
 - c. 700°F AND RCS Subcooling Unacceptable.
 - d. 1200°F AND RCS Subcooling Unacceptable.
86. The following plant conditions exist:

A reactor trip and loss of offsite power occurred.
Reactor power was initially at 100%.
Tavg is 531°F.
Tcold is at 527°F.
Thot is at 534°F.
Average of the ten (10) hottest CETC's is 538°F.
Pressurizer pressure is at 2185 psig.

Which of the following is the subcooling that currently exists?

- a. 92°F
- b. 102°F
- c. 111°F
- d. 121°F

Reactor Operator Examination

87. A Small Break LOCA occurred on Unit 2 resulting in a reactor trip/SI.
While performing the Immediate Actions of 2BwEP-0, the Main Turbine did not trip and the crew successfully performed ALL actions of the RNO for verifying a Turbine Trip.
From 2BwEP-0 the crew transitioned to 2BwEP-1.
At step 6 of 2BwEP-1, "Check if ECCS flow should be reduced" RCS pressure starts decreasing rapidly.
The crew notes steam flows on ALL 4 Steam Generators.
The crew transitions to 2BwEP ES-0.0 "Rediagnosis"
- From 2BwEP ES-0.0, the crew should transition to...
- a. 2BwEP-2, "Faulted Steam Generator Isolation."
 - b. 2BwCA-2.1, "Uncontrolled Depressurization of All SGs."
 - c. 2BwEP ES-1.1, "SI Termination."
 - d. 2BwEP-0, "Reactor Trip or Safety Injection."
88. Which of the following describes the methods in order of preference used in 1BwEP ES-1.2, "Post LOCA Cooldown and Depressurization" during the performance of step 10, Depressurize RCS to Refill PZR?
- a. One Pzr PORV, Normal Spray, Aux. Spray.
 - b. One Pzr PORV, Aux. Spray, Normal Spray.
 - c. Normal Spray, Aux. Spray, One Pzr PORV.
 - d. Normal Spray, One Pzr PORV, Aux. Spray.

Reactor Operator Examination

89. A Large Break LOCA has occurred on Unit 1 and a transition to 1BwEP-1, "Loss of Reactor or Secondary Coolant," has been made. Subsequently, 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation," was implemented. Currently, the operators are aligning the SI and CV pumps for Cold Leg Recirculation per Step 5. The STA reports a RED path in Heat Sink.

The proper course of action for the operator is to...

- a. immediately suspend 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation," and implement 1BwFR H.1, "Loss of Secondary Heat Sink."
- b. only complete aligning ECCS for Cold Leg Recirculation steps of 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation," and then implement 1BwFR H.1, "Loss of Secondary Heat Sink."
- c. complete all steps of 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation," and then implement 1BwFR H.1, "Loss of Secondary Heat Sink."
- d. immediately implement 1BwFR H.1, "Loss of Secondary Heat Sink," while concurrently aligning ECCS for Cold Leg Recirculation per 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation."

90. Unit 1 is in MODE 4 on RH cooldown with the following plant conditions:

RCS Temperature	340°F slowly lowering			
RCS pressure	300 psig lowering			
PZR level	42% lowering			
CNMT pressure	0.2 psig			
Alarm received for ECCS cubicle radiation (GRID 2)				
SG levels	42% (A)	40% (B)	43% (C)	40% (D)
SG pressures	115 psig (A)	115 psig (B)	115 psig (C)	115 psig (D)

What event is taking place?

- a. A steam leak has occurred inside CNMT.
- b. The Cold Overpressure system has actuated.
- c. Letdown line pressure control valve, 1PCV-131, has failed open.
- d. A LOCA has occurred on the suction of the RH pump.

Reactor Operator Examination

91. An SI Signal has been initiated due to a LOCA outside Containment.

Which of the following describes the lineup of the Control Room Ventilation System?

- a. Makeup Air Fan autostarts and Recirc Charcoal Absorber unisolates.
- b. Makeup Air Fan autostarts and Supply Fan trips.
- c. Makeup Air Fan trips and Normal intake from outside isolates.
- d. Makeup Air Fan trips and Purge Exhaust Damper opens.

92. The following conditions exist on Unit 2:

- Reactor power was 8% prior to the event below.
- A failure in the feedwater control system caused ONE S/G level to rise to 83%.
- The main turbine tripped.
- S/G levels have returned to their normal level range
- The Startup FW Pump is running

What are the minimum set of conditions that would have to be met to feed the S/Gs using the 2FW034s Feedwater Tempering Flow Control valves?

- a. The FW Isolation Aux Relays would have to be reset and 2FW035 Feedwater Tempering Isol valves opened.
- b. The reactor trip breakers would have to be cycled, the FW Isolation Aux Relays would have to be reset and 2FW035 Feedwater Tempering Isol valves opened.
- c. The FW Isolation Main Relays and Aux Relays would have to be reset and 2 FW035 Feedwater Tempering Isol valves opened.
- d. The reactor trip breakers would have to be cycled and FW Isolation Main Relays and Aux Relays reset and 2FW035 Feedwater Tempering Isol valves opened.

93. All reactor core heat removal systems have failed and the RCS temperature is increasing.

When core exit thermocouple temperatures are greater than 700°F...

- a. the DNBR decreases to less than 1.3.
- b. the core is superheated.
- c. RCP damage is prevalent.
- d. fuel cladding failure is prevalent.

Reactor Operator Examination

94. The following conditions exist on Unit 1:

- A natural circulation cooldown is in progress per 1BwEP ES-0.2 "Natural Circulation Cooldown."
- Pressurizer pressure is being controlled using Aux. Spray and Pzr heaters.
- As pressure is being lowered through 1300 psig, a rapid increase is noted in Pzr level.
- Charging and letdown are in manual and are balanced.

What action is required to be taken by the operators?

- a. Repressurize the RCS.
- b. Isolate the SI Accumulators.
- c. Increase the RCS cooldown rate.
- d. Place excess letdown in service.

95. Which of the following describes why it is important to run CRDM fans when performing a natural circulation cooldown?

- a. Provides the heat removal mechanism for the vessel head area.
- b. Aids in natural circulation flow through the RCS vessel head region.
- c. Prevents erratic indication of SR instrumentation.
- d. Aids in natural circulation flow through the RCS.

96. What are the MAXIMUM cooldown rates that apply for a cooldown from normal operating temperature for the RCS to 500°F in the following indicated procedures? (NOTE: all choices are applicable in any ONE hour period.)

1BwEP ES-0.3 "Natural Circulation Cooldown With Void In Vessel (With RVLIS)"

1BwEP ES-0.4 "Natural Circulation Cooldown With Void In Vessel (Without RVLIS)"

1BwEP ES-0.3 value	1BwEP ES-0.4 value
-----------------------	-----------------------

- | | |
|----------|-------|
| a. 50°F | 50°F |
| b. 50°F | 100°F |
| c. 100°F | 50°F |
| d. 100°F | 100°F |

Reactor Operator Examination

97. Unit 1 reactor tripped approximately 1 hour ago due to a large steam break inside containment. The crew is currently in 1BwEP ES-0.3, "Natural Circulation Cooldown with Steam Voids in Vessel (with RVLIS)". Pressurizer level is currently at 95%.

Per 1BwEP ES-0.3, PZR Level should be reduced to less than 90% by ...

- a. cycling PZR heaters and securing the RCS cooldown.
 - b. controlling charging and letdown.
 - c. closing PZR sprays and energizing PZR heaters.
 - d. ONLY establish maximum letdown.
98. Why are the S/Gs depressurized to less than 670 psig according to 1BwCA-1.1, "Loss of Emergency Coolant Recirculation"?
- a. To allow maximum AF flow to the S/Gs.
 - b. To ensure adequate subcooling for restart of the RCPs.
 - c. To set up conditions for controlled injection to the RCS from the accumulators.
 - d. To decrease RCS temperature and pressure which reduces break flow in a LOCA condition.
99. The NSO reports that the Spray Additive Tank low-2 level light has just been received as a result of a Containment spray system actuation during a steam line break. Containment Pressure is currently 24 psig. Which of the following is correct concerning this situation? (Assume CS Actuation signal has been RESET)
- a. Allow the Containment spray system to operate AS-IS until containment pressure is < 15 psig.
 - b. Manually shift the Containment spray system lineup to the post accident recirculation lineup.
 - c. Manually close the motor operated isolation valve between the eductor and the spray additive tank (1CS019A/B).
 - d. Stop all containment spray pumps until the spray additive tank is filled and vented per BwOP CS-3.

Reactor Operator Examination

100. Per 1BwFR-Z.2, "Respond to Containment Flooding," the MAXIMUM level of water in containment following a major accident is based upon the entire contents of the RCS, RWST,
- a. CST and SI accumulators.
 - b. SX and CC water.
 - c. SX and FP.
 - d. CC water and PW.

Reactor Operator Answer Key

- | | |
|-------|-------|
| 1. c | 26. b |
| 2. a | 27. a |
| 3. a | 28. d |
| 4. d | 29. a |
| 5. a | 30. c |
| 6. a | 31. d |
| 7. b | 32. a |
| 8. a | 33. d |
| 9. c | 34. a |
| 10. d | 35. c |
| 11. b | 36. d |
| 12. c | 37. b |
| 13. c | 38. a |
| 14. b | 39. c |
| 15. b | 40. d |
| 16. b | 41. d |
| 17. d | 42. d |
| 18. c | 43. c |
| 19. b | 44. c |
| 20. c | 45. d |
| 21. b | 46. a |
| 22. d | 47. c |
| 23. d | 48. a |
| 24. a | 49. a |
| 25. d | 50. c |

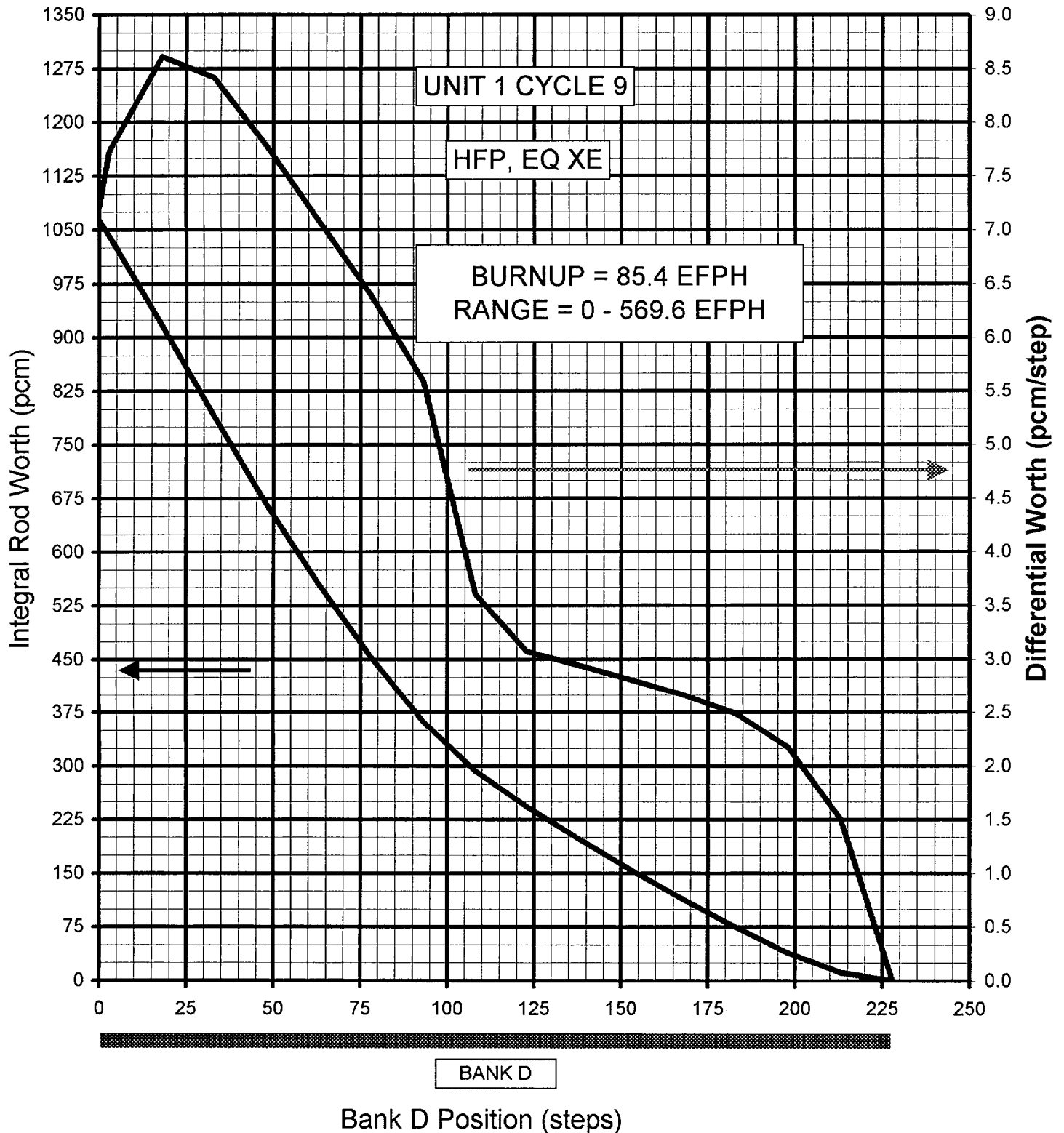
Reactor Operator Answer Key

51. b	76. a
52. b	77. d
53. a	78. a
54. b	79. c
55. b	80. c
56. b	81. c
57. a	82. b
58. c	83. a
59. b	84. c
60. b	85. b
61. c	86. c
62. d	87. b
63. d	88. d
64. a	89. b
65. c	90. d
66. c	91. a
67. b	92. a
68. b	93. b
69. c	94. a
70. c	95. a
71. c	96. c
72. c	97. b
73. d	98. c
74. b	99. c
75. b	100. a

REV. 51A	DECAY TANK HIGH ACTIVITY UNIT 0	OBWOA RAD-3
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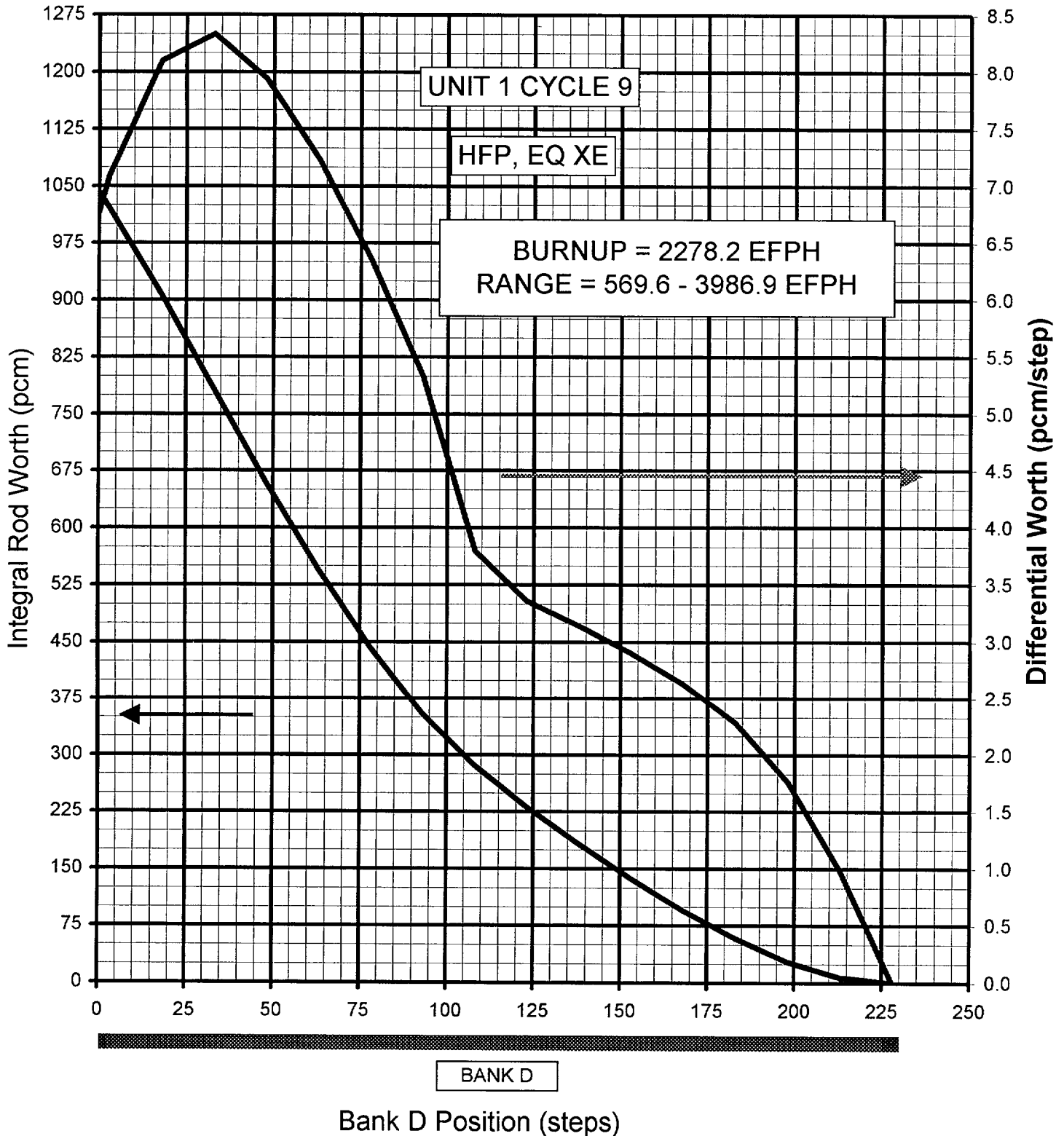
STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>ATTACHMENT A (PG 1 OF 1)</u> <u>ACCEPTABLE PRESSURE CALCULATION</u></p> <p>1 <u>Calculate absolute pressure for affected gas decay tank:</u></p> <p>$P_A = (\text{indicated pressure}) + 15 \text{ psi}$</p> <p>2 <u>Calculate pressure of affected gas decay tank at which activity will be within limits:</u></p> <p>$P_{Lim} = \frac{P_A \times 5 \times 10^4 \text{ curies}}{(\text{present tank activity in curies})}$</p> <p>3 <u>Calculate indicated pressure equivalent to P_{Lim} :</u></p> <p>Indicated pressure = $P_{Lim} - 15 \text{ psi}$</p> <p style="text-align: center;">-END-</p>		

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



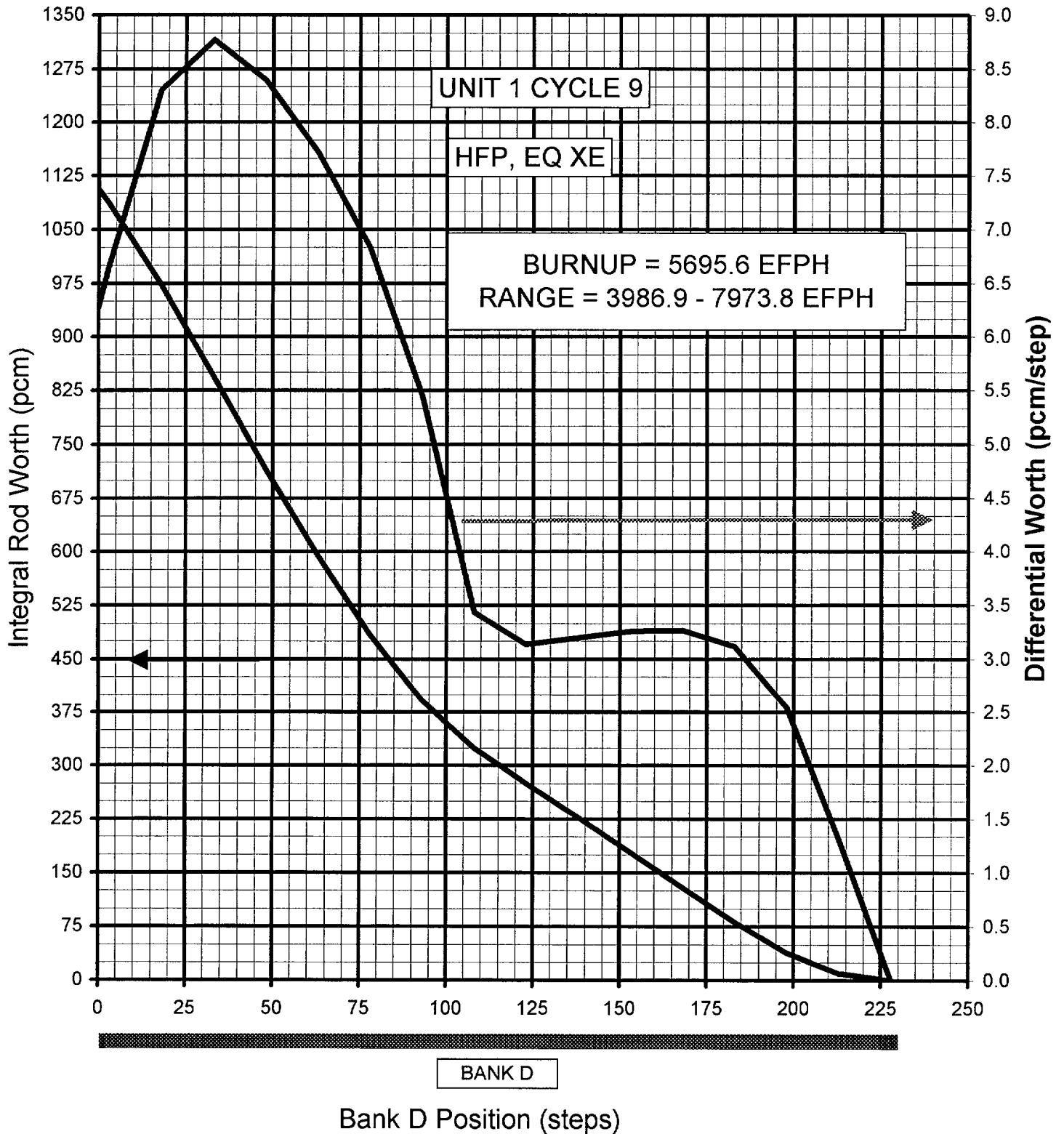
** EXPANDED SCALE **

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



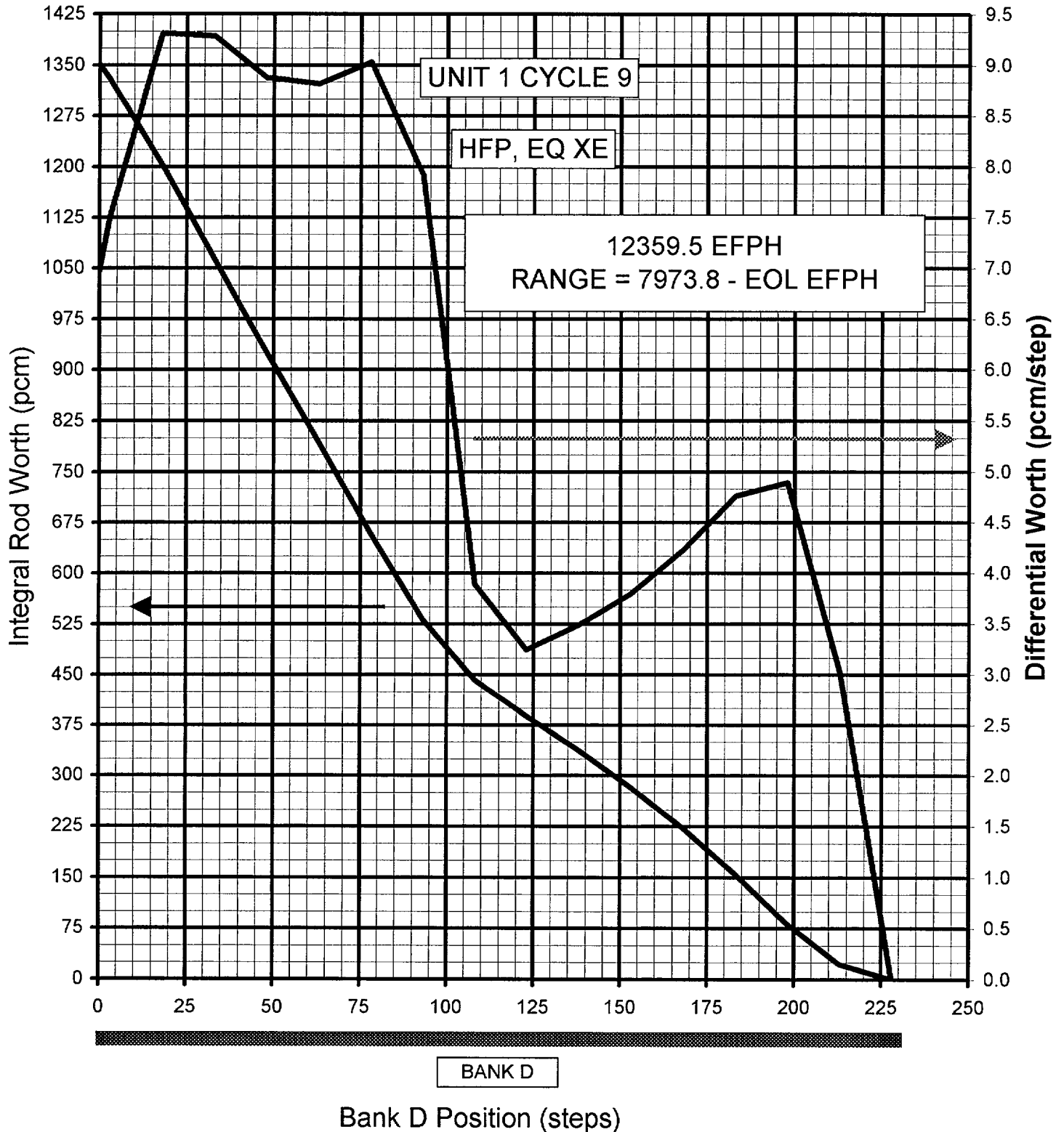
** EXPANDED SCALE **

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



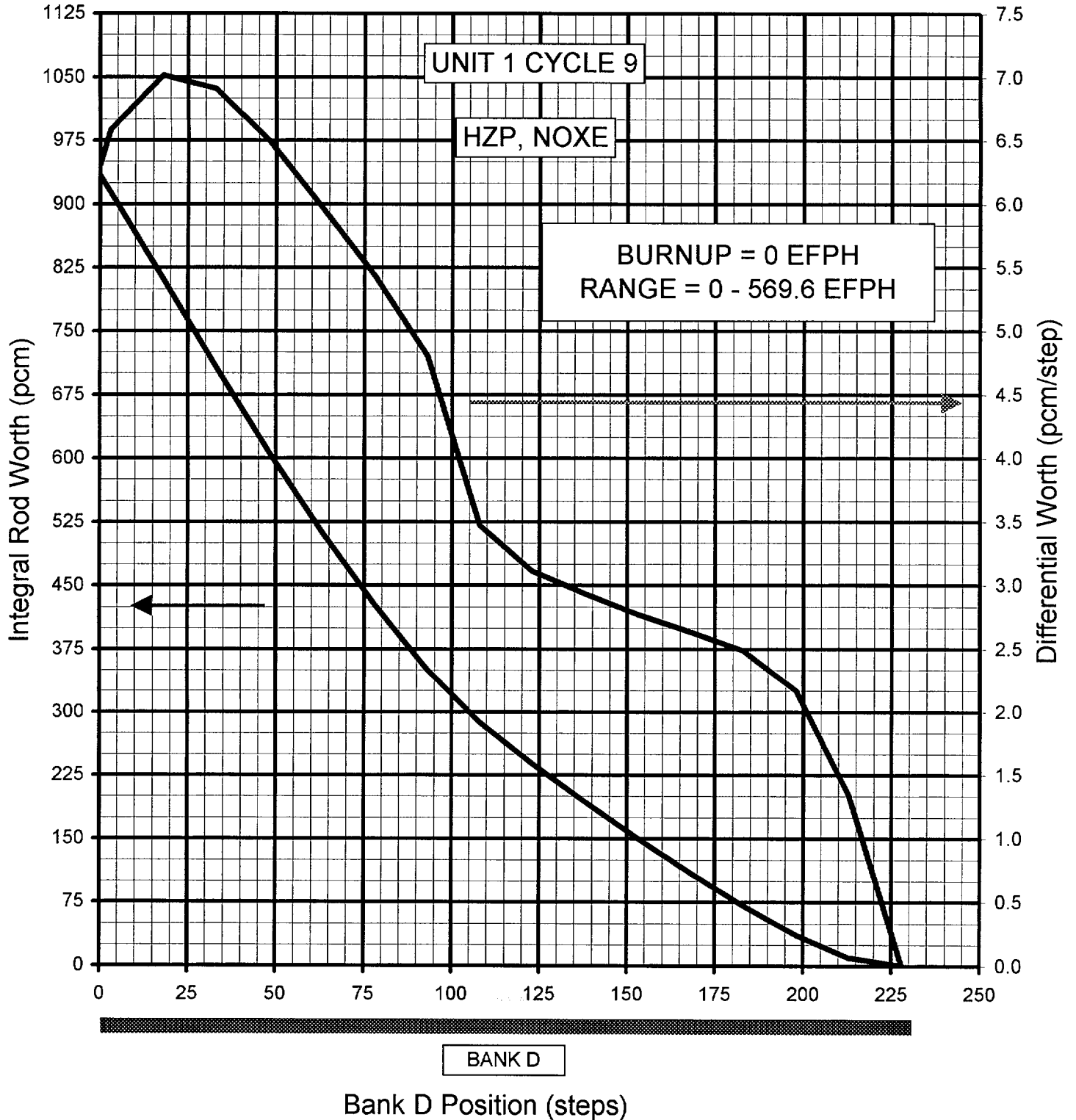
** EXPANDED SCALE **

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



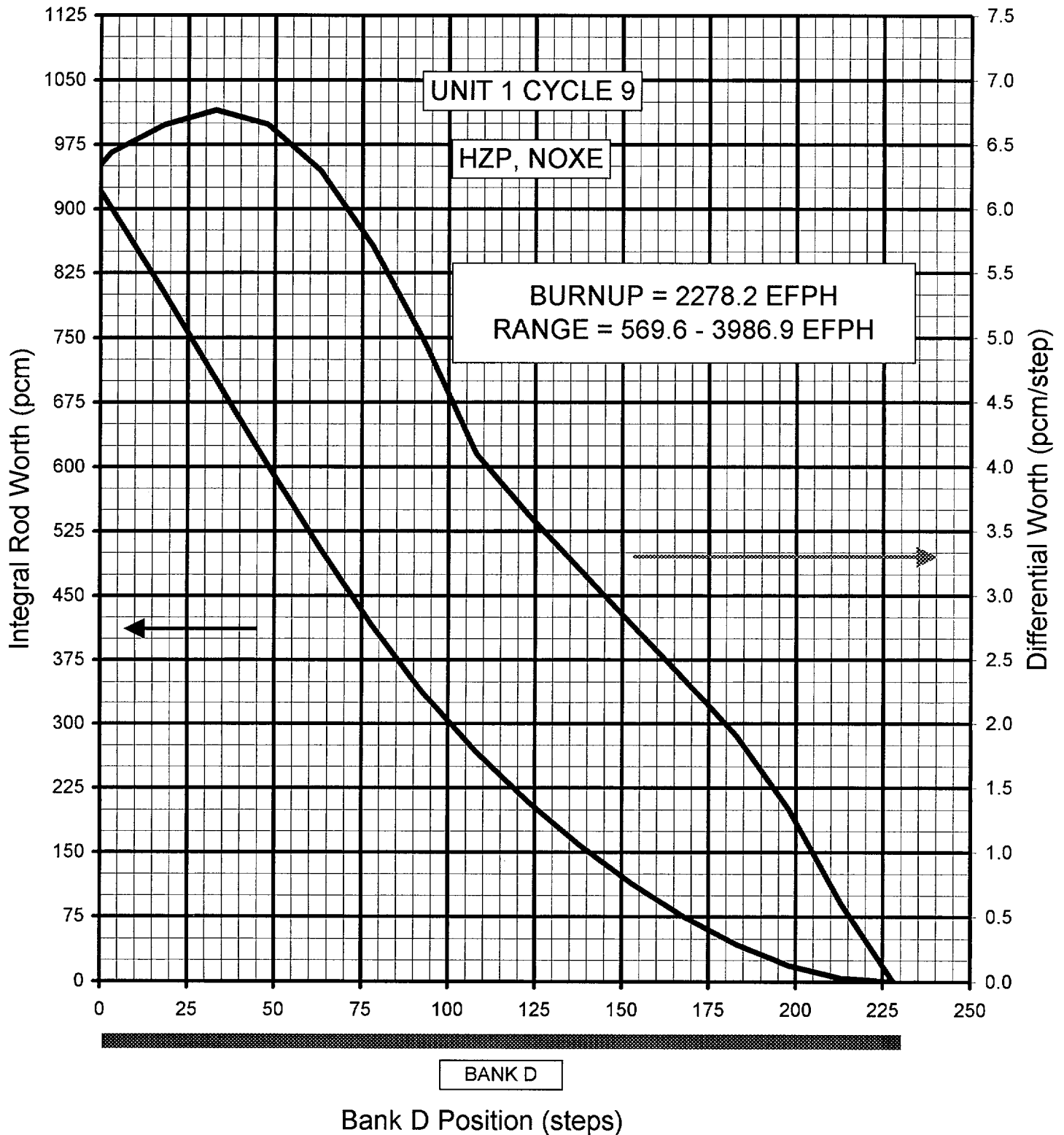
** EXPANDED SCALE **

**Differential and Integral Rod Worth vs. Steps Withdrawn
Control Banks D and C Moving with 113 Step Overlap**



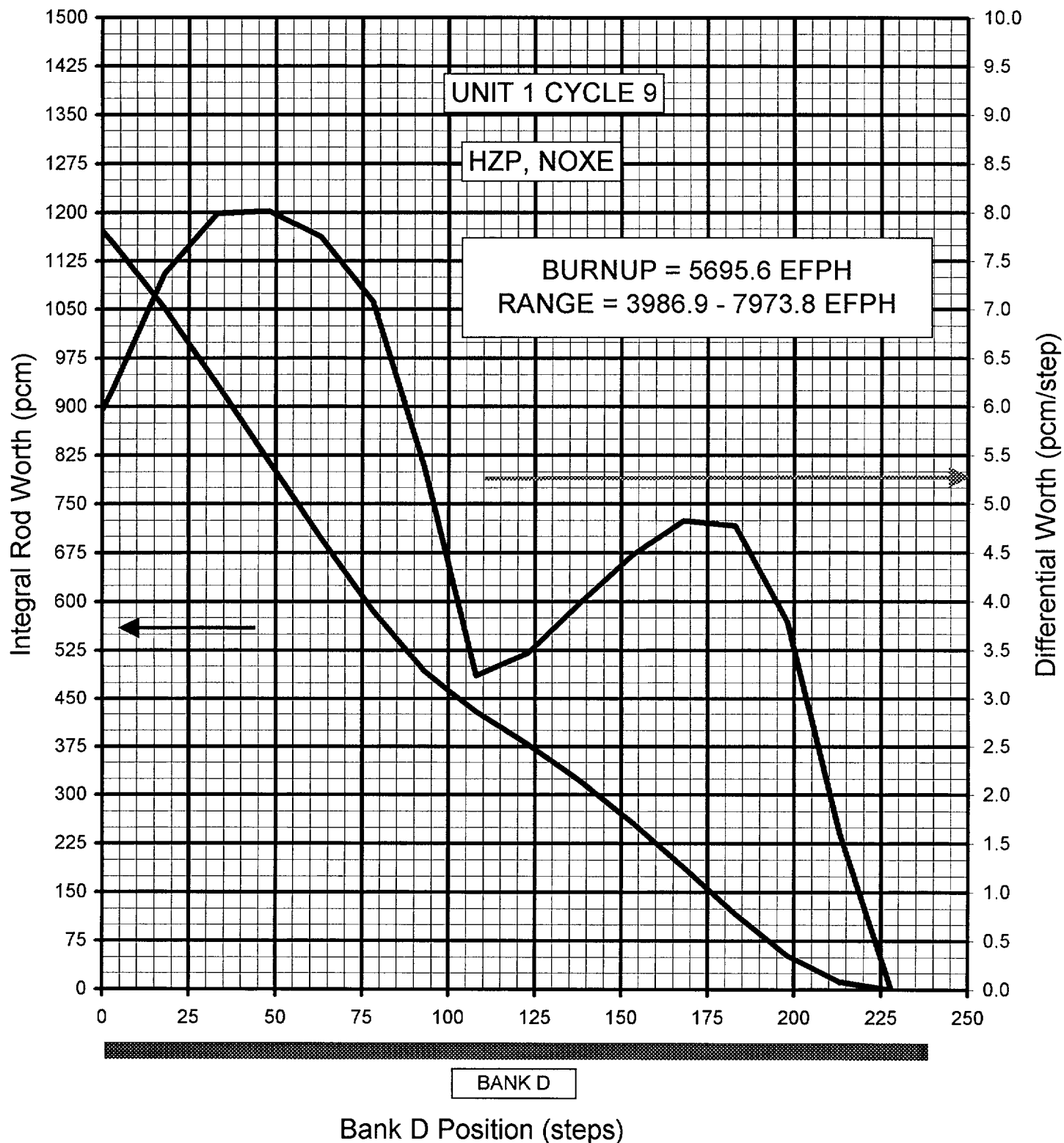
** EXPANDED SCALE **

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



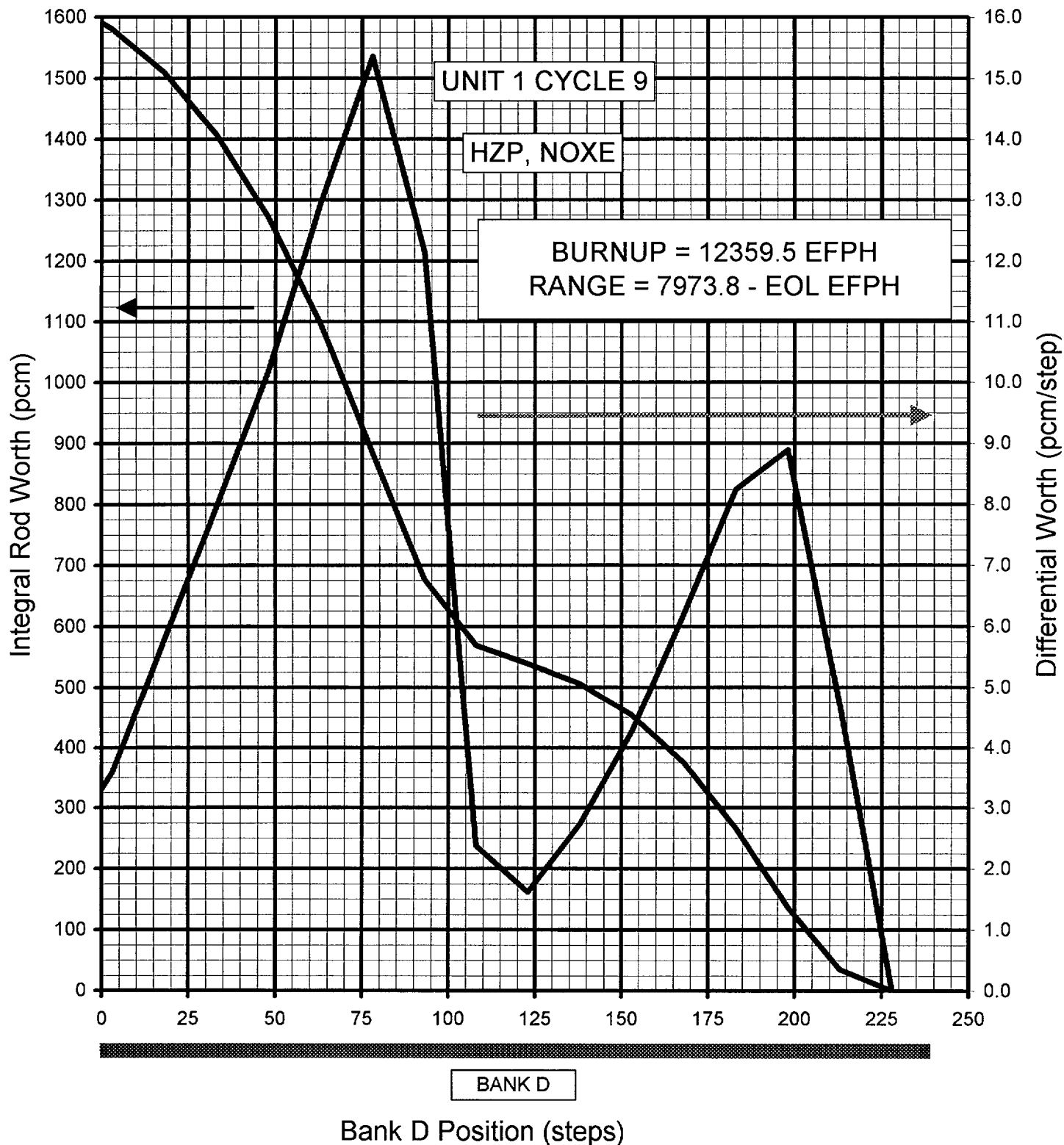
** EXPANDED SCALE **

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



** EXPANDED SCALE **

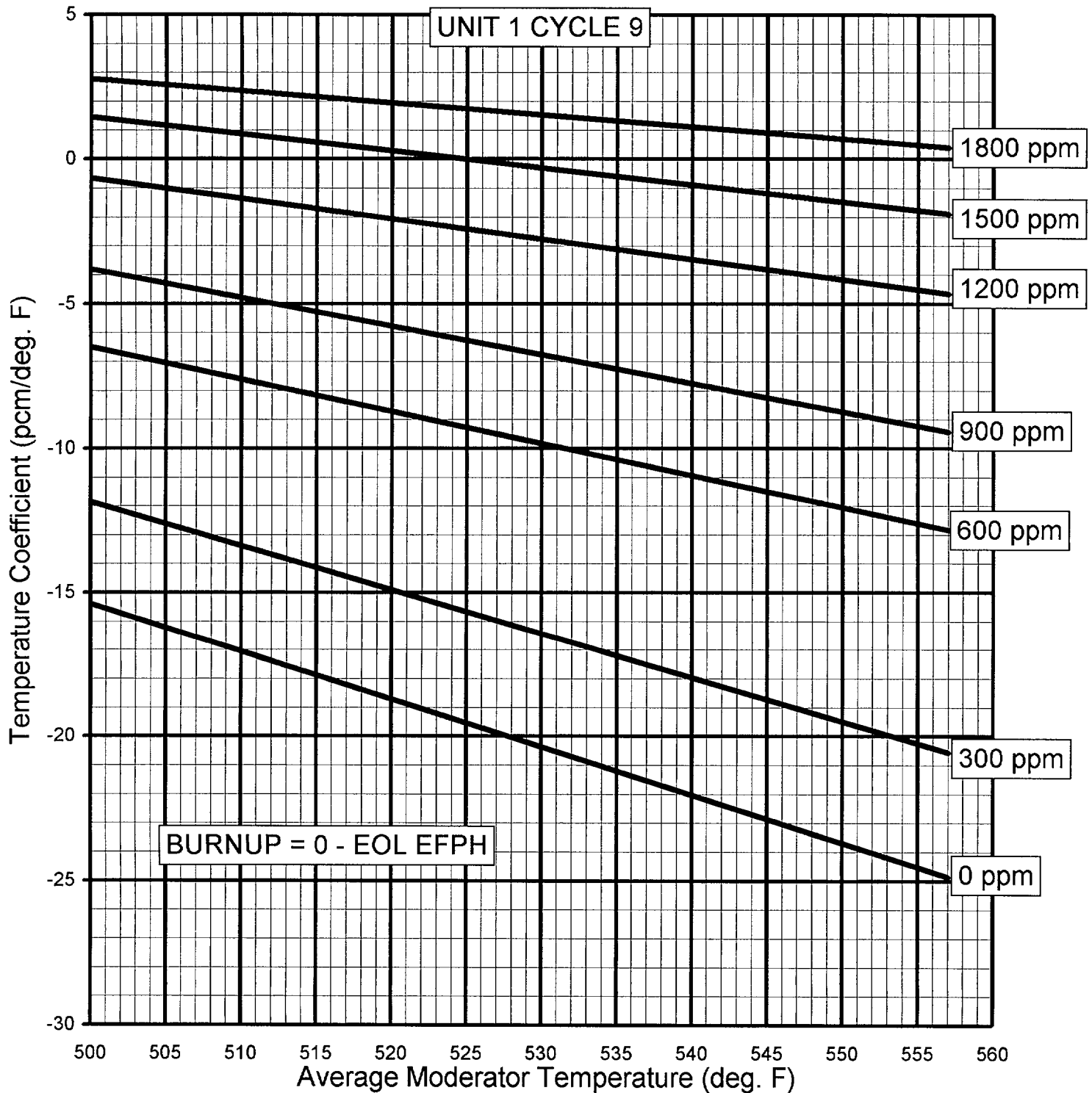
Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



** EXPANDED SCALE **

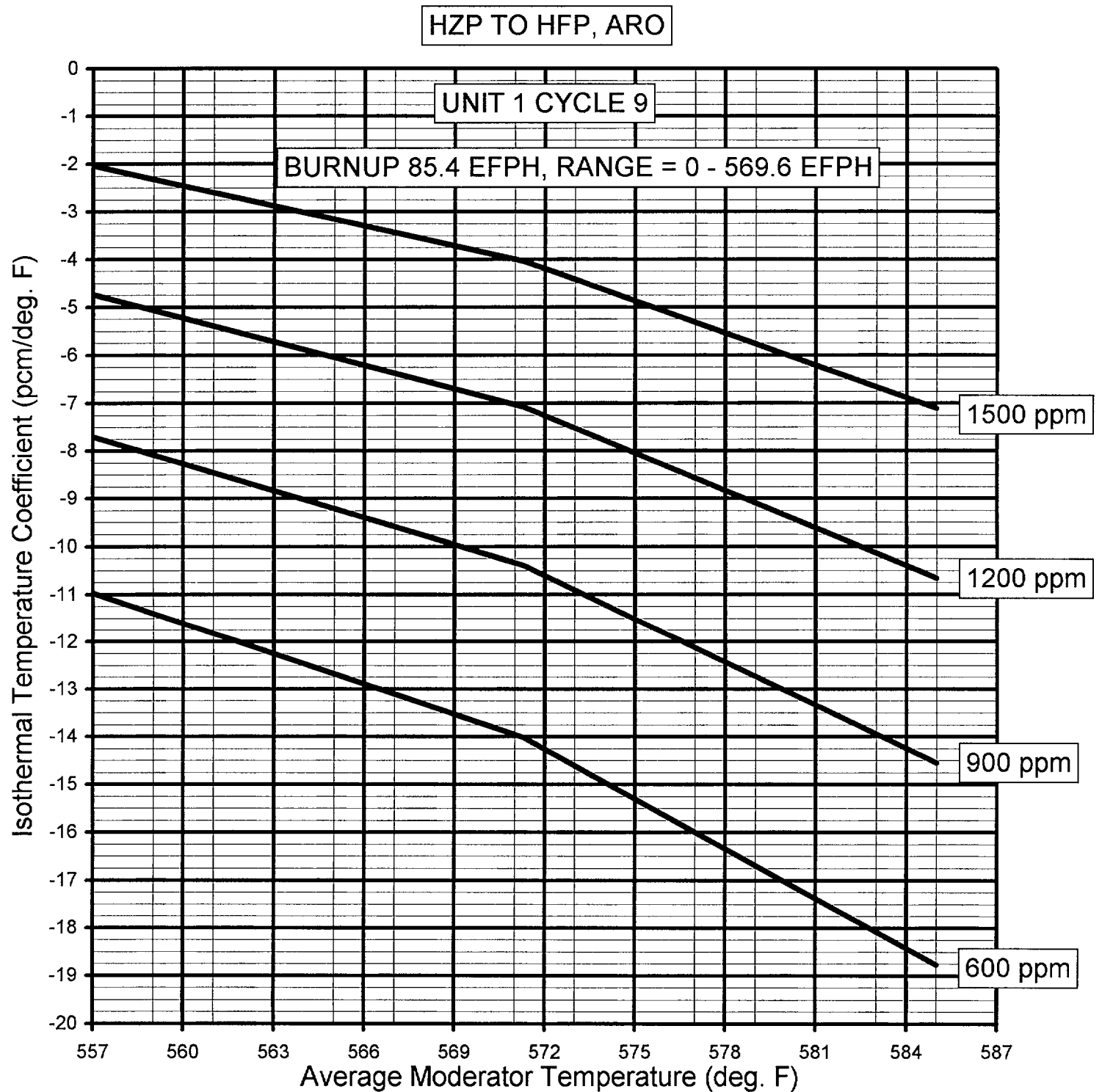
TEMPERATURE COEFFICIENT VS. MODERATOR TEMPERATURE

CZP TO HZP, ARO, NO Xe

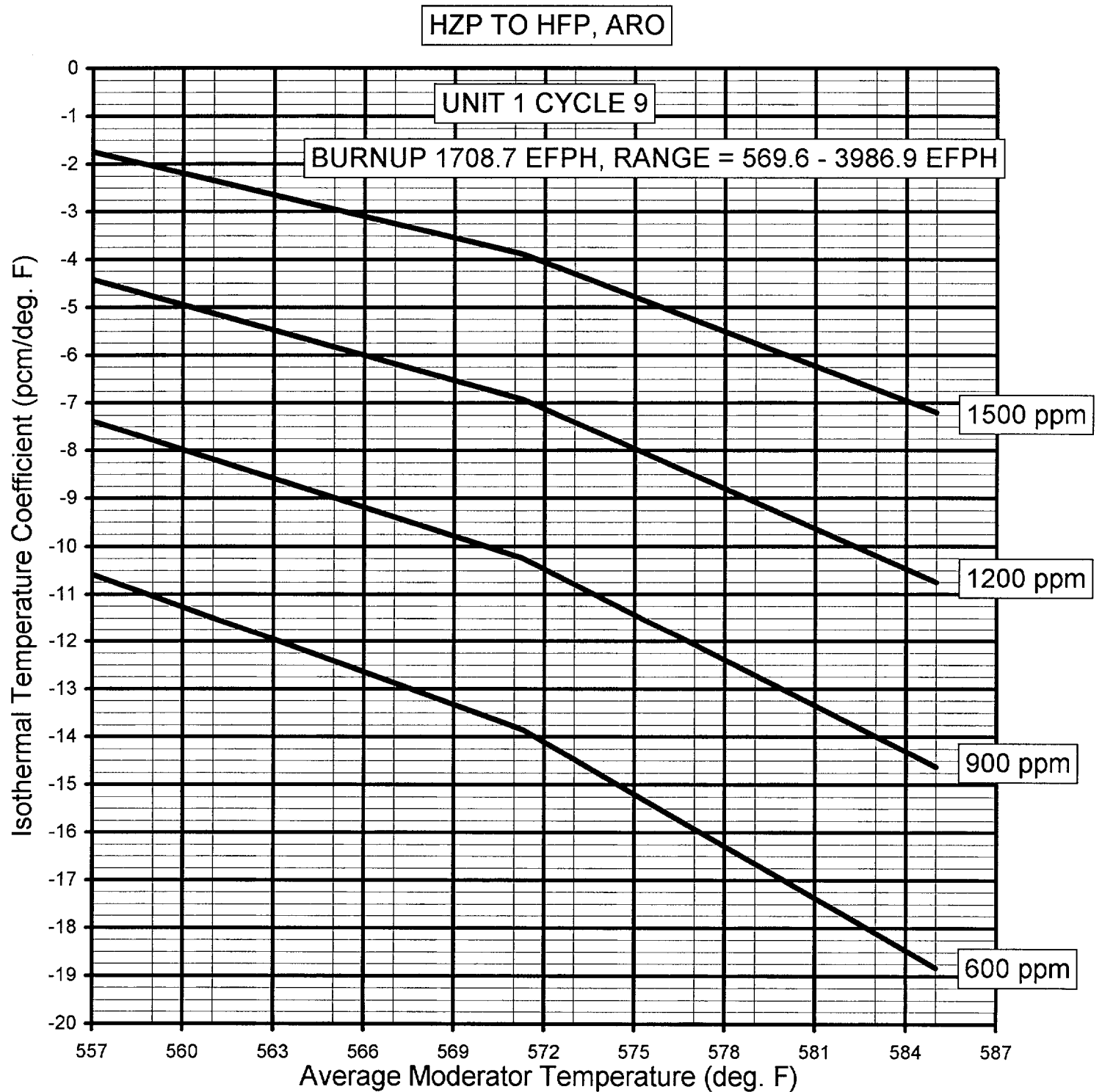


See following pages for Hot Full Power Curves.

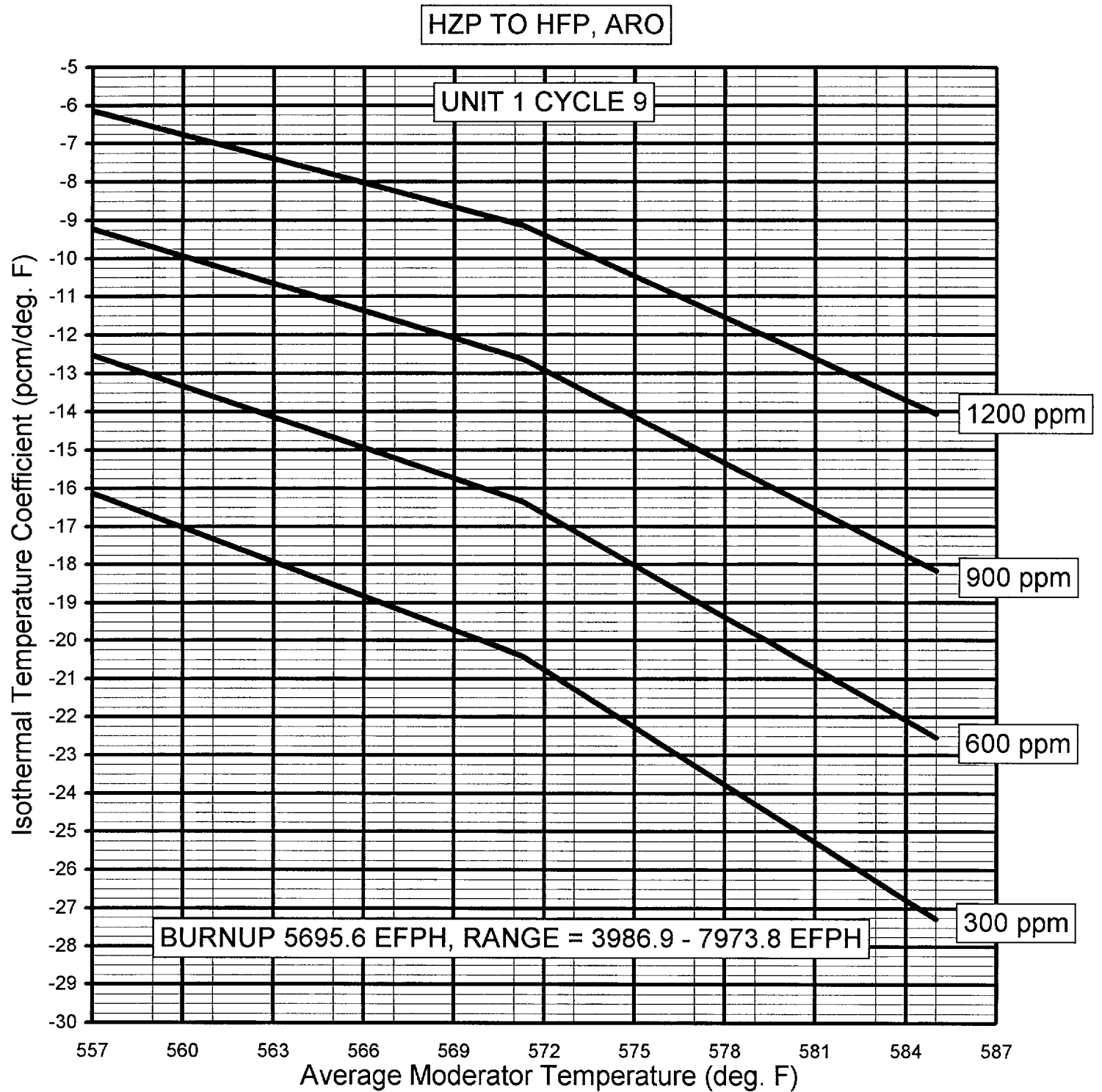
TEMPERATURE COEFFICIENT VS. MODERATOR TEMPERATURE



TEMPERATURE COEFFICIENT VS. MODERATOR TEMPERATURE



TEMPERATURE COEFFICIENT VS. MODERATOR TEMPERATURE

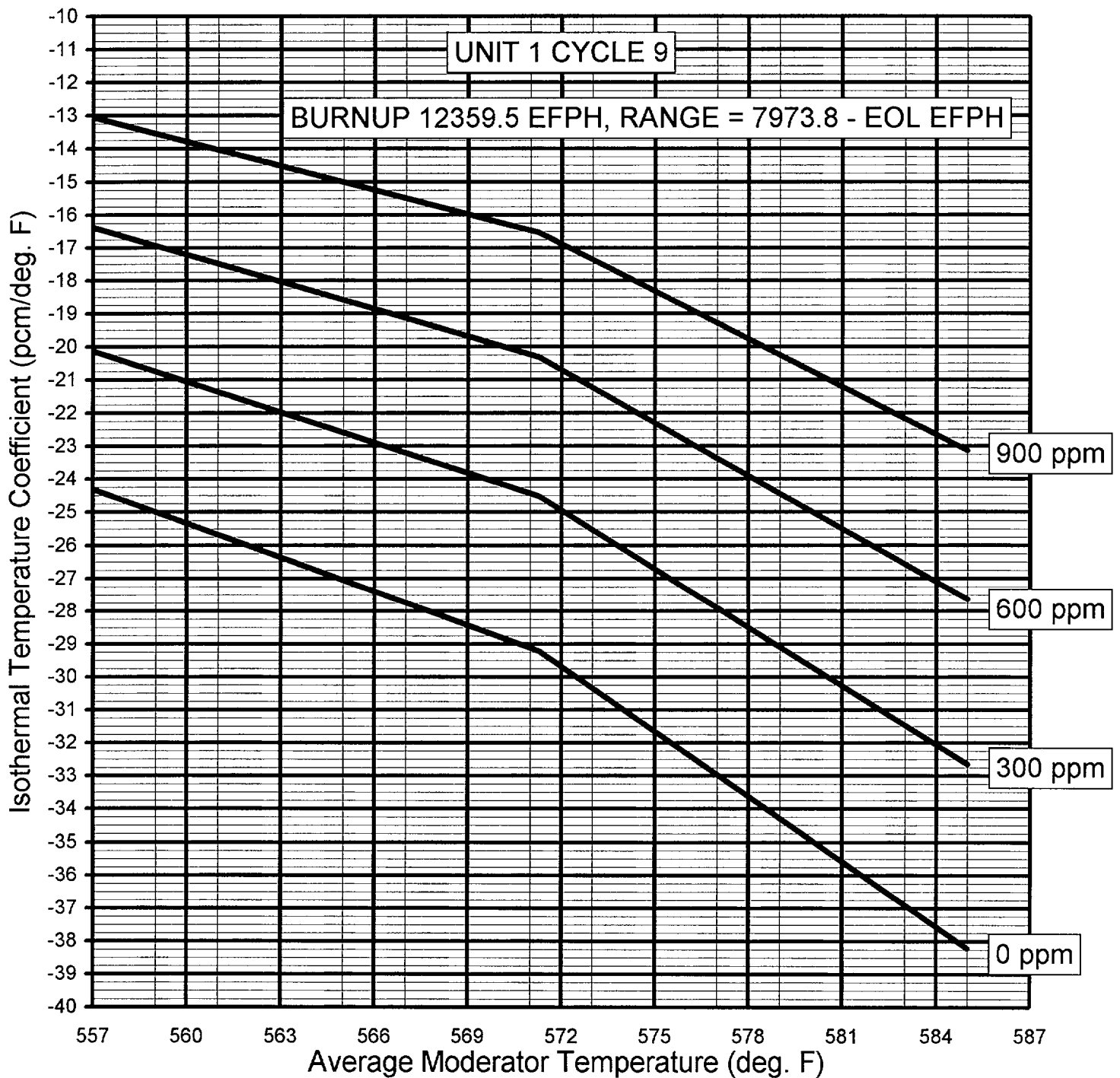


TEMPERATURE COEFFICIENT VS. MODERATOR TEMPERATURE

HZP TO HFP, ARO

UNIT 1 CYCLE 9

BURNUP 12359.5 EFPH, RANGE = 7973.8 - EOL EFPH



REV. 1
WOG 1C

REDIAGNOSIS
UNIT 1

1BwEP
ES-0.0

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1 CHECK IF ANY SG SECONDARY
PRESSURE BOUNDARY IS INTACT:

a. Check pressure in all SGs -
ANY SG PRESSURE STABLE OR
INCREASING

a. IF a controlled cooldown
is in progress,
THEN GO TO Step 2 (Next
Page).

IF NOT,
THEN the following
applies:

o IF main steamlines are
NOT isolated,
THEN you should be in
1BwEP-2, FAULTED STEAM
GENERATOR ISOLATION.

-OR-

o IF main steamlines are
isolated,
THEN you should be in
1BwCA-2.1,
UNCONTROLLED
DEPRESSURIZATION OF ALL
STEAM GENERATORS.

REV. 1 WOG 1C	REDIAGNOSIS UNIT 1	1BwEP ES-0.0
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2	<p><u>CHECK IF ALL SGs SECONDARY PRESSURE BOUNDARIES ARE INTACT:</u></p> <p>a. Check pressure in all SGs:</p> <ul style="list-style-type: none"> · <u>NO SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER</u> · <u>NO SG COMPLETELY DEPRESSURIZED</u> 	<p>a. You should be in 1BwEP-2, FAULTED STEAM GENERATOR ISOLATION.</p> <p><u>IF NOT, THEN GO TO</u> 1BwEP-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.</p>
3	<p><u>CHECK IF SG TUBES ARE RUPTURED:</u></p> <ul style="list-style-type: none"> o <u>ANY SG LEVEL INCREASING IN AN UNCONTROLLED MANNER</u> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o <u>ANY ABNORMAL SECONDARY RADIATION</u> 	<p>You should be in a 1BwEP-1, or 1BwCA-1 series procedure.</p> <p><u>IF NOT, THEN GO TO</u> 1BwEP-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.</p>
4	<p><u>YOU SHOULD BE IN A 1BwEP-3, OR A 1BwCA-3 SERIES PROCEDURE</u></p>	<p><u>GO TO</u> 1BwEP-3, STEAM GENERATOR TUBE RUPTURE, Step 1.</p>
-END-		

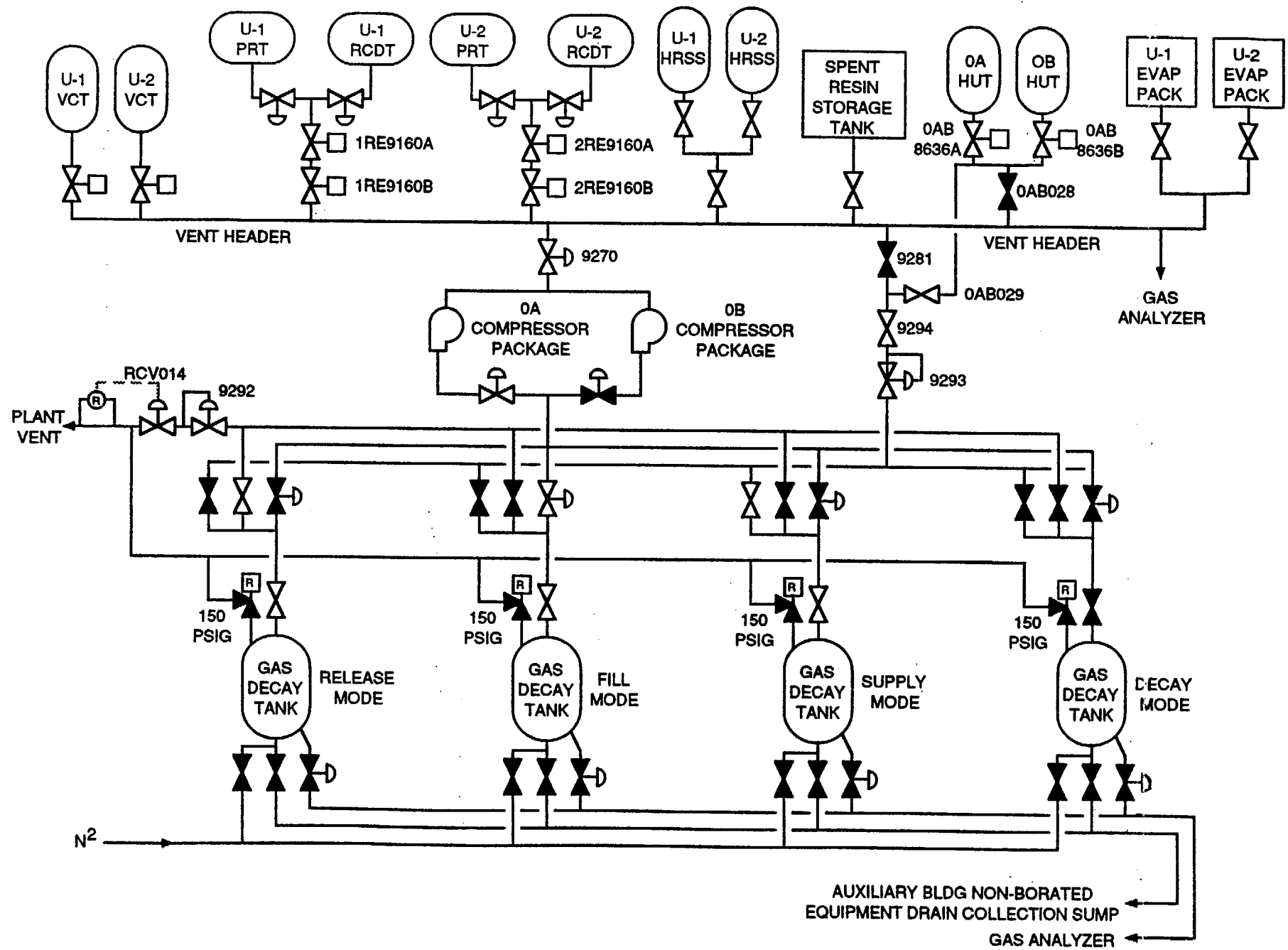


FIGURE 46-1 GASEOUS RADIOACTIVE WASTE SYSTEM (REV. 0)

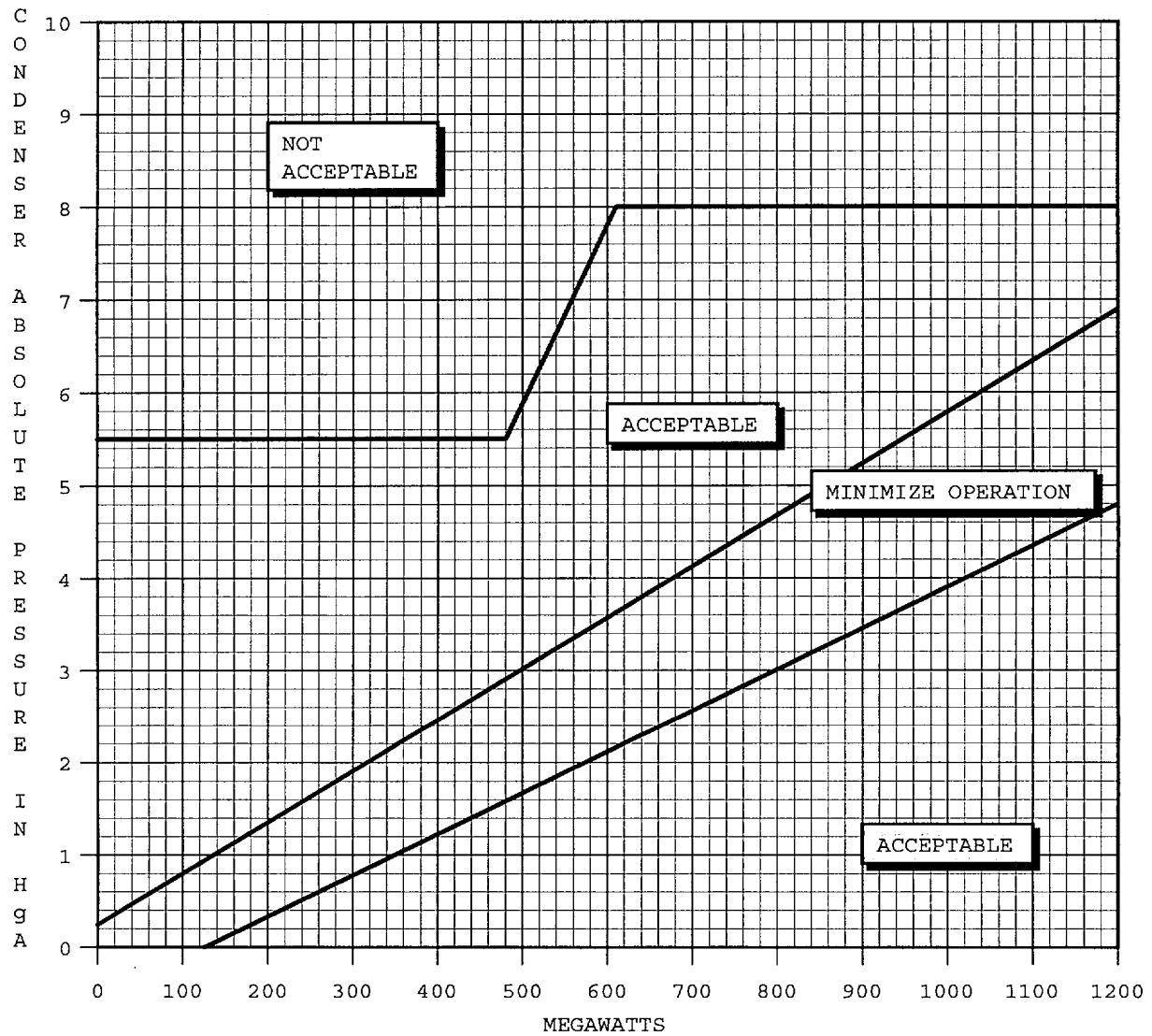


FIGURE 1BWOA SEC-3-1
TURBINE LOAD -vs- CONDENSER PRESSURE

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

Name: MASTER EXAMINATION

Region: III

Date: November 1, 2000

Facility/Unit: Braidwood Units 1 and 2

License Level: SRO

Reactor Type: W

Start Time:

Finish Time:

Instructions

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

Applicant Certification

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

Applicant's Signature

Results

Examination Value _____ Points

Applicant's Score _____ Points

Applicant's Grade _____ Percent

Senior Reactor Operator Examination

1. Surveillance 1BwOSR 3.7.5.4-1 "Unit One Train A Auxiliary Feedwater Valve Emergency Actuation Signal Verification Test" is being performed. The personnel performing the surveillance are stationed at the Main Control Room, Aux. Electrical Room and the AF Pump Area.

In accordance with 1BwAP 390-1 "Operating Department Surveillance Program" how are operator actions directed while performing the surveillance?

- a. US directs operator actions for the surveillance and will inform the NSO of any changes in the status of plant evolutions.
- b. Assigned management person (other than shift operations) will provide direction to the operators and will directly inform the US of the status of plant evolutions.
- c. NSO directs the operator's actions for the surveillance and is directly informed of the status of plant evolutions.
- d. Operator at the AF pump area is in charge of actions being performed and will inform the Unit Supervisor of any changes in the status of plant evolutions.

2. The following Unit 1 conditions exist:

- Reactor Power is 85%
- Containment pressure is 0.6 psig
- Containment temperature is 115°F

Electric Operations has requested a load ascension to 95% power.

A containment entry is required to search for a 0.3 gpm UNIDENTIFIED leak inside containment. Which of the following is applicable for this entry?

- a. Reactor power must be reduced to <60% if entry inside the missile barrier is required.
- b. Containment Integrity must be maintained.
- c. The requested load increase may occur while personnel are inside containment.
- d. A Containment Entry Checklist is NOT required for this entry.

3. Per Technical Specification Definitions, a MODE is determined by power level

- a. core reactivity, and average RCS temperature.
- b. core reactivity, and auctioneered high RCS temperature.
- c. decay heat, and average RCS temperature.
- d. decay heat, and auctioneered high RCS temperature.

Senior Reactor Operator Examination

4. Which of the following chemistry values requires restoration within its steady state limit within 24 hours per TRM 3.4.b while in Mode 5.

Dissolved O2	Chloride	Flouride
a. 80 ppb	150 ppb	100 ppb
b. 300 ppb	80 ppb	80 ppb
c. 100 ppb	200 ppb	100 ppb
d. 150 ppb	100 ppb	80 ppb

5. Which of the following items is considered a temporary modification?
- Tygon hose installed on a water drop to fill a cleaning bucket.
 - Blocking device installed on a safety valve to prevent inadvertent opening.
 - Thermal overloads removed from a breaker that are specified on an OOS.
 - An electrical jumper placed in a component's start circuit as part of a surveillance procedure to prevent inadvertent auto start.
6. Which of the following actions is NOT required when a Tech Spec surveillance fails to meet the designated acceptance criteria?
- Immediately inform the Shift Manager/Senior Reactor Operator.
 - Document information on the data package cover sheet.
 - Notify the NRC within 1 hour.
 - Initiate a Condition Report (previously a PIF).
7. The Shiftly/Daily surveillance is being performed by the NSO. The NSO has made a circle around the reading for 1PI-960, SI Accumulator 1A pressure Indicator.

What is indicated by the circle?

- The indicator is suspect.
- Data is missing from previous entry/entries.
- The data falls outside the limits specified.
- The parameter indicates a significant change from previous readings.

Senior Reactor Operator Examination

8. Concerning 1BwGP 100-2, "Plant Startup," Limitations and Actions, the overlap of the Rod Control Banks shall be
(Assume current fuel cycle)
- a. 113 steps.
 - b. 115 steps.
 - c. 116 steps.
 - d. 118 steps.
9. An operator received radiation exposures at BOTH Braidwood and LaSalle Stations during the year.

The exposure record to date this year is:

	Braidwood	LaSalle
- Deep Dose Equivalent (DDE)	180 mrem	40 mrem
- Lens Dose Equivalent (LDE)	10 mrem	5 mrem
- Committed Effective Dose Equivalent (CEDE)	105 mrem	0 mrem
- Shallow Dose Equivalent (SDE)	10 mrem	10 mrem
-Committed Dose Equivalent (CDE)	20 mrem	0 mrem

The operator at Braidwood Station has been requested to work in an area where the known radiation rate is 160 mR/hr. The source of the radiation is a nearby HOT SPOT inside a pipe trap where crud has collected and has been determined to be totally gamma radiation.

If the work task takes 30 minutes to complete, what is the individual's Total Effective Dose Equivalent (TEDE) for the year?

- a. 365 mrem
- b. 405 mrem
- c. 460 mrem
- d. 485 mrem

Senior Reactor Operator Examination

10. Which of the following activities would NOT require Radiation Protection consultation prior to performing?
- Raising radioactive material(s) from the fuel pool above established limits.
 - Uncovering contaminated process lines.
 - Cleanup of a boric acid spill covering 2 levels of the Auxiliary Building.
 - Adding boric acid to the batch tank.

11. What are the MINIMUM requirements for unconditional release of a wrench that has been used in a Radiological Posted Area (RPA)?

A survey indicates the wrench is...

- free of both smearable and fixed contamination.
- free of smearable contamination but is allowed up to 1000 dpm/100cm² fixed contamination.
- allowed up to 20 dpm/100cm² smearable contamination and is allowed up to 5000 dpm/100cm² fixed contamination.
- allowed up to 100 dpm/100cm² of either smearable or fixed contamination.

12. The following conditions exist on Unit 1:

- Unit 1 Containment Equipment hatch is removed
- Refueling operations in progress
- A HIGH alarm is received on radiation monitors 1RE-AR011/12, Containment Fuel Handling Incident

The crew should...

- Activate the Unit 1 Containment evacuation alarm and start containment charcoal filter fans.
- Verify Fuel Handling Building is at a negative pressure and start the Cnmt Mini Purge System.
- Start the Containment Purge System and start containment charcoal filter fans.
- Activate the Unit 1 Containment evacuation alarm and start the Containment Mini Purge System.

Senior Reactor Operator Examination

13. Per procedure 1BwCA-0.0, "LOSS OF ALL AC POWER", which of the following is the basis for maintaining SG Narrow Range levels above 10% when the RCS is being cooled to 350°F?
- Narrow Range level is the only indication of SG inventory available after a loss of all AC power.
 - Ensure proper thermal stratification in the SGs in the event of a SGTR.
 - Ensures the capability to cooldown once AC power is restored.
 - Ensures heat transfer capability exists to remove heat from the RCS.

14. The following plant conditions exist:

- Unit 2 is in the process of starting up from a refueling outage.
- Reactor power is at 3% and has been stabilized to perform a power history surveillance.
- Indicated intermediate range start up rate is 0 dpm.

A loss of the Unit 2 station auxiliary transformer occurs.

The Unit Supervisor directs a reactor trip.

The reactor operator attempts to trip the reactor at 2PM05J and 2PM06J with no results.

The Unit Supervisor has entered 2BwEP-0 and is at Step 1 RNO.

The next procedure action will be to...

- continue with 2BwEP-0, Step 2.
- transition to 2BwCA-0.0, "Loss of All AC Power."
- transition to 2BwFR-S.1, "Response to Nuclear Power Generation/ATWS."
- transition to 2BwOA ELEC-3, "Loss of 4KV ESF Bus."

Senior Reactor Operator Examination

15. The following conditions exist following a LOCA on unit 2:

- | | | | | |
|--------------------------|------------------------|--------|--------|--------|
| - AF flow | 420 gpm | | | |
| - CNMT Pressure | 18 psig and increasing | | | |
| - RCS Pressure | 2340 psig | | | |
| - Core Exit TC's | 650°F and increasing | | | |
| - RCPs | Tripped | | | |
| - SG pressures | 750 psig stable | | | |
| - Narrow Range SG levels | 38% (A) | 34%(B) | 34%(C) | 35%(D) |

Based on the above conditions, which of the following satisfies the minimum scanning requirements for the CSF Status Tree's?

- Continuously scan.
- Scan at 15 minute intervals.
- Scan at 30 minute intervals.
- Scanning may be terminated.

16. The following alarms have actuated:

- Unit Two Area Fire
- CO2 Storage Tank Trouble
- On ¹/₂ PM09J, the Zone Light for the 2B DG Room is illuminated

The fire brigade has been dispatched.

The fire brigade can expect CO2 actuation in the...

- 2B DG Room ONLY.
- 2B DG Day Tank Room ONLY.
- 2B DG Room and 2B DG Day Tank Room.
- NO actuation due to low CO2 Storage Tank Pressure.

Senior Reactor Operator Examination

17. Unit 1 has declared an ALERT due to a Steam Generator Tube Rupture. Offsite dose assessment is in progress. The Shift Manager is the acting Station Director. Which of the following responsibilities CAN NOT be delegated by the SM?
- a. Notification of the offsite authorities of protective action recommendations.
 - b. Authorize exceeding 10CFR100 site boundary limits.
 - c. Decision to issue thyroid blocking agents to onsite personnel.
 - d. Notify the NRC Operations Center via the ENS Red Phone.

18. The following plant conditions exist:

- Rod D-4 rod bottom light	LIT
- PWR RANGE FLUX RATE RX TRIP ALERT annunciator	LIT
- Reactor Power	95%
- ROD CONTROL URGENT FAILURE annunciator	NOT LIT
- 1BWOA ROD-3 "Dropped or Misaligned Rod" has been entered.	

While the crew is taking data for the dropped rod per step 7 of 1BWOA ROD-3, the following indications occur:

- Rod D-8 rod bottom light	LIT
----------------------------	-----

Which of the following describes the action required?

- a. Reset rate trip and perform dropped rod recovery per 1BWOA ROD-3.
- b. Trip the reactor and enter 1BwEP-0.
- c. Restore Tave/Tref, then calculate QPTR.
- d. Perform SDM surveillance and reduce reactor power to less than 70%

Senior Reactor Operator Examination

19. Given the following plant conditions on Unit 1:

- 80% reactor power.
- CBD is 175 steps.
- Core Age is 5200 EFPH.
- RCS Tave is 575°F.
- RCS Boron Concentration is 600 ppm.

What will RCS Tave be following a withdrawal of CBD to 200 steps? Assume new stable plant conditions exist.

- a. 576.5°F
- b. 578.5°F
- c. 580.5°F
- d. 581.5°F

20. Given the following plant conditions on Unit 1:

- The plant is operating at 75% power with normal lineup for performing a calorimetric.
- During the calorimetric, the NSO is in the process of adjusting N-44 when a turbine runback occurs.
- 1PT-505, turbine first stage impulse chamber pressure, fails high when the turbine runsback.
- Tavg is 584°F and increasing.

Based on these conditions, the NSO should ...

- a. Drive rods in manual until rod speed drops below 48 steps/min, then switch to AUTO until temperature is restored.
- b. Drive rods in manual and continuously insert rods until temperature is restored.
- c. Allow automatic insertion until rod speed drops below 48 steps/min, then insert rods in manual until temperature is restored.
- d. Allow automatic insertion until rod speed drops below 64 steps/min, then insert rods in manual until temperature is restored.

Senior Reactor Operator Examination

21. The following plant conditions exist during a small-break LOCA:

- Core exit TC's read approximately 532°F
- RCS pressure is 885 psig
- S/G levels are 25% narrow range
- Steam pressure is 1092 psig
- RCS wide range cold leg temperatures are all 525°F

Based on the above conditions, the RCS is ...

- a. saturated. Decreasing RCS pressure will aid in establishing subcooling.
- b. subcooled. Increasing S/G pressure will aid in increasing subcooling.
- c. subcooled. Decreasing RCS pressure will aid in increasing subcooling.
- d. saturated. Decreasing S/G pressure will aid in establishing subcooling.

22. The following conditions exist on Unit 1:

- Reactor power 36%
- Pzr pressure 2235 psig
- Pzr level 35%

RCP 1A breaker trips due to sensed undervoltage from bus 157. What is expected as a result of the trip of the RCP?

- a. The reactor will automatically trip due to the open RCP breaker.
- b. The reactor will automatically trip due to RCS loop low flow condition.
- c. The reactor must be manually tripped by the operator.
- d. A normal plant shutdown will be initiated.

Senior Reactor Operator Examination

23. The following plant conditions exist:

- | | |
|----------------|----------------------|
| - Reactor | Tripped |
| - All RCPs | Running |
| - PZR level | 48% increasing |
| - RCS pressure | 1700 psig decreasing |

Which of the following leak locations is consistent with the plant conditions above?

- Failure of charging header connection to the RCS.
- Weld failure on pressurizer liquid space sample line.
- Failure of pressurizer PORV in an intermediate position.
- Weld failure on RCP B discharge piping.

24. The following plant conditions exist on Unit 1:

- 100% power
- RCS Tave is 582°F
- PZR Pressure is 2235 psig

All systems were operating normally in Automatic when the 1A CV pump trips. Which of the following actions are required per BWAR 1-9-A3, "CHG PUMP TRIP?"

- Place 1CV121, "Cent Chg Pumps Flow Cntrl Vlv", in manual and close, then start 1B CV pump.
- Verify suction source, then start 1B CV pump.
- Isolate letdown, then start 1B CV pump.
- Close 1HCV182, "Chg Hdr Back Press Cntrl Vlv", then start 1B CV pump.

Senior Reactor Operator Examination

25. The following plant conditions exist:

Unit 1 is at 100%

1A CC pump is running

1B CC pump is OOS

0 CC pump is aligned to Bus 141

Unit 2 is in MODE 4

2A CC pump is running

2B CC pump is in standby

0 CC HX is aligned to Unit 1

Which of the following applies?

- a. No Tech Spec actions apply.
- b. Unit 1 is in a 7 day LCO to restore required CC pump to operable status.
- c. Unit 2 is in a 7 day LCO to restore required CC HX to operable status.
- d. Unit 1 and unit 2 are in a 7 day LCO to restore required CC pump to operable status.

26. The unit is at 100% power, steady state, NOP/NOT. The Pressurizer Pressure Master Controller setpoint fails to 2185 psig. Assume a step change in the setpoint and assume that pressurizer pressure control remains in automatic.

Which of the following is the immediate automatic response of the system?

- a. Spray valves open, Variable Heaters deenergize
- b. PORV 455A opens, Spray valves open, Variable Heaters energize.
- c. Spray valves open, Variable Heaters energize.
- d. Spray valves close, Variable Heaters deenergize.

27. Per Tech Specs, which of the following is NOT a reason for designating 1LT459 and 1LT460 as Post Accident Monitoring Instrumentation?

- a. Used to determine whether to terminate SI.
- b. Used to determine if SI reinitiation is required.
- c. Used to verify unit conditions necessary to establish natural circulation.
- d. Used to evaluate RCP trip criteria.

Senior Reactor Operator Examination

28. Which of the following Reactor Protection System Trips protects against DNB accidents?
- a. IR High Flux
 - b. High Pressurizer Pressure
 - c. High Pressurizer Level
 - d. Power Range High Negative Rate

29. The Status light for 1SI8801B is DARK following a SI actuation. 1SI8801B is...
- a. FULL OPEN and is NOT in its required safeguards position.
 - b. CLOSED and is NOT in its required safeguards position.
 - c. FULL OPEN and is in its required safeguards position.
 - d. CLOSED and is in its required safeguards position.

30. Rods are being withdrawn in manual during a reactor startup, with all systems operable.

For the Control Banks, which of the following describes the status of the DRPI rod bottom lights at the moment the ROD AT BOTTOM annunciator alarm clears?

- a. Banks A, B, C, & D -- OFF.
 - b. Banks A, B, C, & D -- ON.
 - c. Banks A, B, C -- OFF; Bank D -- ON.
 - d. Bank A -- OFF; Banks B, C, & D -- ON.
31. Which of the following components is being DIRECTLY adjusted by the gain adjust at the NI panel potentiometer following a calorimetric calibration?
- a. Summing and level amplifier
 - b. Detector output current
 - c. Upper and Lower Detector Averaging Circuit
 - d. Detector high voltage power supply

Senior Reactor Operator Examination

32. The following plant conditions exist on Unit 2:

- Reactor is operating at 100% rated thermal power
- Annunciator 2-10-A4 "PWR RNG UPPER DET FLUX DEV HIGH" has alarmed
- All control rods are positioned within 12 steps of their group demand counters
- Maximum QPTR based on the plant computer calculation is 1.04

Assuming QPTR is not reduced, within two hours reactor power must be reduced to...

- a. 50%
- b. 74%
- c. 88%
- d. 94%

33. Given the following plant conditions on Unit 1:

- 100% power.
- Train A CETC power supply (MCC 131x1 ckt15) has been deenergized for breaker replacement.
- Train B CETC has only 10 thermocouples operable which are currently indicating:
 - 1-610°F 6-613°F
 - 2-610°F 7-612°F
 - 3-613°F 8-612°F
 - 4-640°F 9-611°F
 - 5-613°F 10-613°F
- MCB display for train B CETC indicates 615°F

CETC #4 fails high.

MCB temperature would indicate

- a. 612°F
- b. 615°F
- c. 731°F
- d. 781°F

Senior Reactor Operator Examination

34. The following conditions exist with Unit 1 in MODE 5:

- Containment temperature - 88°F
- 2C RCP - RUNNING
- 2C RCFC - STOPPED

The adverse consequence of starting the 2C RCFC is that 2C RCP seal number ...

- a. 2 may CLOSE causing the number 1 seal leakoff flow indication to INCREASE.
- b. 2 may OPEN causing the number 1 seal leakoff flow indication to DECREASE.
- c. 1 may OPEN causing the number 1 seal leakoff flow indication to INCREASE.
- d. 1 may CLOSE causing the number 1 seal leakoff flow indication to DECREASE.

35. Given the following Unit 2 conditions:

- 2A and 2C Reactor Containment Fan Coolers (RCFC) are operating in HIGH speed.
- 2B and 2D RCFCs are stopped and in standby.
- Normal cooling water lineup for the RCFCs exists.

What will be the status of the RCFCs 15 seconds after an SI signal occurs concurrent with a loss of offsite power?

- a. Only 2A and 2B RCFCs running in HIGH speed.
- b. Only 2B and 2D RCFCs running in LOW speed.
- c. ALL RCFCs running in LOW speed.
- d. NO RCFCs are running.

36. During initial actuation of the Containment Spray System during a LOCA, radiation levels in the RWST are expected to....

- a. increase due to spray add tank recirculation to the RWST.
- b. increase due to containment recirc. sump recirculation to the RWST.
- c. stay the same due to NO recirculation aligned to the RWST.
- d. stay the same due to spray add tank recirculation to the RWST.

Senior Reactor Operator Examination

37. A fire has occurred in the 2B Containment Charcoal Filter Unit. Deluge is actuated at ...
- a. 0PM02J in the Main Control Room.
 - b. 1PM09J, Fire Panel in the Main Control Room.
 - c. 2B Containment Charcoal Filter Unit.
 - d. 2VP01J on 426' Electrical Penetration Area.

38. The following plant conditions exist:

- A LOCA has occurred on Unit 1
- E-0 has been completed and the crew has transitioned to E-1
- From E-1 the crew transitioned to FR-C.1
- The Post-LOCA Purge Exhaust Fan is de-energized due to an electrical fault on Bus 134V4.

Which of the following containment hydrogen concentrations is the MAXIMUM concentration which the Hydrogen Recombiners may be placed in service WITHOUT CONSULTATION WITH THE TSC?

- a. 0.5%
 - b. 4.0%
 - c. 6.0%
 - d. 8.0%
39. In Modes 1-4, the Containment Normal Purge Valves _____ and the Mini Purge Valves _____.
- a. are sealed closed, may be opened as needed.
 - b. are sealed closed, are sealed closed
 - c. may be opened as needed, may be opened as needed
 - d. may be opened as needed, are sealed closed

Senior Reactor Operator Examination

40. The following conditions exist:

- Unit 1 is at 100% power
- Unit 2 is currently off loading fuel to the Spent Fuel Pool
- Current Spent Fuel Pool temperature is 105°F
- 1FC01P "SFP Cooling Pump" is OOS for maintenance
- 2FC01P "SFP Cooling Pump" was running and tripped for unknown reasons

Per 0BwOA REFUEL-3, which of the following actions should take place:

- a. Start one FHB Charcoal Booster Fan and two Aux Building Charcoal Booster Fans.
- b. Align a RWST to the SFP and start one Aux Building Charcoal Booster Fan.
- c. Align Recycle Hold Up Tank to the SFP.
- d. Place the Skimmer Loop in Service.

41. The plant is operating at 100% power when the Controlling S/G Level Channel on 'A' S/G fails to 100%.

If no operator action is taken, what is the expected plant response?

- a. Feedwater flow to 'A' S/G will INITIALLY INCREASE, then DECREASE causing S/G level to STABILIZE at a level HIGHER THAN PROGRAM.
- b. Feedwater flow to 'A' S/G will INITIALLY DECREASE, then INCREASE causing S/G level to STABILIZE at a level LOWER THAN PROGRAM.
- c. Reactor trip will occur on Lo-Lo S/G level.
- d. Reactor trip will occur due to turbine trip.

42. Which of the following will close the MSIVs?

- a. 3.4 psig Cnmt pressure on 2/3 channels.
- b. 640 psig steam line pressure > P-11 on 1/3 channels on 1/4 lines.
- c. -100 psi/50sec < P-11 with SI blocked on 1/3 channels on 1/4 lines.
- d. 8.2 psig Cnmt pressure on 2/3 channels.

Senior Reactor Operator Examination

43. The following conditions exist on Unit 2:

- Reactor Power is at 50%, steady state.
- The Steam Dumps are in the Tave MODE and in Automatic
- The Reactor Operator adjusts the steam dump controller potentiometer from 7.28 to 8.00

Which of the following is a correct plant effect of the potentiometer change?

Fuel Cladding Temperature...

- a. increases due to increased steam demand.
- b. decreases due to a decrease in steam demand.
- c. remains constant due to the potentiometer only in circuit during Manual Mode.
- d. remains constant due to the potentiometer only in the circuit during STEAM PRESSURE Mode.

44. What is the SEQUENCE that occurs when a Main Feed pump LOW NPSH signal is actuated?

- a. The CD 152 valve (CD pump recirc) opens, the CD/CB aux oil pump starts, the CD/CB pump starts.
- b. The CD/CB pump starts then the CD 152 valve (CD pump recirc) opens.
- c. The CD 152 valve (CD pump recirc) closes, the CD/CB aux oil pump starts, the CD/CB pump starts.
- d. The CD/CB pump starts then the CD 152 valve (CD pump recirc) closes.

Senior Reactor Operator Examination

45. The following conditions exist on Unit 1:

- Reactor power is 100%
- All systems are normal
- 1FT-512 is selected for steam flow input into SGWLC for S/G 1A

With NO OPERATOR ACTION, what is the effect of the pressure transmitter associated with FT-512 failing low?

1A S/G level will decrease, feed pump speed ...

- a. will decrease, and S/G level will decrease below the LO-2 setpoint.
- b. is unaffected, and S/G level will return to normal.
- c. will increase, and S/G level will return to normal.
- d. is unaffected, and S/G level will decrease below LO-2 setpoint.

46. A Unit 1 RCS cooldown is in progress with the A auxiliary feedwater pump maintaining level in all steam generators. Instrument bus 111 is deenergized.

Auxiliary feedwater system flow control valves (1AF005a-d)

- a. Fail as is.
- b. Fail Open.
- c. Fail Closed.
- d. Are not affected.

47. A Reactor Trip has just occurred on Unit 1. Following the main generator trip, Automatic Bus Transfer failed to operate for Busses 156 and 157. Which ONE of the following describes the 6.9 KV Bus AND RCP status?

- a. All Feed and Load Breakers Open on Busses 156 and 157.
Only the 1A and 1B RCPs trip due to Bus Undervoltage.
- b. All Load Breakers Open on Busses 156 and 157.
Only the 1A and 1B RCPs trip due to Bus Underfrequency.
- c. All Load Breakers Open on Busses 156 and 157.
All RCPs trip due to Bus Undervoltage.
- d. All Feed and Load Breakers Open on Busses 156 and 157.
All RCPs trip due to Bus Underfrequency.

Senior Reactor Operator Examination

48. During operation at power with the Reactor Trip Breakers closed, a LOSS of 125 VDC control power to one of the Reactor Trip Breakers occurs.

Which of the following describes how that Reactor Trip Breaker will respond?

- a. Trips OPEN due to loss of power to the SHUNT coil.
- b. Trips OPEN due to loss of power to the UNDERVOLTAGE coil.
- c. Is NOT capable of tripping on a SHUNT trip.
- d. Is NOT capable of tripping on an UNDERVOLTAGE trip.

49. Given the following conditions:

- Unit 2 is in MODE 3 at 500°F
- The MCB indication for DC Bus 211 indicates 0 volts
- Pressurizer Spray Valve 2RY455B is stuck open
- RCS pressure is lowering

Which of the following will stop the RCS depressurization?

- a. Energize all Pressurizer heaters.
- b. Trip the 2D RCP locally at its breaker.
- c. Isolate Instrument Air to Containment.
- d. Secure the 2C RCP from the Main Control Room.

50. The 1A DG is not running.

Which of the following combinations of Diesel Generator Air Receiver pressures is sufficient to maintain the 1A Diesel Generator OPERABLE per BwOP DG-1 "Diesel Generator Alignment to Standby Condition?"

	Receiver A (PSIG)	Receiver B (PSIG)
a.	170	100
b.	0	240
c.	170	170
d.	0	170

Senior Reactor Operator Examination

51. The 2A Diesel Generator is NOT running. The lead Fuel Oil Transfer pump starts in response to low level in the Fuel Oil Day Tank. This pump fails to develop adequate discharge pressure but continues to run.

The second Fuel Oil Transfer pump will ...

- a. NOT start because it is not selected to start on low level.
- b. NOT start unless DG engine speed reaches 100 RPM.
- c. start if in AUTO.
- d. start immediately if the running pump is placed in Pull Out.

52. The waste gas discharge control modulating valve (RCV 014)....

- a. must be opened by first dialing the controller to 50%, then placing the open control switch to the OPEN position.
- b. will close automatically and an alarm will be activated when vent stack activity exceeds the high alarm setpoint on OPR2J.
- c. controls pressure at 1.3 psig from a gas decay tank to the hold up tanks.
- d. maintains a constant downstream pressure to ensure a constant discharge flowrate.

53. The Main Control Room Outside Air Intake Radiation Monitors (gaseous) are separated into Train A and Train B (0RE-PR031B and 0RE-PR032B for Train A and 0RE-PR033B and 0RE-PR034B for Train B).

Which of the following is correct regarding the Main Control Room Outside Air Inlet Radiation Monitors (gaseous)?

The MINIMUM conditions to initiate automatic actions are...

- a. 0RE-PR031B and 0RE-PR034B are in the OPERATE FAILURE condition.
- b. 0RE-PR031B and 0RE-PR033B are in the OPERATE FAILURE condition.
- c. 0RE-PR031B in HIGH alarm.
- d. 0RE-PR031B and 0RE-PR033B are in HIGH alarm.

Senior Reactor Operator Examination

54. The unit is presently at 90% and shutting down due to a loss of Instrument Bus 114. All systems are in automatic.

A Loss of Coolant Accident (LOCA) occurs. Which of the following statements best describes response of the 1B SX pump?

- a. Will automatically start on low system pressure.
- b. Will have to be manually started.
- c. Cannot be started from the control room.
- d. Will automatically start on a Manual SI actuation.

55. Given the following Unit 1 conditions:

- Reactor power - 100%
- 1B D/G surveillance test in progress - full load
- 1B SX pump - running
- 1A SX pump - available

The 1B SX pump tripped due to electrical problem with Bus 142. The US directs a start of the 1A SX pump.

What is the SEQUENCE for starting the 1A SX pump in these conditions?

The operator will ...

- a. take the 1A SX pump switch to START and release. The pump will start after a delay.
- b. take the 1A SX pump switch to START and hold until the pump starts.
- c. start the auxiliary oil pump, take the 1A SX pump switch to START and release. The pump will immediately start.
- d. start the auxiliary oil pump, wait 5 seconds, take the 1A SX pump switch to START and hold until the pump starts.

Senior Reactor Operator Examination

56. Which of the following would occur on a small tube leak in the Component Cooling Water (CC) Heat Exchanger?
- a. Automatic CC System makeup from the Primary Water System only would occur, providing the necessary level for CC pump operation.
 - b. CC System liquid inventory would increase, thus increasing the CC flowrate to components cooled by the CC System.
 - c. CC would leak into the Essential Service Water (SX) System, potentially contaminating the SX System.
 - d. CC surge tank level would increase, which would cause water to overflow through the vent valve.

57. Unit 1 is currently in Mode 4.
1A RH train is in service providing shutdown cooling.
RCS temp - 340°F
RCS pressure - 350 psig

Unit 2 is in Mode 1 at 100% power.

Equipment OOS for maintenance:

1B CW pump	"OC" WS pump
1A CC pump	U2 SA Compressor

A loss of the Unit 1 SAT occurs due to a sudden pressure actuation.

With NO operator action, Unit 1 will experience an uncontrolled _____ and Unit 2 will _____.

- | | |
|-------------|--------------------------|
| a. cooldown | trip on Lo-Lo S/G level. |
| b. heatup | not be affected |
| c. cooldown | not be affected |
| d. heatup | trip on Lo-Lo S/G level. |

Senior Reactor Operator Examination

58. Unit 1 is at 36% power, when a rapid drop in reactor power occurs and a rod bottom light (DRPI panel) appears for a rod in Control Bank A. The crew enters 1BwOA ROD-3, Dropped or Misaligned Rod, for determining, correcting, and recovering a dropped control rod.

Which of the following actions will actuate the ROD CONT URGENT FAILURE (Annun. 1-10-C6) alarm during the dropped rod recovery?

- a. Resetting Group 1A step counter to ZERO.
- b. Resetting Control Bank A P/A Converter to ZERO.
- c. Withdrawing the dropped rod to its bank position.
- d. Opening the Lift Coil Disconnect switches for the unaffected rods in CB "A".

59. Given the following Unit 1 conditions:

Reactor power is at 100% steady state

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Power range NIS	102%	103%	102%	102%
PZR pressure	1880 psig(455)	1910 psig(456)	2500 psig(457)	1905 psig(458)
PZR level	90%(459)	92%(460)	90%(461)	72%(462)
Tave	584°F	585°F	582°F	586°F
SG levels	43%(1A)	34%(1B)	89%(1C)	40%(1D)
(all S/G instruments for a S/G read the same level)				

What is the FIRST required action for these conditions?

- a. Verify a turbine runback is initiated.
- b. Reduce power to LESS THAN 100% indicated to ensure 8 hour average does NOT exceed 100% power.
- c. Trip the reactor and initiate actions of 1BwEP-0.
- d. Initiate a MANUAL Safety Injection and initiate actions of 1BwEP-0.

Senior Reactor Operator Examination

60. A reactor trip has occurred due to a turbine trip from full power. Narrow range steam generator levels are off scale low.

Why does 1BwEP ES-0.1, Reactor Trip Response, instruct the operator to feed the steam generators at greater than 500 GPM?

- a. Enhance natural circulation.
- b. Provide an adequate heat sink for decay heat removal.
- c. Ensure the steam generator U-tubes remain "wet" preventing dry steam generators.
- d. Prevent the formation of steam in the steam generator feed ring.

61. Given the following plant conditions on Unit 1:

- A reactor trip and SI signal have been generated due to a PZR vapor space LOCA
- ALL RCPs are stopped
- RCS subcooling is inadequate
- PZR level is 68% and INCREASING
- CNMT pressure is 6 psig and slowly INCREASING

The US is directing actions of 1BwEP ES-1.2 "Post LOCA Cooldown And Depressurization" and is checking to see if an RCP should be started.

Which of the following describes the correct actions?

- a. Start the 1A or 1B RCP.
- b. Start the 1C or 1D RCP.
- c. Do NOT start an RCP since PZR level is inadequate.
- d. Do NOT start an RCP since subcooling is inadequate.

Senior Reactor Operator Examination

62. The plant is operating at 100% power when a pressurizer safety valve inadvertently lifts. The PRT pressure is 20 psig.

Which of the following most closely approximates the tail pipe temperature of the open safety valve?

- a. 235°F
- b. 265°F
- c. 295°F
- d. 325°F

63. If Unit 1 is operating at 20% power with control rods in MANUAL and 1C RCP trips but the reactor is NOT manually tripped, which of the following sets of conditions describes the expected conditions for the parameter listed below?

Actual Reactor Power	Steam Flow for Affected Loop SG	Steam Flow for Other SGs
a. DECREASE,	DECREASE,	DECREASE
b. CONSTANT,	INCREASE,	INCREASE
c. CONSTANT,	DECREASE,	INCREASE
d. DECREASE,	INCREASE,	CONSTANT

Senior Reactor Operator Examination

64. The following plant conditions exist on Unit 1:

- PZR Level is 34%
- Combined RCP Seal Return flow is 12 gpm
- 1BWOA PRI-1 has been entered due to an Identified RCS leakage of 8 gpm
- Letdown Flow is isolated

Assume:

Tave constant

92 Gallons/% PZR Level

A loss of all CV pumps is preventing makeup to the RCS. With NO OPERATOR ACTION what is the longest amount of time the crew will have until they are procedurally required to trip?

- a. 78 minutes.
- b. 138 minutes.
- c. 195 minutes.
- d. 345 minutes.

65. The following plant conditions exist:

- Unit 1 40% reactor power steady state conditions
- Rod Control Automatic
- Letdown 75 gpm through 1A L/D Hx

Temperature Control Valve (1CC130A), CC flow control valve, repositions due to a loss of IA to the valve positioner. Which of the following describes the plant response to the event?

- a. 1TCV-129 opens bypassing flow around the demineralizers.
- b. Control rods step out due to a reduction in RCS temperature.
- c. Control rods step in due to rising RCS temperature.
- d. RCS temperature falls requiring dilution to restore temperature.

Senior Reactor Operator Examination

66. Which of the following valve combinations and flows for emergency boration are allowed in accordance with 1BwOA PRI-2, "Emergency Boration?"
- a. 1CV112B, VCT Outlet Isolation Valve FULL OPEN and 1CV121, Charging Line Flow Control Valve, FULL OPEN with maximum charging header flow.
 - b. 1CV112C, VCT Outlet Isolation Valve, CLOSED, and 1CV8104, Emergency Boration Valve, FULL OPEN with maximum charging header flow.
 - c. 1CV112D, RWST to Cent Chg Pump Suction Valve, FULL OPEN, and 1CV8485A, CV Pump Disch Valve THROTTLED to balance high head SI flow and Letdown flow.
 - d. 1CV8104, Emergency Boration Valve, FULL OPEN, and 1CV8485A, CV Pump Disch Valve THROTTLED to balance high head SI flow and Letdown flow.

67. Given the following plant conditions on Unit 1:

- Reactor power 75%
- PZR pressure control selected to 455/456
- Pressure channel 1PT-457 fails LOW

1BwOA INST-2 "Operation With A Failed Instrument Channel" is entered and the required actions for the failed channel are performed.

How is the PZR PORV operation affected with the failed channel Out of Service?

- a. ONLY PORV PCV-456 will NOT CLOSE, if OPEN in AUTO, when PZR pressure decreases to the PORV blocking signal.
- b. Neither PORV will CLOSE, if OPEN in AUTO, when PZR pressure decreases to the PORV blocking signal.
- c. ONLY PORV PCV-456 will NOT OPEN when PZR pressure increases to its OPEN setpoint.
- d. Neither PORV will OPEN when PZR pressure increases to their OPEN setpoint.

Senior Reactor Operator Examination

68. Given the following plant conditions on Unit 1:

- Power level 77%
- PZR pressure 2235 psig
- RCS Tave 577°F (A) 575°F (B) 579°F (C) 575°F (D)
- PZR Level Channel Selector Switch - 459/460 position

The CV121 Flow Controller, FK-121, fails such that charging flow to the RCS is increased.

What would PZR level read on 1LI-459 when annunciator 1-12-C3, "PZR LEVEL CONT DEV HIGH HTRS ON", actuates?

- a. 52%
- b. 56%
- c. 57%
- d. 61%

69. Given the following conditions:

- The unit is at 8% power.
- Plant startup is in progress
- PZR level instrument 1LT-459 has failed LOW.
- All actions of 1BwOA INST-2 "Operation with a Failed Instrument Channel" Attachment C are complete.

Which of the following describes the crews minimum course of action if there is a subsequent failure of PZR level instrument 1LT-460 HIGH?

- a. Verify reactor trip.
- b. Stop the startup and restore one of the failed channels of pressurizer level to OPERABLE status prior to increasing power above 10%.
- c. Stop the startup and restore both of the failed channels of pressurizer level to OPERABLE status prior to increasing power above 10%.
- d. Within one hour initiate ACTION to be in at least HOT STANDBY within the next 6 hours.

Senior Reactor Operator Examination

70. While performing the immediate actions of BwFR-S.1," Response to Nuclear Power Generation/ATWS", the operator was directed to verify a turbine trip. Subsequently, in Step 8, the operator is again directed to verify a turbine trip. If the main turbine has not tripped at this point, the crew is directed to trip the main turbine locally.

Why wasn't the operator directed to trip the main turbine locally during the immediate actions of the procedure?

- a. Local operators are busy isolating the steam dumps.
- b. The main turbine can still be used to draw steam for RCS temperature control.
- c. The main turbine can still be used to maintain S/G water level due to no MFW pump trip.
- d. Local operator actions are more time consuming to initiate and complete.

71. The following plant conditions exist:

- A fuel assembly has just been removed from the core.
- Immediately after initiating transit to the upender, the refueling cavity level is reported to be a foot below normal and dropping at a visible rate.

Which of the following is the preferred course of action?

- a. Stop the refuel movement at the current location in transit to the upender.
- b. Place the fuel assembly back into the reactor vessel.
- c. Place the fuel assembly in the upender and lower it to the horizontal position.
- d. Position the mast over the deepest part of the cavity and lower the assembly to the bottom.

Senior Reactor Operator Examination

72. A SGTR has occurred on Unit 1. Current conditions are:

- RCS pressure 1350 psig
- RCS temperature (CETCs) 545° F
- SG pressures 930 psig (A) 1145 psig (B) 940 psig (C) 940 psig (D)
- SG 1B has been confirmed as the SG with the rupture.

While performing the steps of 1BwEP-3, "Steam Generator Tube Rupture", the Unit Supervisor found ALL available copies of the procedure had an illegible page. This page contained the required temperatures for determining RCS cooldown temperatures.

The US directs you to use the steam tables to determine the required RCS (core exit) temperature with an allowance of 50° F for subcooling.

The required core exit temperature after the RCS cooldown is ...

- a. 513°F
- b. 518°F
- c. 534°F
- d. 538°F

73. The following plant conditions exist:

- An initial plant startup is in progress, per 1BwGP 100-3, from a refueling outage.
- The reactor is initially at 13% power.
- The Main Turbine is at 600 rpm.
- Trips associated with Permissive P-10 have been blocked.
- Fouling of the circ water traveling screens has caused a reduction in condenser CW flow.
- Condenser vacuum decreases to indicate 7.0 inches Hg absolute.

Assuming no operator action, choose the statement below which describes the effect on the plant.

- a. The reactor will trip due to a turbine trip.
- b. The reactor will trip on NIS IR FLUX HI Setpoint.
- c. RCS temperature will increase until steam dumps actuate.
- d. RCS temperature will increase until Steam Generator PORVs actuate.

Senior Reactor Operator Examination

74. While at 35% power, a main feed water regulating valve fails open causing the affected SG level to exceed the hi-hi level setpoint. The reactor trips; however, NO SG level drops below the LO-LO level setpoint. Assuming NO operator action is taken, how many AF pump Lube Oil Pumps will be running 1 minute after the trip?
- a. None.
 - b. One.
 - c. Two.
 - d. Three.

75. Given the following plant conditions on Unit 1:

- Reactor power is 90%.
- RCS Tave is stable at 579°F on all 4 loops.
- RCS pressure is stable at 2235 psig.
- Containment Pressure is INCREASING.
- 1C SG Feed Flow is pegged HIGH.
- 1C SG Main FW Reg Valve is full OPEN.
- 1C SG pressure is STABLE.
- 1C SG level is DECREASING.

Which of the following events is in progress?

- Main FW Reg Valve failed OPEN.
- Feed Flow Indicator failed HIGH.
- Feed Line Break INSIDE Containment.
- Main Feed Pump trip.

76. Given the following plant conditions on Unit 1:

- 100% reactor power.
- A voltage transient caused the DC Bus 113 supply fuses to blow.
- The reactor was manually tripped due to adverse secondary transients.
- One minute after performing the immediate action steps of 1BwEP-0 "Reactor Trip or Safety Injection", an operator was dispatched to open the PMG output Breaker.

After the PMG output breaker is opened, Bus 143 will be _____ and Bus 144 will be _____.

- | | |
|-----------------|--------------|
| a. energized | energized |
| b. energized | de-energized |
| c. de-energized | energized |
| d. de-energized | de-energized |

Senior Reactor Operator Examination

77. Which of the following signals will cause the Radwaste Release Tank Pump (0WX53P) to trip?
- a. High radiation condition on OPR01J "Liquid Radwaste."
 - b. Low flow from the Circ Water system.
 - c. Low level of 16% in the Radwaste Release Tank.
 - d. High level of 90% in the Regeneration Waste Drain Tank.
78. A waste gas decay tank release is in progress. Which of the following malfunctions occurring during the release could result in a release outside of permitted limits assuming no operator action?
- a. Loss of instrument air to OGWRCV014 "Gas Decay Tank Vent Stack Effluent Isolation Valve."
 - b. Gas Decay Tank Cover Gas Pressure reaches .7 psig.
 - c. OPR02J "Waste Gas Processing Rad Monitor" fails low.
 - d. In service Gas Decay Tank pressure reaches 95 psig.

79. The following plant conditions exist:

0B Gas Decay Tank is now in service.
0E Gas Decay Tank is in Standby.
0A Gas Decay Tank was in service and is currently isolated.

Previously while the 0A Gas Decay Tank was in service, Chemistry reported that the curie content was 7×10^4 curies with a pressure of 88 psig. 0BwOA RAD-3 was entered and the 0A Gas Decay Tank was taken off-line and isolated.

Transferring the 0A Gas Decay Tank to another Gas Decay Tank is required until 0A Gas Decay Tank pressure is ...

- a. 47 psig.
- b. 58 psig.
- c. 62 psig.
- d. 73 psig.

Senior Reactor Operator Examination

80. - You are the Unit 1 Unit Supervisor.
- A fire has occurred in the Main Control Room.
- Smoke in the Main Control Room is growing very heavy.
- The order has been given to evacuate the control room.

You should direct a reactor trip and go to the...

- a. Remote Shutdown Panel to obtain plant control.
 - b. Reactor trip breakers to verify Reactor Trip.
 - c. Fire Hazards Panel to obtain plant control.
 - d. Auxiliary Electric Room to align needed instrumentation.
81. Per Tech Spec Basis regarding high containment pressure, which of the following events could lead to the highest pressure/leakage out of containment?
- a. Design Basis LOCA.
 - b. Design Basis Steam Line Break inside Containment.
 - c. Inadvertant Containment Spray Initiation.
 - d. Pressurizer vapor space LOCA.
82. Which of the following is NOT a high level action of 1BwFR-Z.1, "Response to Containment High Pressure?"
- a. Verify containment isolation.
 - b. Verify containment heat removal.
 - c. Reduce heat input to containment.
 - d. Check for and isolate faulted steam generator.

Senior Reactor Operator Examination

83. 2BwFR-C.1, "Inadequate Core Cooling" must be entered if CETCs are greater than or equal to...
- a. 700°F ONLY.
 - b. 1200°F ONLY.
 - c. 700°F AND RCS Subcooling Unacceptable.
 - d. 1200°F AND RCS Subcooling Unacceptable.

84. The following plant conditions exist:

A reactor trip and loss of offsite power occurred.
Reactor power was initially at 100%.
Tavg is 531°F.
Tcold is at 527°F.
Thot is at 534°F.
Average of the ten (10) hottest CETC's is 538°F.
Pressurizer pressure is at 2185 psig.

Which of the following is the subcooling that currently exists?

- a. 92°F
- b. 102°F
- c. 111°F
- d. 121°F

Senior Reactor Operator Examination

85. A Small Break LOCA occurred on Unit 2 resulting in a reactor trip/SI. While performing the Immediate Actions of 2BwEP-0, the Main Turbine did not trip and the crew successfully performed ALL actions of the RNO for verifying a Turbine Trip. From 2BwEP-0 the crew transitioned to 2BwEP-1. At step 6 of 2BwEP-1, "Check if ECCS flow should be reduced" RCS pressure starts decreasing rapidly. The crew notes steam flows on ALL 4 Steam Generators. The crew transitions to 2BwEP ES-0.0 "Rediagnosis"
- From 2BwEP ES-0.0, the crew should transition to...
- a. 2BwEP-2, "Faulted Steam Generator Isolation."
 - b. 2BwCA-2.1, "Uncontrolled Depressurization of All SGs."
 - c. 2BwEP ES-1.1, "SI Termination."
 - d. 2BwEP-0, "Reactor Trip or Safety Injection."
86. Which of the following is NOT a condition in which a transition to 1BwEP ES-0.0, "Rediagnosis", is allowed?
- a. Large Break LOCA, RCS Temperature 563°F, RCS Pressure 1000 psig, PZR Level Off-Scale Low.
 - b. Main Steam Line Break inside containment, Containment Pressure 23 psig.
 - c. Main Steam Line Break outside containment, SG Pressures - 1A - 560 psig, 1B - 570 psig, 1C - 570 psig, 1D - 590 psig.
 - d. Reactor Trip due to P-14, RCS Temperature 557°F, RCS Pressure 2100 psig, PZR Level 20%.
87. A small break LOCA has occurred on Unit 1. The crew has transitioned to 1BwEP-1, "Loss of Reactor or Secondary Coolant" and is evaluating SI termination criteria in step 6.
- Which of the following is used to determine if adequate core cooling exists?
- a. RCS wide range temperature.
 - b. ECCS injection flow rate.
 - c. RVLIS indication.
 - d. Subcooling margin.

Senior Reactor Operator Examination

88. Which of the following describes the methods in order of preference used in 1BwEP ES-1.2, "Post LOCA Cooldown and Depressurization" during the performance of step 10, Depressurize RCS to Refill PZR?
- a. One Pzr PORV, Normal Spray, Aux. Spray.
 - b. One Pzr PORV, Aux. Spray, Normal Spray.
 - c. Normal Spray, Aux. Spray, One Pzr PORV.
 - d. Normal Spray, One Pzr PORV, Aux. Spray.
89. A Large Break LOCA has occurred on Unit 1 and a transition to 1BwEP-1, "Loss of Reactor or Secondary Coolant," has been made. Subsequently, 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation," was implemented. Currently, the operators are aligning the SI and CV pumps for Cold Leg Recirculation per Step 5. The STA reports a RED path in Heat Sink.

The proper course of action for the operator is to...

- a. immediately suspend 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation," and implement 1BwFR H.1, "Loss of Secondary Heat Sink."
- b. only complete aligning ECCS for Cold Leg Recirculation steps of 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation," and then implement 1BwFR H.1, "Loss of Secondary Heat Sink."
- c. complete all steps of 1Bw EP ES-1.3, "Transfer to Cold Leg Recirculation," and then implement 1BwFR H.1, "Loss of Secondary Heat Sink."
- d. immediately implement 1BwFR H.1, "Loss of Secondary Heat Sink," while concurrently aligning ECCS for Cold Leg Recirculation per 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation."

Senior Reactor Operator Examination

90. Unit 1 is in MODE 4 on RH cooldown with the following plant conditions:

RCS Temperature	340°F slowly lowering			
RCS pressure	300 psig lowering			
PZR level	42% lowering			
CNMT pressure	0.2 psig			
Alarm received for ECCS cubicle radiation (GRID 2)				
SG levels	42% (A)	40% (B)	43% (C)	40% (D)
SG pressures	115 psig (A)	115 psig (B)	115 psig (C)	115 psig (D)

What event is taking place?

- a. A steam leak has occurred inside CNMT.
- b. The Cold Overpressure system has actuated.
- c. Letdown line pressure control valve, 1PCV-131, has failed open.
- d. A LOCA has occurred on the suction of the RH pump.

91. The following conditions exist on Unit 2:

- Reactor power was 8% prior to the event below.
- A failure in the feedwater control system caused ONE S/G level to rise to 83%.
- The main turbine tripped.
- S/G levels have returned to their normal level range
- The Startup FW Pump is running

What are the minimum set of conditions that would have to be met to feed the S/Gs using the 2FW034s Feedwater Tempering Flow Control valves?

- a. The FW Isolation Aux Relays would have to be reset and 2FW035 Feedwater Tempering Isol valves opened.
- b. The reactor trip breakers would have to be cycled, the FW Isolation Aux Relays would have to be reset and 2FW035 Feedwater Tempering Isol valves opened.
- c. The FW Isolation Main Relays and Aux Relays would have to be reset and 2 FW035 Feedwater Tempering Isol valves opened.
- d. The reactor trip breakers would have to be cycled and FW Isolation Main Relays and Aux Relays reset and 2FW035 Feedwater Tempering Isol valves opened.

Senior Reactor Operator Examination

92. All reactor core heat removal systems have failed and the RCS temperature is increasing.

When core exit thermocouple temperatures are greater than 700°F...

- a. the DNBR decreases to less than 1.3.
- b. the core is superheated.
- c. RCP damage is prevalent.
- d. fuel cladding failure is prevalent.

93. A steam void has been detected in the Unit 2 reactor vessel head during natural circulation cooldown. RVLIS is NOT available.

Which of the following means can be utilized by the operators to estimate the growth of the steam void per 2BwEP ES-0.4, "Natural Circulation Cooldown with Steam Void in Vessel (Without RVLIS)"?

- a. Pressurizer pressure indication changes.
- b. Pressurizer level indication changes.
- c. RCS Hot Leg temperature indications.
- d. Core Exit Thermocouple indications.

94. Step 1 of 1BwFR-C.3, "Response to Saturated Core Cooling," checks if the RH system has been placed in shutdown cooling mode.

Which of the following describes the basis for this step?

- a. To ensure a ORANGE or RED condition in Core Cooling will not arise while performing this procedure.
- b. To verify RH is aligned for long term cooling if the appropriate conditions are met.
- c. If RH is in shutdown cooling mode, the saturated core cooling condition is a problem with RH and this procedure will not address this condition.
- d. If RH is in shutdown cooling mode, the saturated core cooling condition is a problem with RH and this procedure will identify and isolate the affected train.

Senior Reactor Operator Examination

95. The following conditions exist on Unit 1:

- A natural circulation cooldown is in progress per 1BwEP ES-0.2 "Natural Circulation Cooldown."
- Pressurizer pressure is being controlled using Aux. Spray and Pzr heaters.
- As pressure is being lowered through 1300 psig, a rapid increase is noted in Pzr level.
- Charging and letdown are in manual and are balanced.

What action is required to be taken by the operators?

- a. Repressurize the RCS.
- b. Isolate the SI Accumulators.
- c. Increase the RCS cooldown rate.
- d. Place excess letdown in service.

96. Which of the following describes why it is important to run CRDM fans when performing a natural circulation cooldown?

- a. Provides the heat removal mechanism for the vessel head area.
- b. Aids in natural circulation flow through the RCS vessel head region.
- c. Prevents erratic indication of SR instrumentation.
- d. Aids in natural circulation flow through the RCS.

97. What are the MAXIMUM cooldown rates that apply for a cooldown from normal operating temperature for the RCS to 500°F in the following indicated procedures? (NOTE: all choices are applicable in any ONE hour period.)

1BwEP ES-0.3 "Natural Circulation Cooldown With Void In Vessel (With RVLIS)"

1BwEP ES-0.4 "Natural Circulation Cooldown With Void In Vessel (Without RVLIS)"

1BwEP ES-0.3 value	1BwEP ES-0.4 value
-----------------------	-----------------------

- | | |
|----------|-------|
| a. 50°F | 50°F |
| b. 50°F | 100°F |
| c. 100°F | 50°F |
| d. 100°F | 100°F |

Senior Reactor Operator Examination

98. Unit 1 reactor tripped approximately 1 hour ago due to a large steam break inside containment. The crew is currently in 1BwEP ES-0.3, "Natural Circulation Cooldown with Steam Voids in Vessel (with RVLIS)". Pressurizer level is currently at 95%.

Per 1BwEP ES-0.3, PZR Level should be reduced to less than 90% by ...

- a. cycling PZR heaters and securing the RCS cooldown.
- b. controlling charging and letdown.
- c. closing PZR sprays and energizing PZR heaters.
- d. ONLY establish maximum letdown.

99. Why are the S/Gs depressurized to less than 670 psig according to 1BwCA-1.1, "Loss of Emergency Coolant Recirculation"?

- a. To allow maximum AF flow to the S/Gs.
- b. To ensure adequate subcooling for restart of the RCPs.
- c. To set up conditions for controlled injection to the RCS from the accumulators.
- d. To decrease RCS temperature and pressure which reduces break flow in a LOCA condition.

100. The NSO reports that the Spray Additive Tank low-2 level light has just been received as a result of a Containment spray system actuation during a steam line break. Containment Pressure is currently 24 psig. Which of the following is correct concerning this situation? (Assume CS Actuation signal has been RESET)

- a. Allow the Containment spray system to operate AS-IS until containment pressure is < 15 psig.
- b. Manually shift the Containment spray system lineup to the post accident recirculation lineup.
- c. Manually close the motor operated isolation valve between the eductor and the spray additive tank (1CS019A/B).
- d. Stop all containment spray pumps until the spray additive tank is filled and vented per BwOP CS-3.

Senior Reactor Operator Answer Key

- | | |
|----------------------------|-------|
| 1. c | 26. a |
| 2. b | 27. d |
| 3. a | 28. d |
| 4. c | 29. b |
| 5. b | 30. d |
| 6. c | 31. a |
| 7. c | 32. c |
| 8. a | 33. a |
| 9. b | 34. b |
| 10. d | 35. d |
| 11. a | 36. c |
| 12. a | 37. d |
| 13. d | 38. b |
| 14. c | 39. a |
| 15. b | 40. a |
| 16. c | 41. c |
| 17. d c 11-1-00 | 42. d |
| 18. b | 43. d |
| 19. b | 44. c |
| 20. b | 45. a |
| 21. d | 46. c |
| 22. b | 47. a |
| 23. c | 48. c |
| 24. b | 49. b |
| 25. b | 50. b |

Senior Reactor Operator Answer Key

51. a	76. c
52. b	77. c
53. c	78. c
54. b	79. b
55. b	80. a
56. c	81. a
57. d	82. c
58. c	83. b
59. c	84. c
60. b	85. b
61. d	86. d
62. b	87. d
63. c	88. d
64. b	89. b
65. c	90. d
66. c	91. a
67. c	92. b
68. d	93. b
69. b	94. c
70. d	95. a
71. b	96. a
72. a	97. c
73. d	98. b
74. a	99. c
75. c	100. c

REV. 51A	DECAY TANK HIGH ACTIVITY UNIT 0	OBWOA RAD-3
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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ATTACHMENT A (PG 1 OF 1)
ACCEPTABLE PRESSURE CALCULATION

- 1 Calculate absolute pressure for affected gas decay tank:

$$P_A = (\text{indicated pressure}) + 15 \text{ psi}$$

- 2 Calculate pressure of affected gas decay tank at which activity will be within limits:

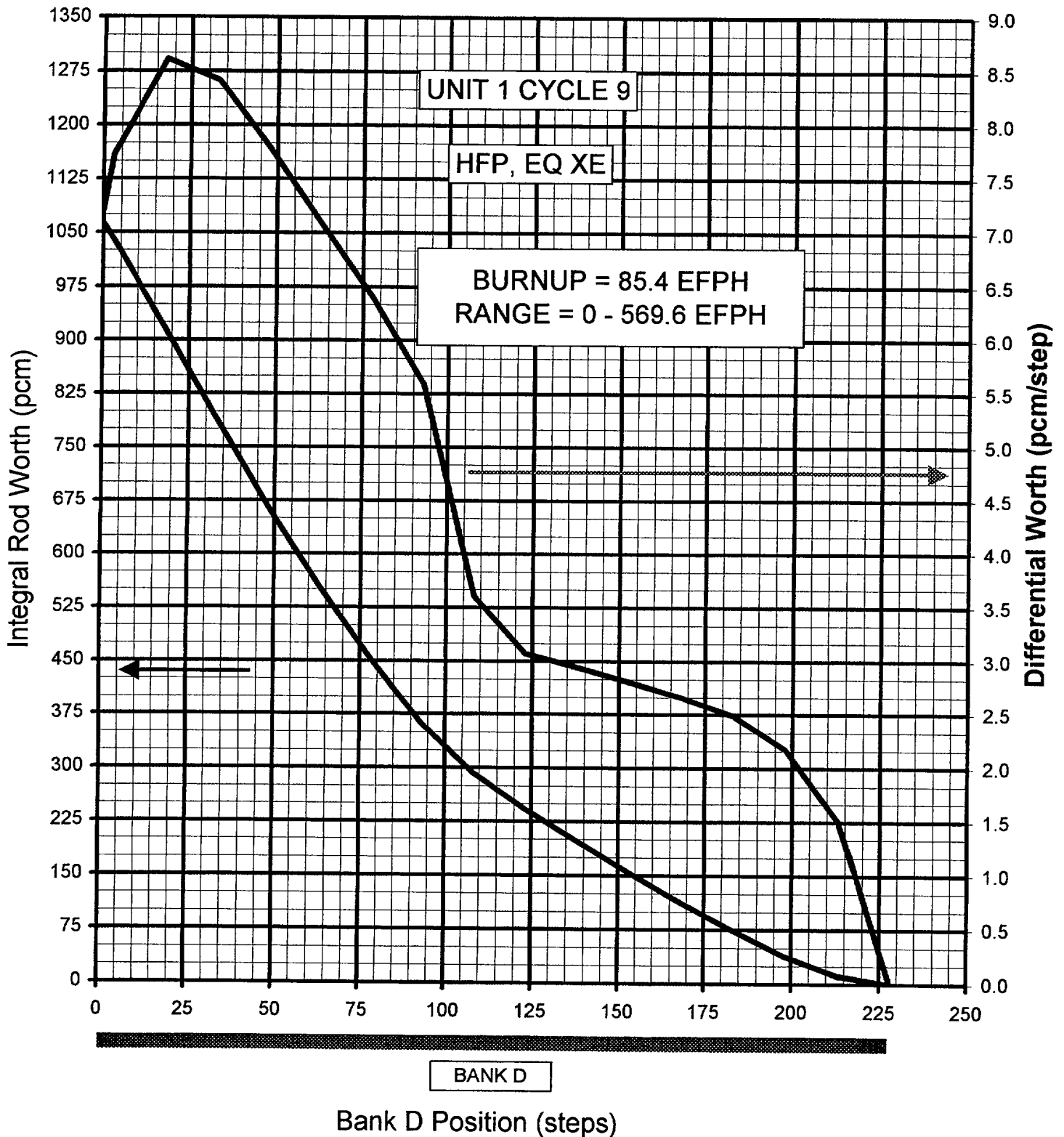
$$P_{Lim} = \frac{P_A \times 5 \times 10^4 \text{ curies}}{(\text{present tank activity in curies})}$$

- 3 Calculate indicated pressure equivalent to P_{Lim} :

$$\text{Indicated pressure} = P_{Lim} - 15 \text{ psi}$$

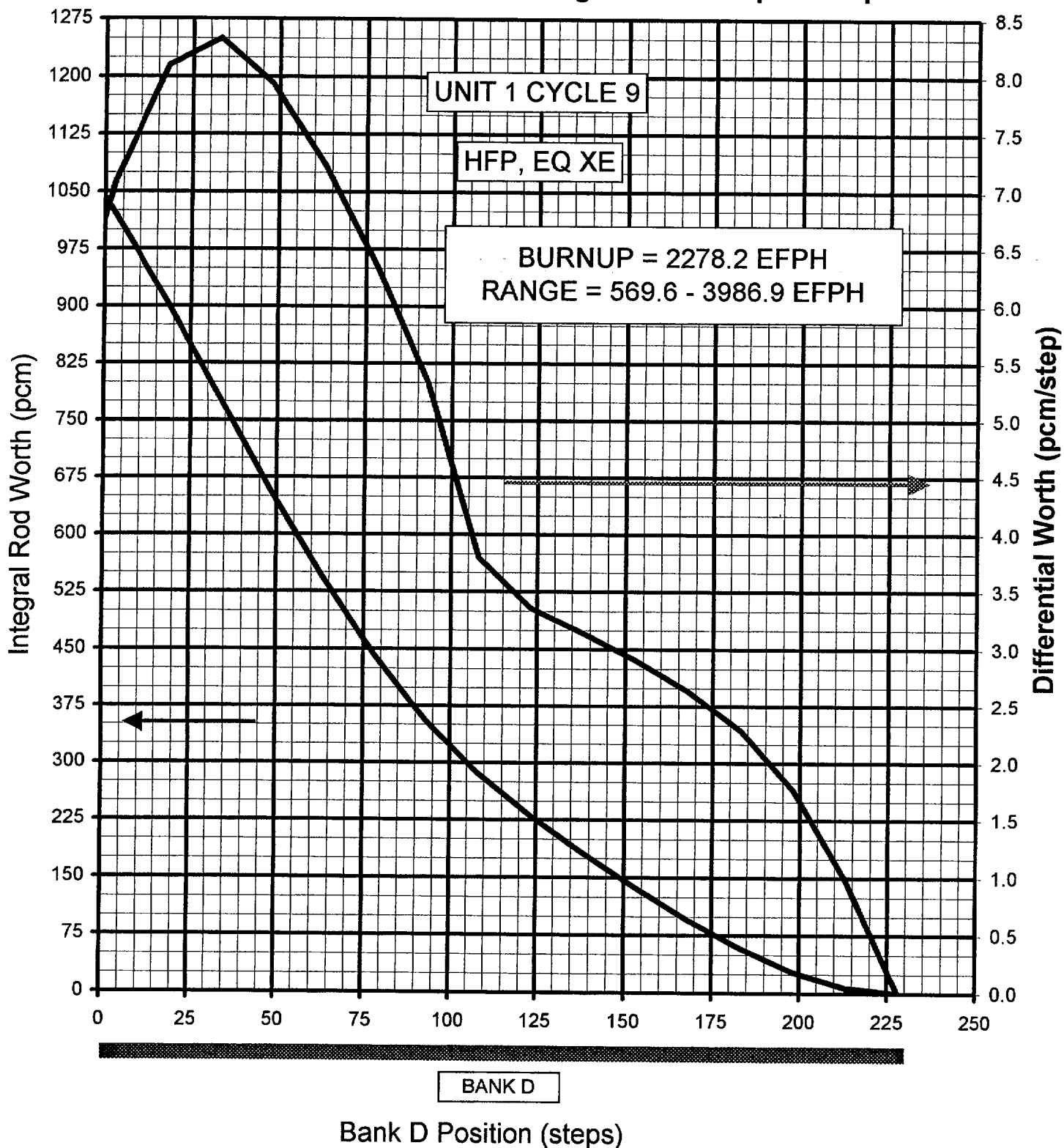
-END-

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



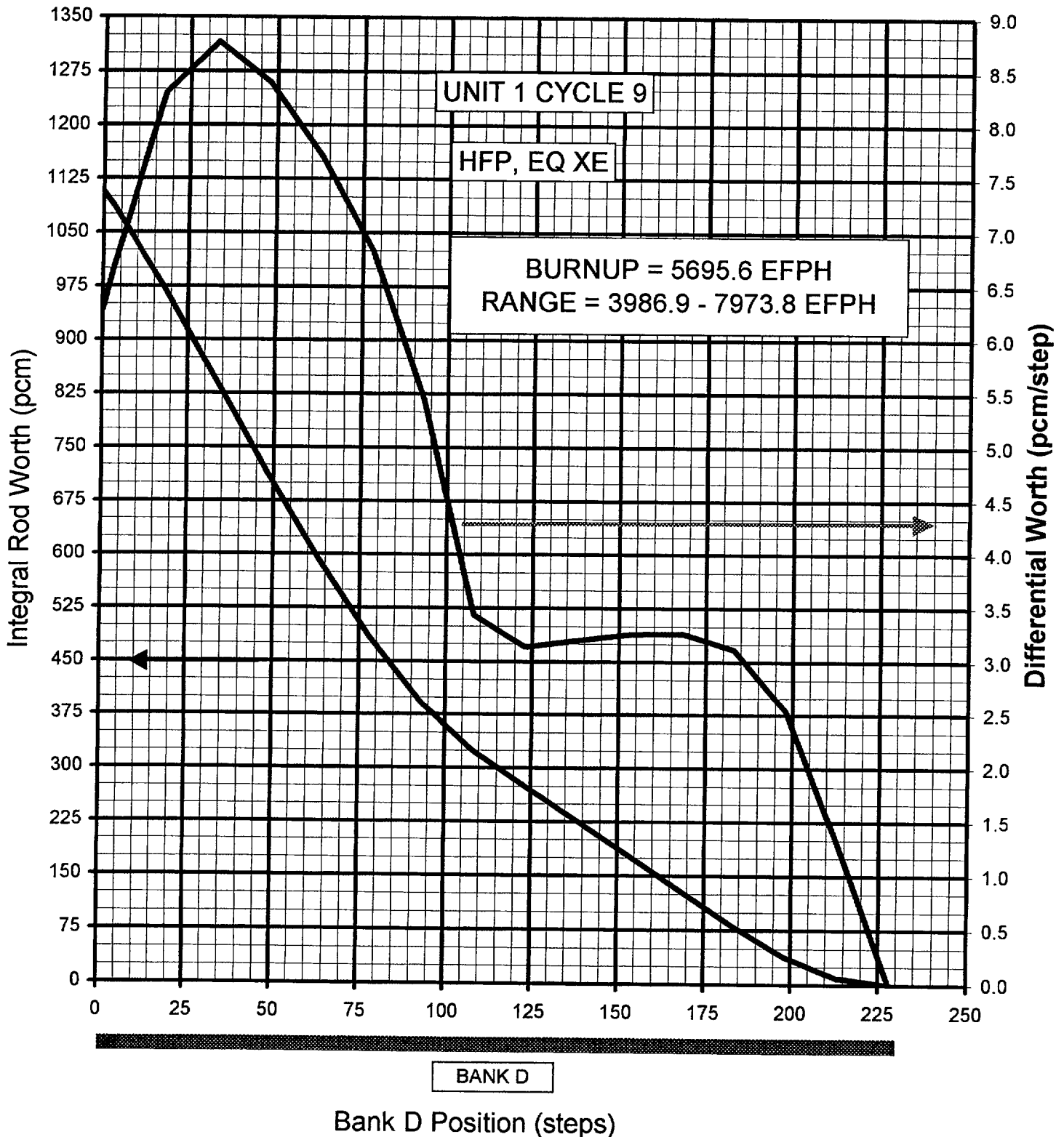
** EXPANDED SCALE **

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



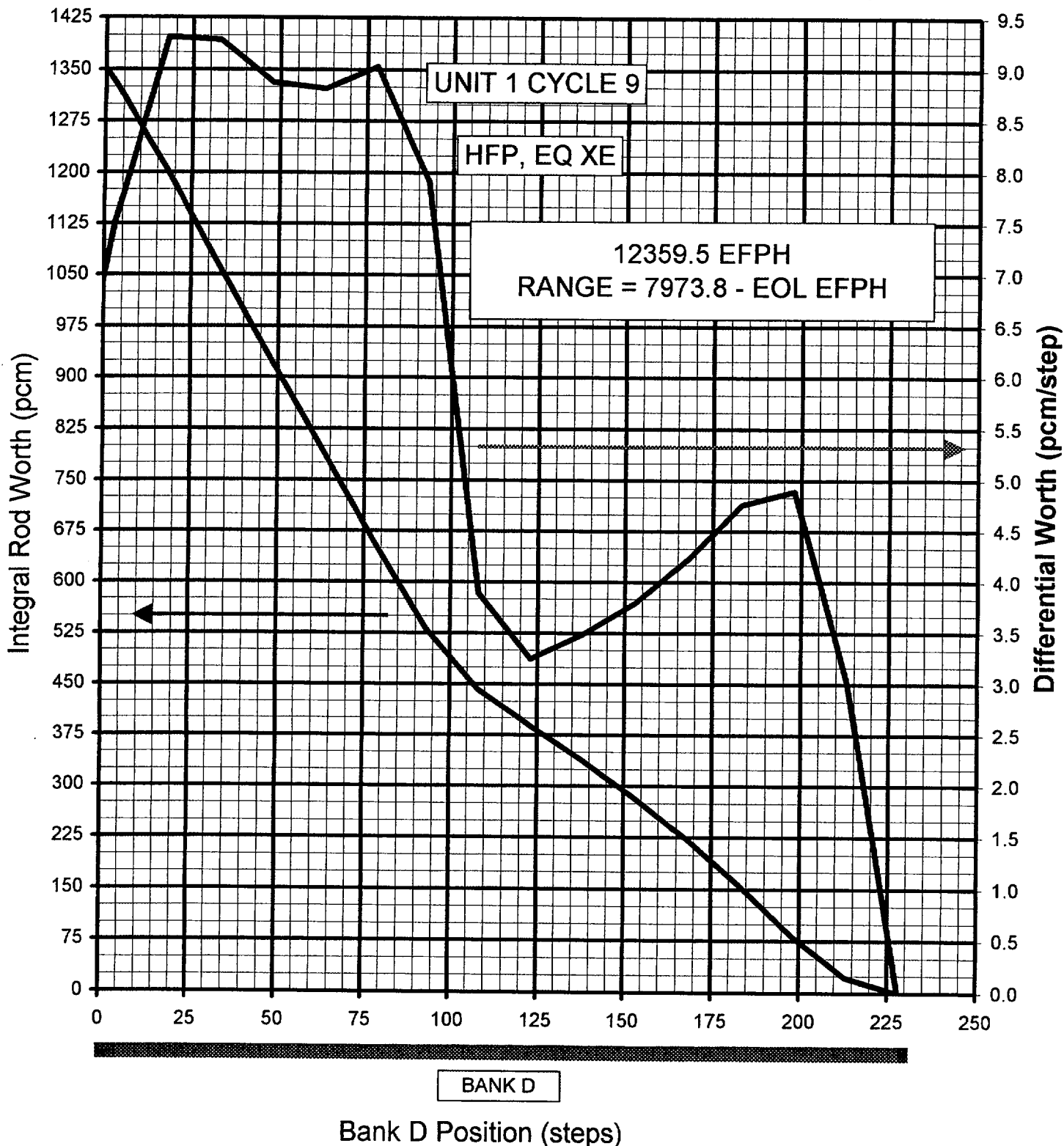
** EXPANDED SCALE **

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



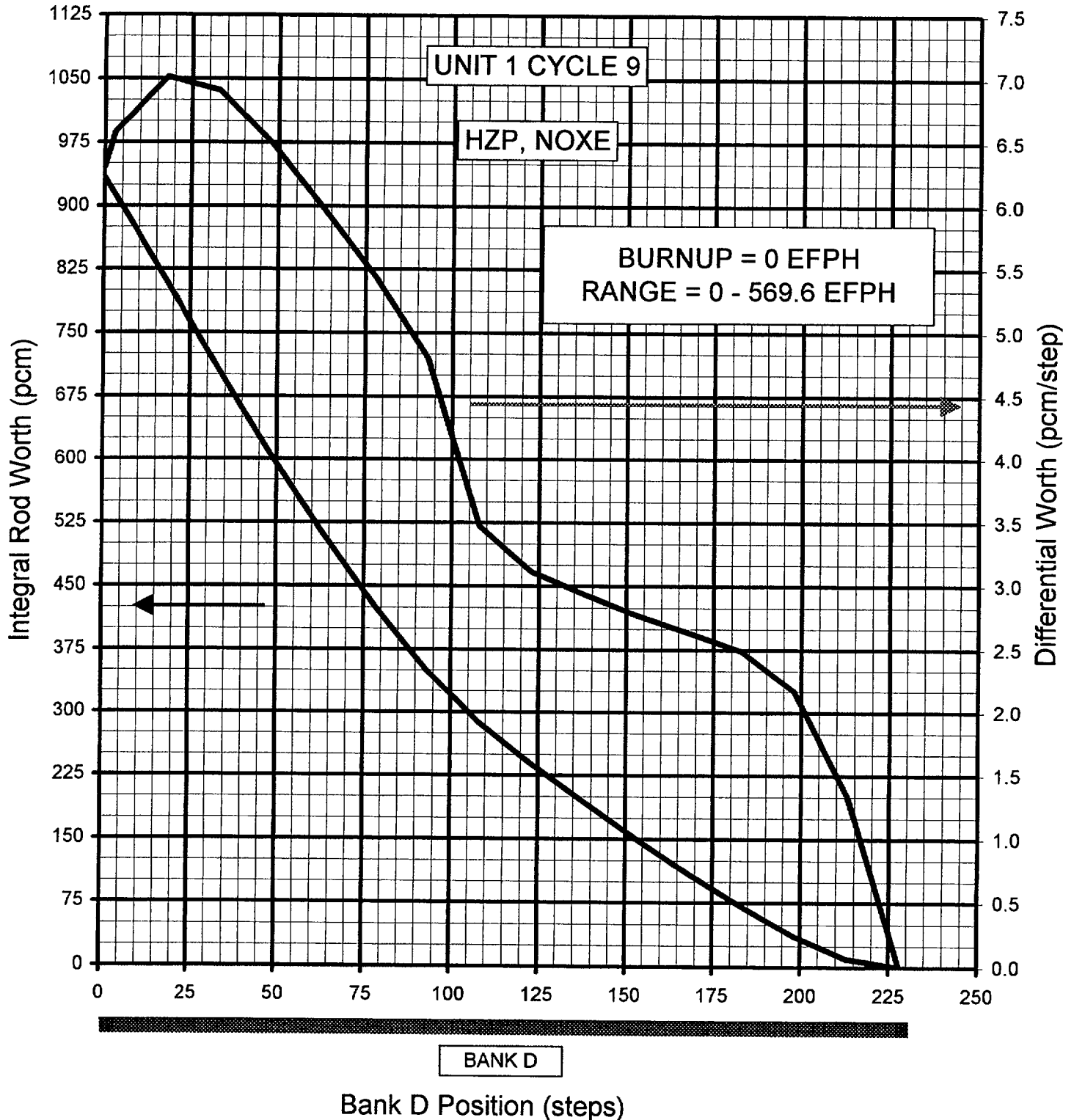
** EXPANDED SCALE **

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



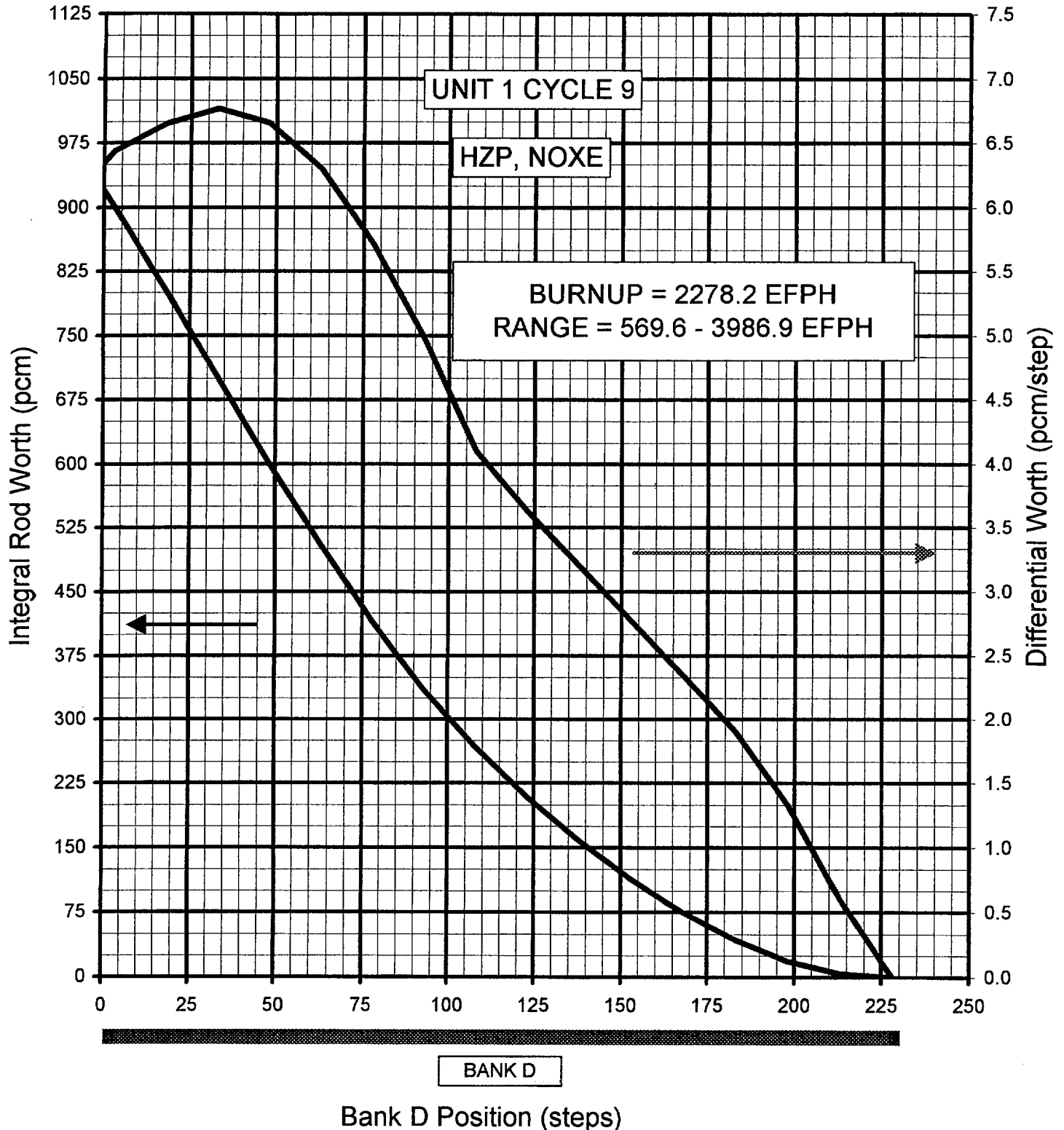
** EXPANDED SCALE **

**Differential and Integral Rod Worth vs. Steps Withdrawn
Control Banks D and C Moving with 113 Step Overlap**



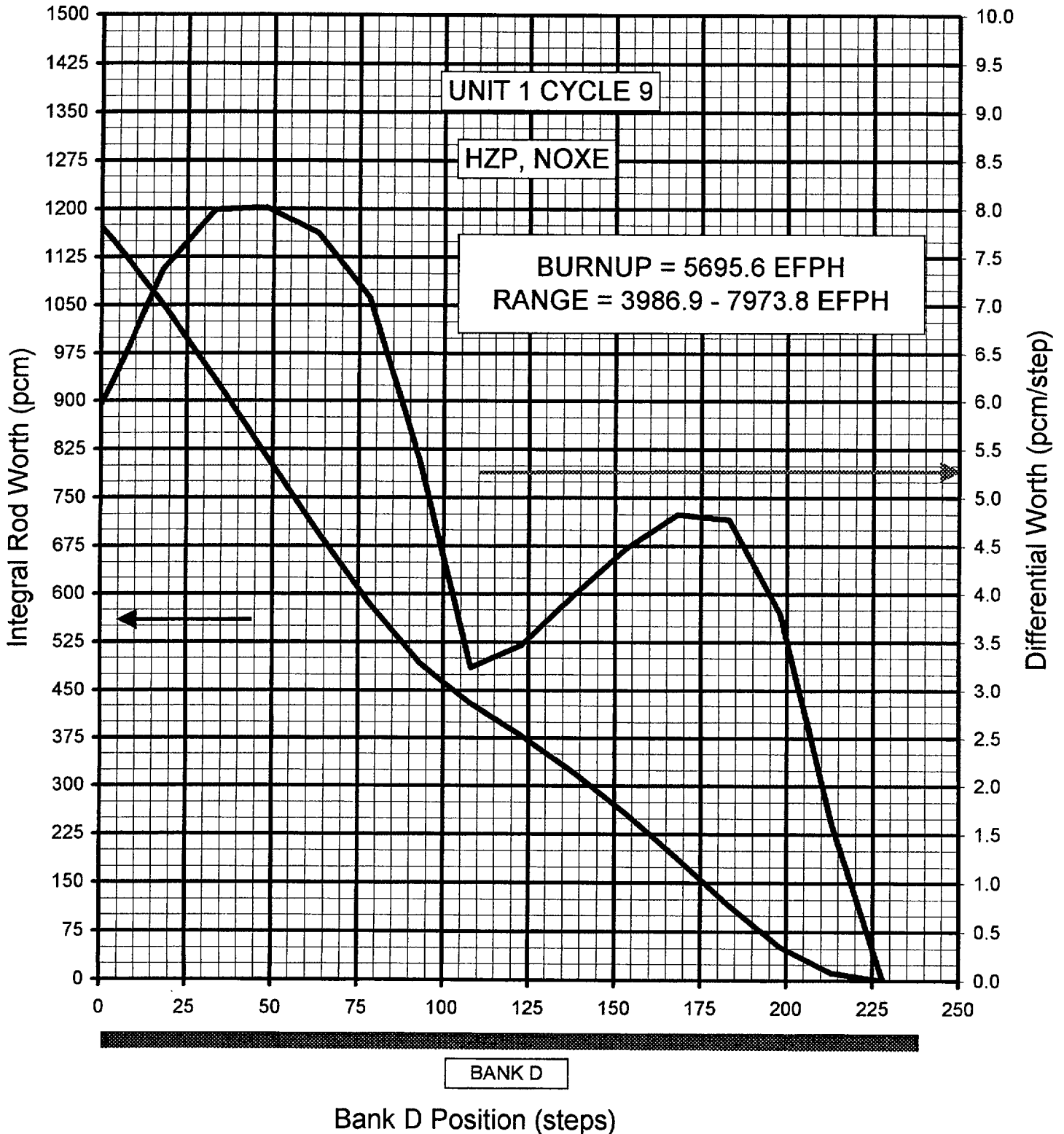
** EXPANDED SCALE **

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



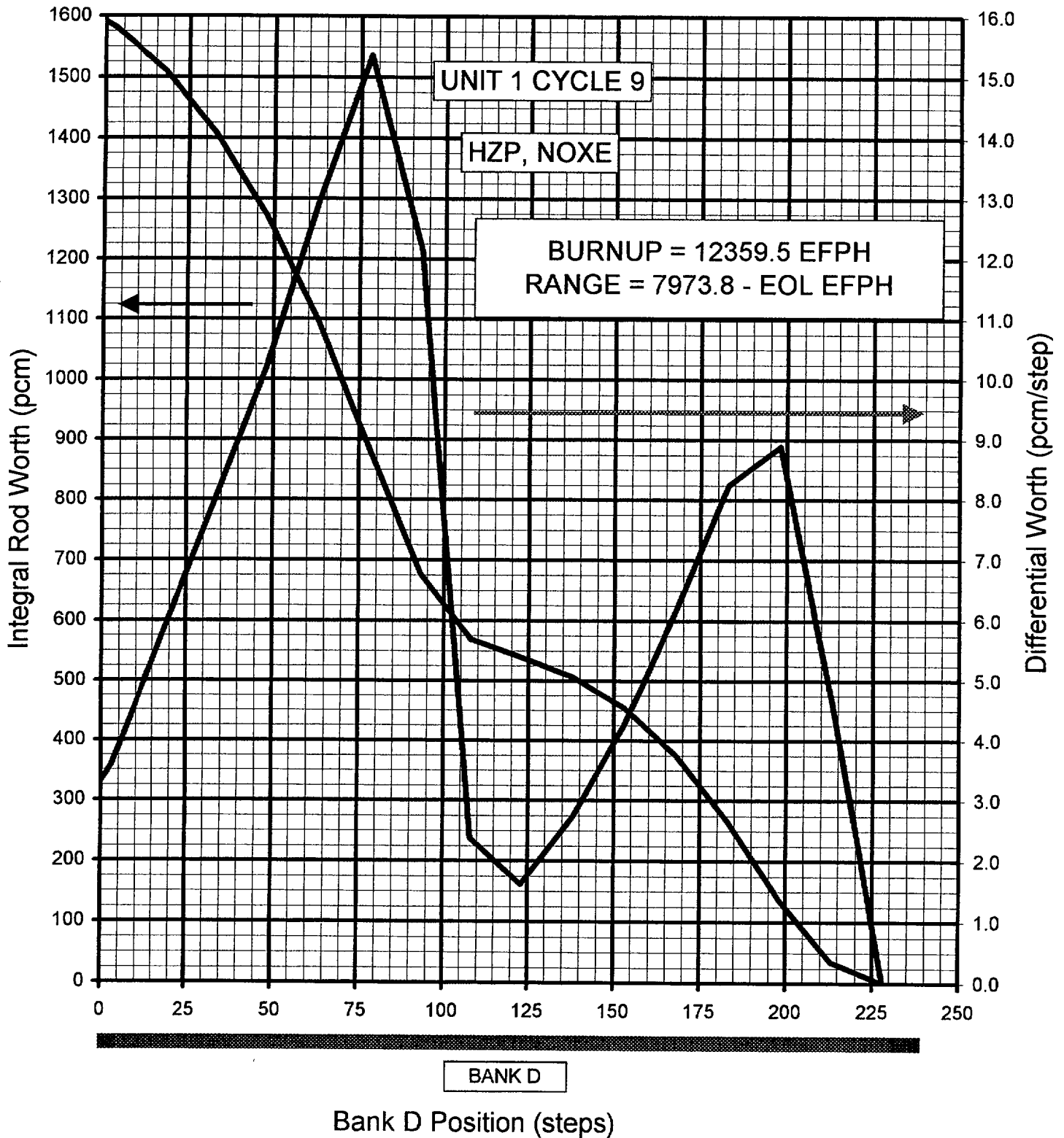
** EXPANDED SCALE **

Differential and Integral Rod Worth vs. Steps Withdrawn Control Banks D and C Moving with 113 Step Overlap



** EXPANDED SCALE **

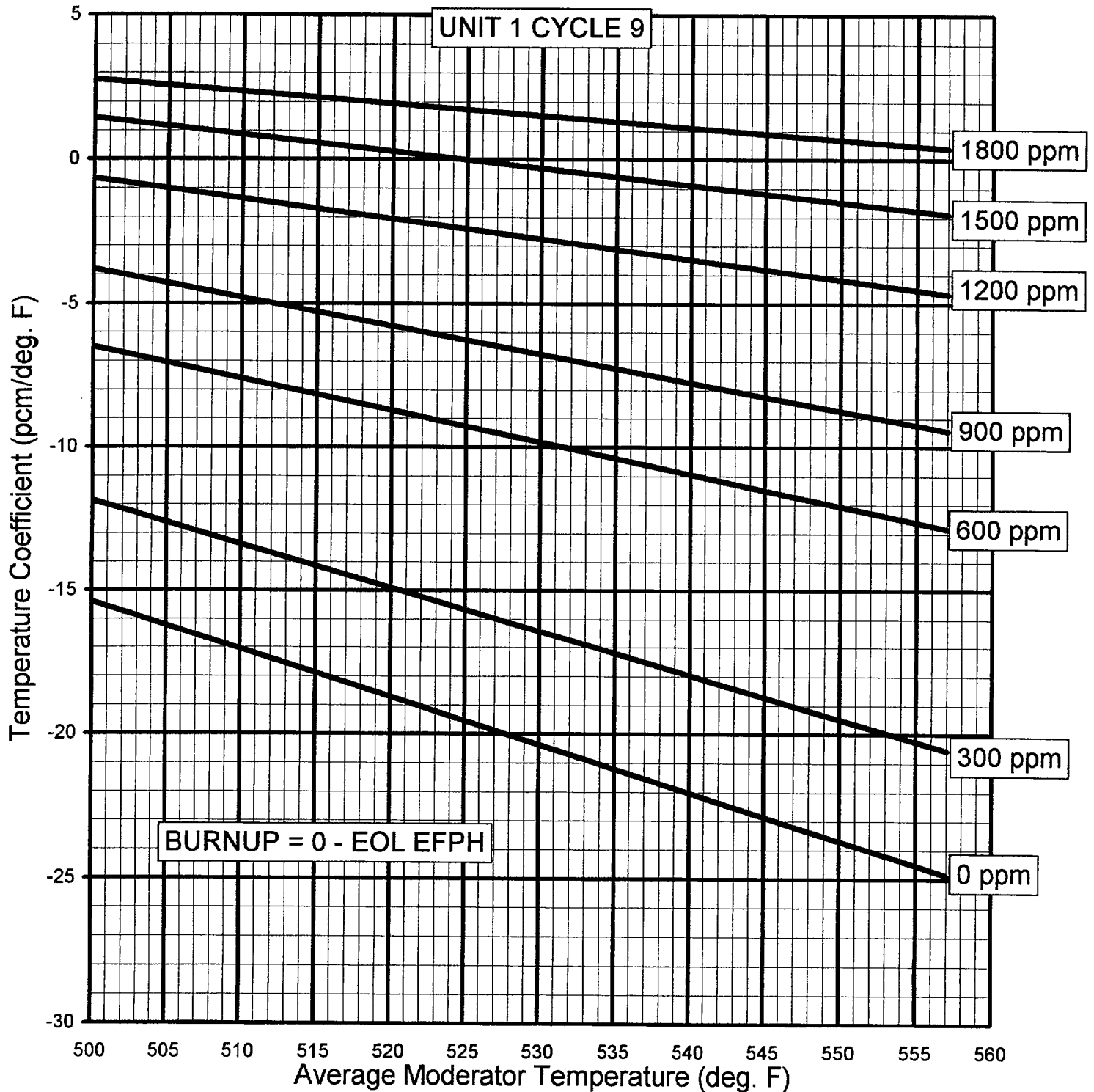
**Differential and Integral Rod Worth vs. Steps Withdrawn
Control Banks D and C Moving with 113 Step Overlap**



** EXPANDED SCALE **

TEMPERATURE COEFFICIENT VS. MODERATOR TEMPERATURE

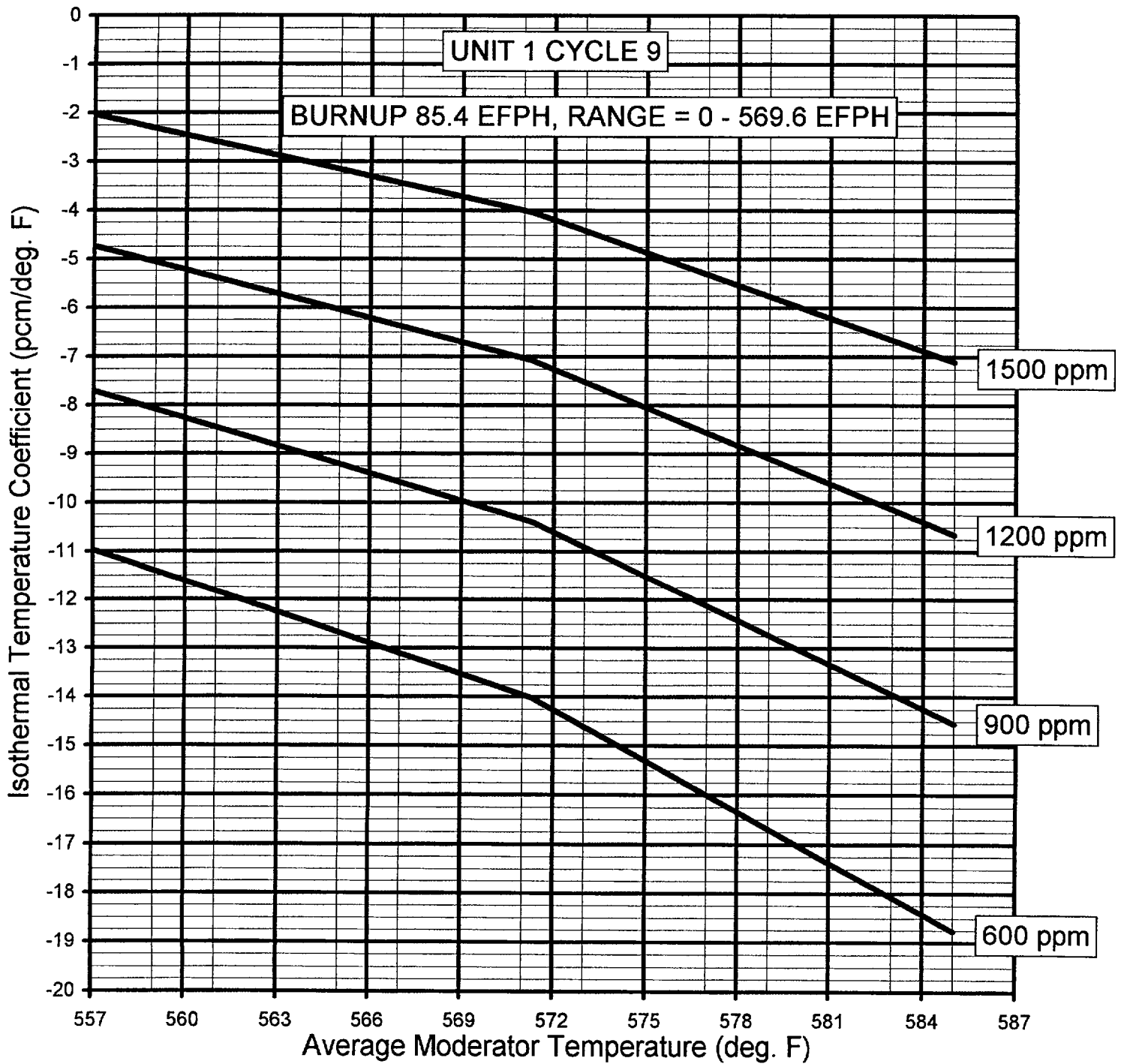
CZP TO HZP, ARO, NO Xe



See following pages for Hot Full Power Curves.

TEMPERATURE COEFFICIENT VS. MODERATOR TEMPERATURE

HZP TO HFP, ARO

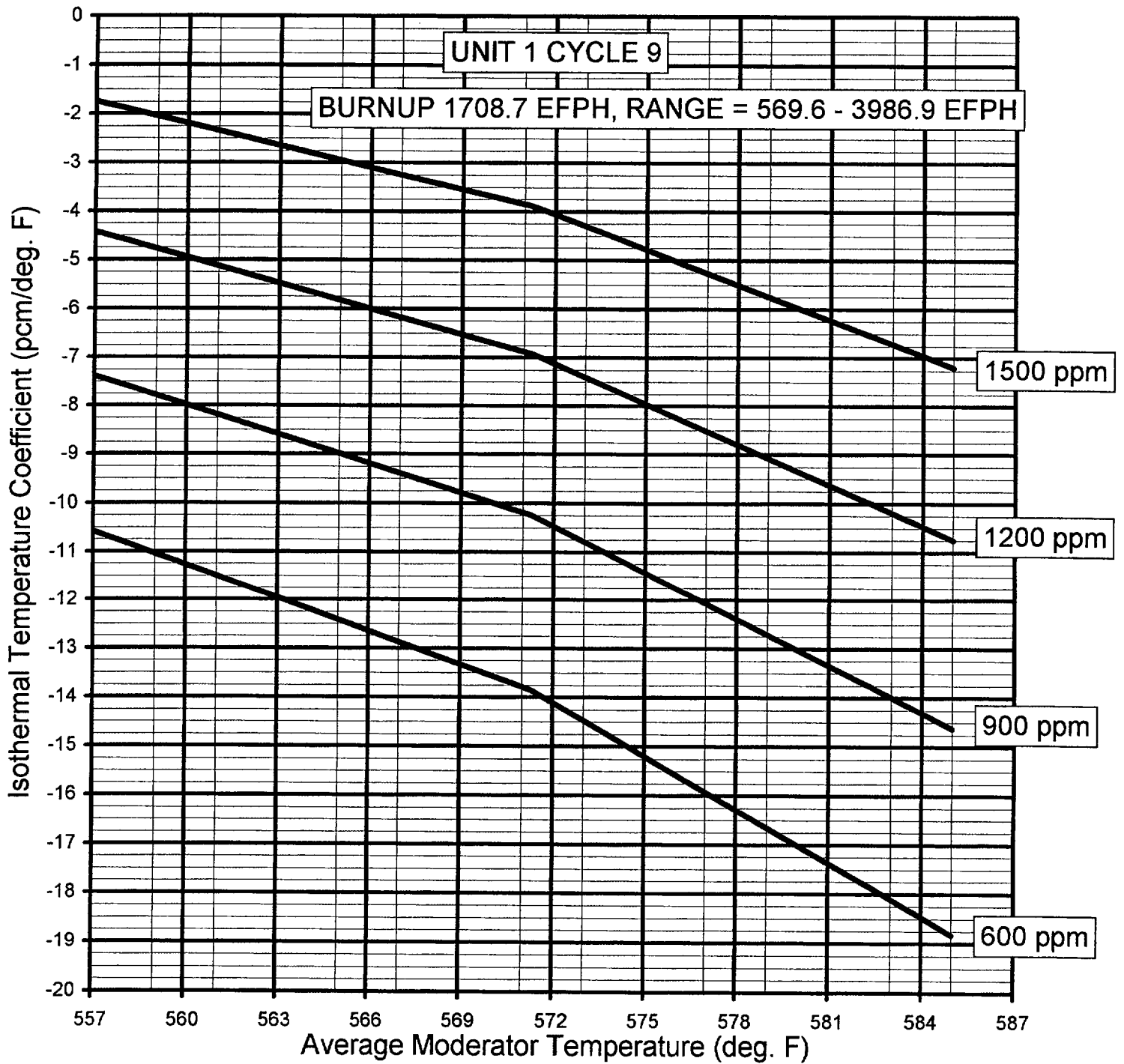


TEMPERATURE COEFFICIENT VS. MODERATOR TEMPERATURE

HZP TO HFP, ARO

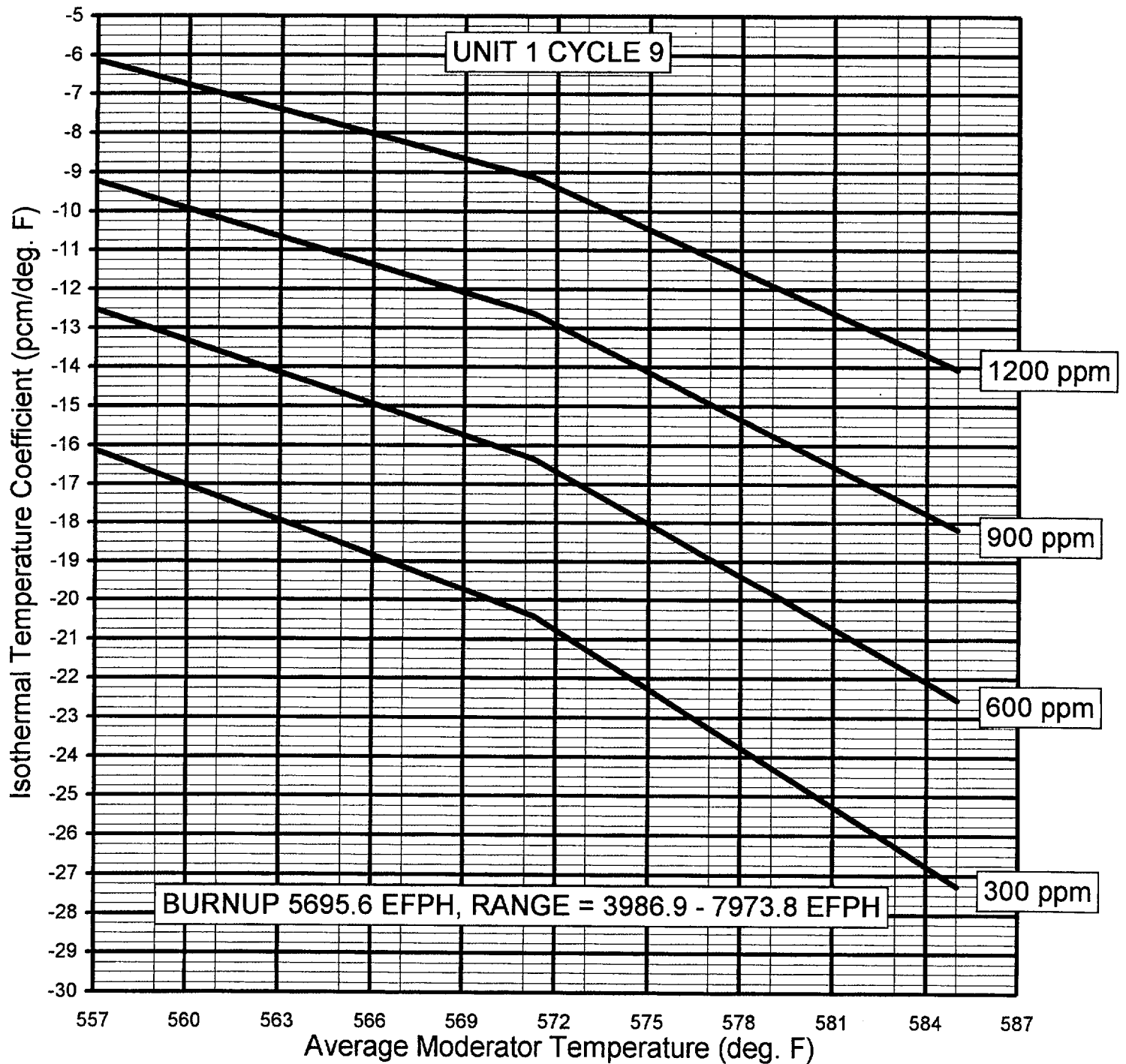
UNIT 1 CYCLE 9

BURNUP 1708.7 EFPH, RANGE = 569.6 - 3986.9 EFPH



TEMPERATURE COEFFICIENT VS. MODERATOR TEMPERATURE

HZP TO HFP, ARO

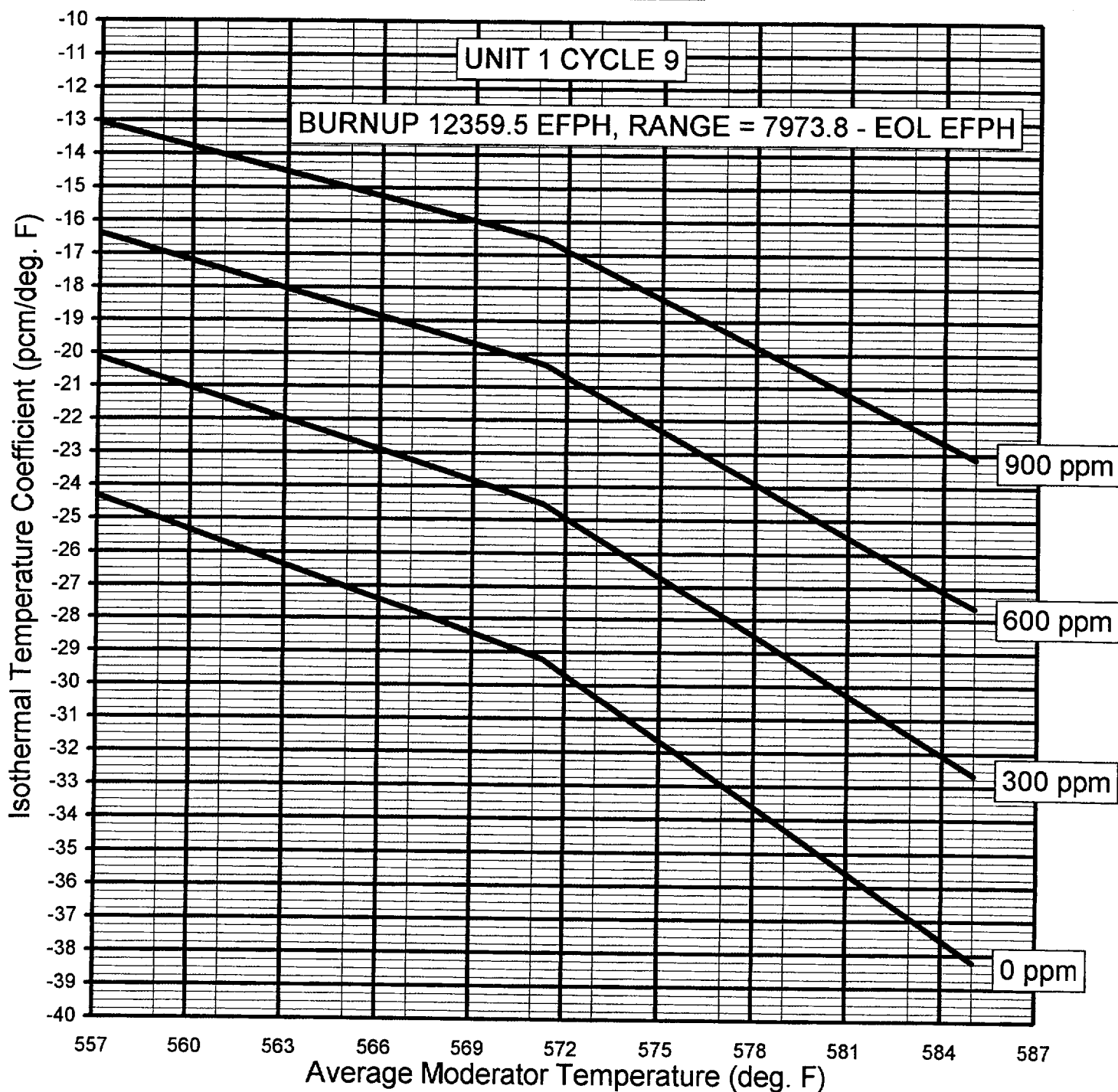


TEMPERATURE COEFFICIENT VS. MODERATOR TEMPERATURE

HZP TO HFP, ARO

UNIT 1 CYCLE 9

BURNUP 12359.5 EFPH, RANGE = 7973.8 - EOL EFPH



REV. 1
WOG 1C

REDIAGNOSIS
UNIT 1

1BwEP
ES-0.0

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1 CHECK IF ANY SG SECONDARY
PRESSURE BOUNDARY IS INTACT:

a. Check pressure in all SGs -
ANY SG PRESSURE STABLE OR
INCREASING

a. IF a controlled cooldown
is in progress,
THEN GO TO Step 2 (Next
Page).

IF NOT,
THEN the following
applies:

o IF main steamlines are
NOT isolated,
THEN you should be in
1BwEP-2, FAULTED STEAM
GENERATOR ISOLATION.

-OR-

o IF main steamlines are
isolated,
THEN you should be in
1BwCA-2.1,
UNCONTROLLED
DEPRESSURIZATION OF ALL
STEAM GENERATORS.

REV. 1
WOG 1C

REDIAGNOSIS
UNIT 1

1BwEP
ES-0.0

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2 CHECK IF ALL SGs SECONDARY
PRESSURE BOUNDARIES ARE INTACT:

- a. Check pressure in all SGs:
- NO SG PRESSURE DECREASING IN
AN UNCONTROLLED MANNER
 - NO SG COMPLETELY
DEPRESSURIZED

a. You should be in 1BwEP-2,
FAULTED STEAM GENERATOR
ISOLATION.

IF NOT,
THEN GO TO 1BwEP-2,
FAULTED STEAM GENERATOR
ISOLATION, Step 1.

3 CHECK IF SG TUBES ARE RUPTURED:

- o ANY SG LEVEL INCREASING IN AN
UNCONTROLLED MANNER

-OR-

- o ANY ABNORMAL SECONDARY
RADIATION

You should be in a 1BwEP-1,
or 1BwCA-1 series procedure.

IF NOT,
THEN GO TO 1BwEP-1, LOSS OF
REACTOR OR SECONDARY COOLANT,
Step 1.

4 YOU SHOULD BE IN A 1BwEP-3, OR
A 1BwCA-3 SERIES PROCEDURE

GO TO 1BwEP-3,
STEAM GENERATOR TUBE RUPTURE,
Step 1.

-END-

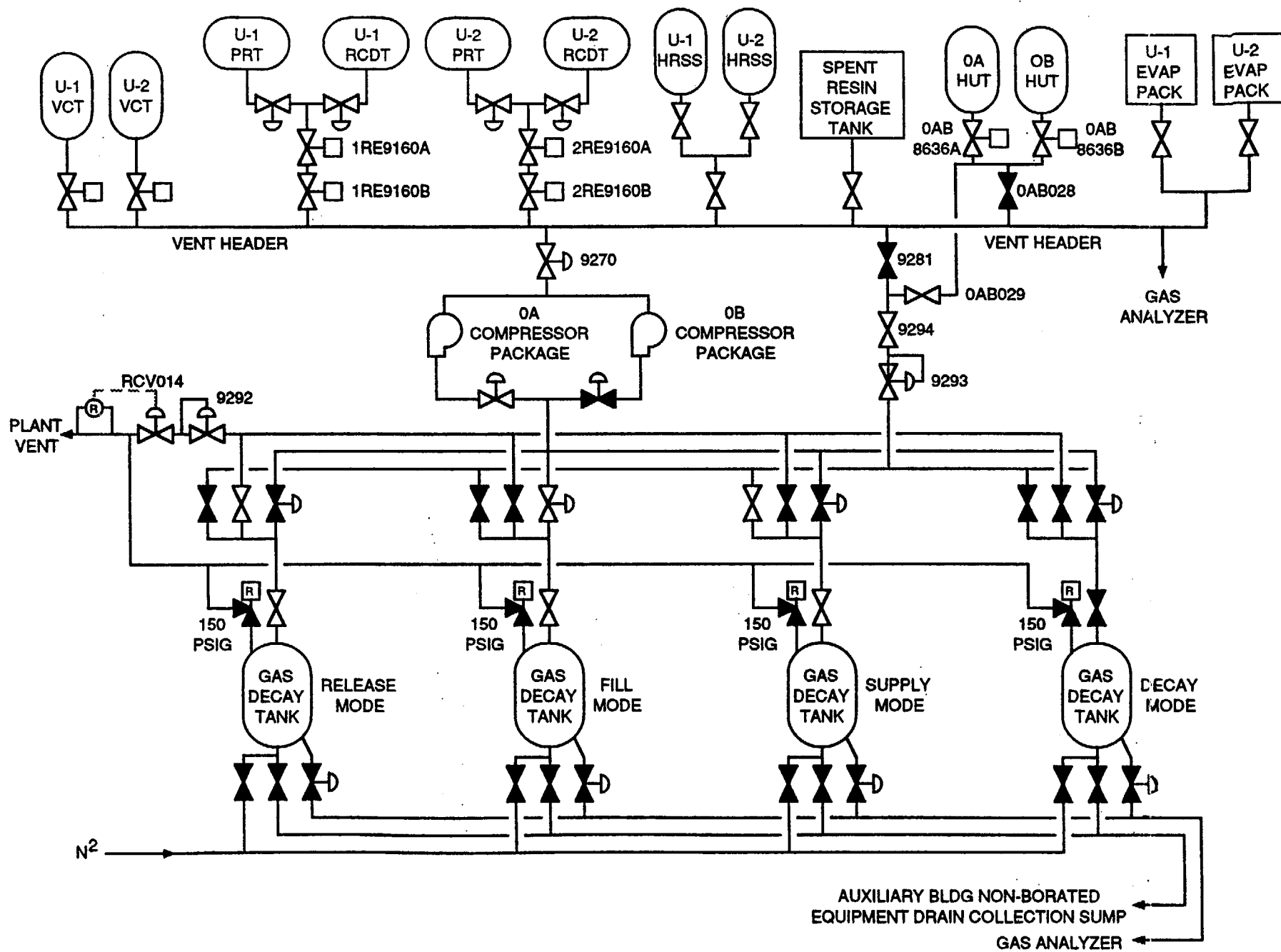


FIGURE 46-1 GASEOUS RADIOACTIVE WASTE SYSTEM (REV. 0)

Surveillance 1BwOSR 3.7.5.4-1 "Unit One Train A Auxiliary Feedwater Valve Emergency Actuation Signal Verification Test" is being performed. The personnel performing the surveillance are stationed at the Main Control Room, Aux. Electrical Room and the AF Pump Area.

In accordance with 1BwAP 390-1 "Operating Department Surveillance Program" how are operator actions directed while performing the surveillance?

- a. US directs operator actions for the surveillance and will inform the NSO of any changes in the status of plant evolutions.
- b. Assigned management person (other than shift operations) will provide direction to the operators and will directly inform the US of the status of plant evolutions.
- c. NSO directs the operator's actions for the surveillance and is directly informed of the status of plant evolutions.
- d. Operator at the AF pump area is in charge of actions being performed and will inform the Unit Supervisor of any changes in the status of plant evolutions.

Answer: c Exam Level: B Cognitive Level: Memory Facility: Braidwood Exam Date: 10/20/00

Tier: Generic Knowledge and Abilities RO Group: 1 SRO Group: 1

GENERIC

2.1 Conduct of Operations

2.1.8 Ability to coordinate personnel activities outside the control room.

3.8

3.6

Explanation of Answer: When Surveillances req. coordination between CR and operators in the plant are being performed, the NSO will direct the operators actions. The operator will communicate directly with the NSO as to the status of plant evolutions.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Operating Department Surveillance Program	1BwAP 390-1	E.4.a	3	6	P1-AM-TK-022

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1997 Braidwood NRC Exam

Record Number: 1 RO Number: 1 SRO Number: 1

In accordance with OP-AA-101-110, "Reactivity Management Controls," which of the following NON-LICENSED individuals can manipulate the controls of the reactor?

Under the direct supervision of the Reactor Operator,

- a. an individual that is enrolled in an approved training program.
- b. a System Engineer during surveillance testing.
- c. a Non-Licensed Operator during surveillance testing.
- d. an individual under the direct supervision of the Shift Manager.

Answer a Exam Level R Cognitive Level Memory Facility Braidwood ExamDate 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.1 Conduct of Operations

2.1.9 Ability to direct personnel activities inside the control room.

2.5 4.0

Explanation of Answer must be enrolled in an approved training program

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Reactivity Management Control	OP-AA-101-110	3.5.3	2	0	
Reactivity Management Control L.P.	PBIG	NA	NA	0	2

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1996 Braidwood NRC Exam RO Question #4 SRO Question #4

Record Number: 2 RO Number: 2 SRO Number:

The following Unit 1 conditions exist:

- Reactor Power is 85%
- Containment pressure is 0.6 psig
- Containment temperature is 115°F

Electric Operations has requested a load ascension to 95% power.

A containment entry is required to search for a 0.3 gpm UNIDENTIFIED leak inside containment. Which of the following is applicable for this entry?

- a. Reactor power must be reduced to <60% if entry inside the missile barrier is required.
- b. Containment Integrity must be maintained.
- c. The requested load increase may occur while personnel are inside containment.
- d. A Containment Entry Checklist is NOT required for this entry.

Answer: b Exam Level: S Cognitive Level: Memory Facility: Braidwood Exam Date: 10/20/00

Tier: Generic Knowledge and Abilities RO Group: 1 SRO Group: 1

GENERIC

2.1 Conduct of Operations

2.1.13 Knowledge of facility requirements for controlling vital / controlled access. 2.0 2.9

Explanation of Answer: < 40% power if entry inside the missile barrier is required, the reactor must be operating a steady state power, cmt. Entry checklist is required.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Access to Containment	BwAP 1450-1	F.1.f, F.3.d, F.1.a, F.1.c	6, 7, 5	16E2	
Selected Admin Procedures	I1-QB-XL-01	XXII	85	8	1

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method: Significantly Modified

Question Source Comments: 1996 Braidwood NRC Exam RO Question #6 SRO Question #7

Record Number: 3 RO Number: SRO Number: 2

Question Topic	Technical Specification MODE definition				
Per Technical Specification Definitions, a MODE is determined by power level					
a.	core reactivity, and average RCS temperature.				
b.	core reactivity, and auctioneered high RCS temperature.				
c.	decay heat, and average RCS temperature.				
d.	decay heat, and auctioneered high RCS temperature.				
Answer	a	Exam Level	B	Cognitive Level	Memory
		Facility	Braidwood	Exam Date	10/20/00
Tier:	Generic Knowledge and Abilities		RO Group	1	SRO Group 1
GENERIC					
2.1	Conduct of Operations				
2.1.22	Ability to determine Mode of Operation.				2.8 3.3
Explanation of Answer	A MODE shall correspond to any on inclusive combination of core reactivity conditions, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.				

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Technical Specifications	Basis Table 1.1-1	Definitions	1.1-9, 1.1-5	Amendment 9B	
Introduction to Technical Specifications	I1-MC-XL-13 (3)	II-A	5	1	3.b

Material Required for Examination	
Question Source: New	Question Modification Method:
Question Source Comments:	
Record Number: 4	RO Number: 3
SRO Number: 3	

Question Topic Shutdown chemistry requirements.

Which of the following chemistry values requires restoration within its steady state limit within 24 hours per TRM 3.4.b while in Mode 5.

	Dissolved O2	Chloride	Flouride
a.	80 ppb	150 ppb	100 ppb
b.	300 ppb	80 ppb	80 ppb
c.	100 ppb	200 ppb	100 ppb
d.	150 ppb	100 ppb	80 ppb

Answer c Exam Level S Cognitive Level Comprehension Facility Braidwood ExamDate 10/20/00

Tier Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.1 Conduct of Operations

2.1.34 Ability to maintain primary and secondary plant chemistry within allowable limits. 2.3 2.9

Explanation of Answer Dissolved O2 has no limit when below Mode 4 at 250°F. CL and FL must be less than or equal to 150 ppb SS limit.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Technical Requirements Manual	TRM 3.4.b	3.4.b	3.4.b-1,4	1	
Reactor Coolant LP	11-RC-XL-01 (12)	III.A	35	1	13

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 5 RO Number: SRO Number: 4

Question Topic Temporary Modifications

Which of the following items is considered a temporary modification?

- a. Tygon hose installed on a water drop to fill a cleaning bucket.
- b. Blocking device installed on a safety valve to prevent inadvertent opening.
- c. Thermal overloads removed from a breaker that are specified on an OOS.
- d. An electrical jumper placed in a component's start circuit as part of a surveillance procedure to prevent inadvertent auto start.

Answer b Exam Level S Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.2 Equipment Control

2.2.11 Knowledge of the process for controlling temporary changes. 2.5 3.4*

Explanation of Answer Repetitive surveillance processes controlled by specific station procedures which call for temporary modifications (e.g. installation of a jumper to conduct a trip test, would not fall under the TMOD procedure. Water droops also not considered TMOD.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Temporary Modifications	CC-AA-112	Exhibit G	42	0	
Temporary Modifications LP	PBIG	Exhibit G	42	0	3

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method: Editorially Modified

Question Source Comments: Modified CC-AA-112-1 Changed 1 distractor to not have 3 distractors referencing a procedure

Record Number: 6 RO Number: SRO Number: 5

Question Topic Clearance of Personal Protection Cards

Mechanical Maintenance has completed work on the 1B SI pump bearings and the pump is ready to be tested. The OOS is in the process of being cleared when it is discovered that the Personnel Protection Card has not been removed. All work is complete, but the lead worker has left the site and cannot be reached.

Who can authorize the removal of the Personnel Protection Card?

- a. Shift Manager (SM).
- b. Unit Supervisor (US).
- c. Work Control Supervisor.
- d. Holder releasing the OOS.

Answer d Exam Level R Cognitive Level Memory Facility Braidwood ExamDate 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.2 Equipment Control

2.2.13 Knowledge of tagging and clearance procedures. 3.6 3.8

Explanation of Answer If the lead worker is not on site and the PPC must be removed, then the holder releasing the OOS shall perform the following

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L O.
Station Equipment Out of Service	OP-AA-101-201	4.3.5.E	24	2	
Station Admin Procedures LP	I1-QB-XL-01	II	2	8	1

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1996 Braidwood NRC Exam RO Question #9 SRO Question #10

Record Number: 7

RO Number: 4

SRO Number:

Question Topic Failed Tech Spec Actions

Which of the following actions is NOT required when a Tech Spec surveillance fails to meet the designated acceptance criteria?

- a. Immediately inform the Shift Manager/Senior Reactor Operator.
- b. Document information on the data package cover sheet.
- c. Notify the NRC within 1 hour.
- d. Initiate a Condition Report (previously a PIF).

Answer c Exam Level S Cognitive Level Memory Facility: Braidwood Exam Date: 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.2 Equipment Control

2.2.20 Knowledge of the process for managing troubleshooting activities. 2.2 3.3

Explanation of Answer In the event of a failure of a Tech Spec , the person performing the work or their immediate supervisor shall immediately notify the SM/SRO. The information will be documented on the data package and initiate a PIF.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Predefine Process	WC-AA-111	4.1.3	6	0	3

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 8 RO Number: SRO Number: 6

Question Topic Recording out of spec data

The Shiftly/Daily surveillance is being performed by the NSO. The NSO has made a circle around the reading for 1PI-960, SI Accumulator 1A pressure Indicator.

What is indicated by the circle?

- a.** The indicator is suspect.
- b.** Data is missing from previous entry/entries.
- c.** The data falls outside the limits specified.
- d.** The parameter indicates a significant change from previous readings.

Answer c **Exam Level** S **Cognitive Level** Memory **Facility** Braidwood **ExamDate** 10/20/00

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC

2.2 Equipment Control

2.2.23 Ability to track limiting conditions for operations. 2.6 3.8

Explanation of Answer A circle around a reading indicates the value is out-of tolerance.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Braidwood Operating Department Memo - Equipment Logs	Memo 1-92	C.7	2	6	350-1 5&6

Material Required for Examination

Question Source: Facility Exam Bank **Question Modification Method:**

Question Source Comments: Braidwood 1999 NRC Exam

Record Number: 9 **RO Number:** **SRO Number:** 7

Question Topic RO duties in Control Room during refueling

Which of the following is a responsibility of the NSO during refueling operations in the main control room?

- a. Checking source range counts while a fuel assembly is being placed in the core.
- b. Verifying proper operation of the Containment Evacuation alarm shiftly.
- c. Maintaining a 1/M plot while reloading fuel during a core shuffle.
- d. Updating the Control Room tag board per the Nuclear Component Transfer List shiftly.

Answer a **Exam Level** R **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC

2.2 Equipment Control

2.2.30 Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area, communication with fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation. 3.5 3.3

Explanation of Answer Coordinating the conduct of refueling activities and monitoring nuclear instrumentation during refueling activities that could affect the reactivity of the core so that abnormal reactivity events can be mitigated.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Reactivity Management	OP-AA-101-110	3.6.5	3	0	P1-QG-TK-051

Material Required for Examination

Question Source: Facility Exam Bank **Question Modification Method:**

Question Source Comments: 1998 Braidwood NRC Exam

Record Number: 10 **RO Number:** 5 **SRO Number:**

Question Topic Control Rod Programming

Concerning 1BwGP 100-2, "Plant Startup," Limitations and Actions, the overlap of the Rod Control Banks shall be
(Assume current fuel cycle)

- a. 113 steps.
- b. 115 steps.
- c. 116 steps.
- d. 118 steps.

Answer a **Exam Level** B **Cognitive Level** Memory **Facility** Braidwood **ExamDate** 10/20/00

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC

2.2 Equipment Control

2.2.33 Knowledge of control rod programming. 2.5 2.9

Explanation of Answer Overlap of banks is at 113 steps. CB"B" begins to move when CB"A" is at 115 steps with a rod height of 228. Overlap on previous fuel cycle was CB"B" began to move when CB"A" is at 116 steps with an overlap of 115 steps due to rod height of 231. 118 steps is determined if rod height of 113 is used with a core height of 231.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Plant Startup	1BwGP 100-2	E.4.b	5	15	
Rod Control System LP	I1-RD-XL-01 (28)				14

Material Required for Examination

Question Source: Facility Exam Bank **Question Modification Method:** Significantly Modified

Question Source Comments: GP 100-2 038

Record Number: 11 **RO Number:** 6 **SRO Number:** 8

An operator received radiation exposures at BOTH Braidwood and LaSalle Stations during the year.

The exposure record to date this year is:

	Braidwood	LaSalle
- Deep Dose Equivalent (DDE)	180 mrem	40 mrem
- Lens Dose Equivalent (LDE)	10 mrem	5 mrem
- Committed Effective Dose Equivalent (CEDE)	105 mrem	0 mrem
- Shallow Dose Equivalent (SDE)	10 mrem	10 mrem
-Committed Dose Equivalent (CDE)	20 mrem	0 mrem

The operator at Braidwood Station has been requested to work in an area where the known radiation rate is 160 mR/hr. The source of the radiation is a nearby HOT SPOT inside a pipe trap where crud has collected and has been determined to be totally gamma radiation.

If the work task takes 30 minutes to complete, what is the individual's Total Effective Dose Equivalent (TEDE) for the year?

a. 365 mrem

b. 405 mrem

c. 460 mrem

d. 485 mrem

Answer: b Exam Level: B Cognitive Level: Application Facility: Braidwood Exam Date: 10/20/00

Tier: Generic Knowledge and Abilities RO Group: 1 SRO Group: 1

GENERIC

2.3 Radiation Control

2.3.1 Knowledge of 10 CFR: 20 and related facility radiation control requirements. 2.6 3.0

Explanation of Answer: TEDE=CEDE+DDE for BOTH facilities. To date: 325 mrem TODAY: Add 80 mrem [160 mR/hr x 0.5 hours] all DDE by definition. Distractors are combinations with other exposures added, today's exposure absent & all exposures.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
	I1-MC-XL-03			8	
Exposure Review and Authorization	BwRP 5300-2	G.1.a.6	5	4	
NGET Study Guide	NGET Study Guide	Rad Protection	50-87	22	NGET

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method: Significantly Modified

Question Source Comments: 1997 Braidwood NRC Examination

Record Number: 12 RO Number: 7 SRO Number: 9

Question Topic Facility Radiation Control

Which of the following activities would NOT require Radiation Protection consultation prior to performing?

- a. Raising radioactive material(s) from the fuel pool above established limits.
- b. Uncovering contaminated process lines.
- c. Cleanup of a boric acid spill coverin 2 levels of the Auxiliary Building.
- d. Adding boric acid to the batch tank.

Answer d Exam Level S Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.3 Radiation Control

2.3.2 Knowledge of facility ALARA program. 2.5 2.9

Explanation of Answer All distractors involve changing radiological conditions that require RP assistance.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Radiological Posting and Labeling	BwRP 5010-1	E.8	4	12	
NGET Study Guide	NGET Study Guide	Radiation Protection	50-87	22	NGET

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 13 RO Number: SRO Number: 10

Question Topic Limits for release of potential contaminated equipment

What are the MINIMUM requirements for unconditional release of a wrench that has been used in a Radiological Posted Area (RPA)?

A survey indicates the wrench is...

- ☐ a. free of both smearable and fixed contamination.
- ☐ b. free of smearable contamination but is allowed up to 1000 dpm/100cm² fixed contamination.
- ☐ c. allowed up to 20 dpm/100cm² smearable contamination and is allowed up to 5000 dpm/100cm² fixed contamination.
- ☐ d. allowed up to 100 dpm/100cm² of either smearable or fixed contamination.

Answer ☐ a Exam Level ☐ B Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Generic Knowledge and Abilities RO Group ☐ 1 SRO Group ☐ 1

GENERIC

2.3 Radiation Control

2.3.4 Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized. 2.5 3.1

Explanation of Answer Tools/equipment to be unconditionally released must be free of any removable or fixed contamination.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
AREA AND EQUIPMENT DECON	BwRP 5721-4	E.1	2	0	
Selected RP LP	I1-MC-XL-03	II	16	0	2

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1999 Braidwood NRC Exam

Record Number: ☐ 14 RO Number: ☐ 8 SRO Number: ☐ 11

The following conditions exist on Unit 1:

- Unit 1 Containment Equipment hatch is removed
- Refueling operations in progress
- A HIGH alarm is received on radiation monitors 1RE-AR011/12, Containment Fuel Handling Incident

The crew should...

- a. Activate the Unit 1 Containment evacuation alarm and start containment charcoal filter fans.
- b. Verify Fuel Handling Building is at a negative pressure and start the Cnmt Mini Purge System.
- c. Start the Containment Purge System and start containment charcoal filter fans.
- d. Activate the Unit 1 Containment evacuation alarm and start the Containment Mini Purge System.

Answer a Exam Level S Cognitive Level Comprehension Facility Braidwood ExamDate 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.3 Radiation Control

2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure. 2.9 3.3

Explanation of Answer FHB should be at a negative pressure. Cnmt Purge and Mini Purge System receive isolation signals from SSPS.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
OA REFUEL Lesson Plan	I1-OA-XL-29/30	N/A	5	7	3
REFUEL-1	1BwOA REFUEL-1	N/A	1,2,4	54	
AR	1BwAR 4-1AR012J	N/A	1	1E1	

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method: Significantly Modified

Question Source Comments: 1998 Braidwood NRC Exam

Record Number: 15 RO Number: SRO Number: 12

Question Topic Isolation of Steam Supply valves to control radiation releases

Given the following plant conditions:

- Unit 1 is at 100% power.
- Unit 2 is at 100% power.
- 0PR09J "CC HX Outlet Unit 0 Radiation Monitor" is in HIGH Alarm.
- A confirmed High Alarm has been determined by chemistry.
- The 0 CC HX has been subsequently isolated.

The crew should verify...

- a. Only 1CC017 is closed and enter the LCOAR for Unit 1.
- b. Only 2CC017 is closed and enter the LCOAR for Unit 2.
- c. Both 1CC017 and 2CC017 are closed and enter the LCOAR for both units.
- d. Both 1CC017 and 2CC017 are closed and do not enter a LCOAR.

Answer c Exam Level R Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.3 Radiation Control

2.3.11 Ability to control radiation releases.

2.7 3.2

Explanation of Answer Both vent valves receive close signal. Must enter the LCOAR for both units.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Tech Specs	3.7.7	Condition A	3.7.7-1	Amendment 98	
CC HX OUTLET UNIT 0	1BwAR 1-0PR09J	N/A	1	1E1	
CC System LP	11-CC-XL-01 (19)	IIA	7-8	0	7

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 16 RO Number: 9 SRO Number:

Question Topic	Basis for SG level																																	
<p>Per procedure 1BwCA-0.0, "LOSS OF ALL AC POWER", which of the following is the basis for maintaining SG Narrow Range levels above 10% when the RCS is being cooled to 350°F?</p>																																		
<p>a. Narrow Range level is the only indication of SG inventory available after a loss of all AC power.</p>																																		
<p>b. Ensure proper thermal stratification in the SGs in the event of a SGTR.</p>																																		
<p>c. Ensures the capability to cooldown once AC power is restored.</p>																																		
<p>d. Ensures heat transfer capability exists to remove heat from the RCS.</p>																																		
Answer	d	Exam Level	S	Cognitive Level	Memory	Facility	Braidwood	Exam Date	10/20/00																									
Tier	Generic Knowledge and Abilities			RO Group	1	SRO Group	1																											
<p>GENERIC</p>																																		
<p>2.4 Emergency Procedures / Plan</p>																																		
<p>2.4.7 Knowledge of event based EOP mitigation strategies.</p>																																		
<p>3.1 3.8</p>																																		
Explanation of Answer	<p>The analysis basis for ECA-0.0 requires that the level in at least one intact S/G be above the top of the S/G tubes to ensure that sufficient heat x-fer capability exists to remove heat from RCS.</p>																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Reference Title</th> <th>Facility Reference Number</th> <th>Section</th> <th>Page Number(s)</th> <th>Revision</th> <th>L. O.</th> </tr> </thead> <tbody> <tr> <td>Loss of All AC Power LP</td> <td>I1-CA-XL-01</td> <td>II</td> <td>27</td> <td>4</td> <td>6</td> </tr> <tr> <td>Loss of All AC Power Unit 1</td> <td>1BwCA-0.0</td> <td>31</td> <td>39</td> <td>WOG1 C</td> <td></td> </tr> <tr> <td>Emergency Response Guideline</td> <td>ERG CA-0.0</td> <td>Step 16</td> <td>113</td> <td>1C</td> <td></td> </tr> </tbody> </table>											Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.	Loss of All AC Power LP	I1-CA-XL-01	II	27	4	6	Loss of All AC Power Unit 1	1BwCA-0.0	31	39	WOG1 C		Emergency Response Guideline	ERG CA-0.0	Step 16	113	1C	
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<p>Question Source: Facility Exam Bank Question Modification Method:</p>																																		
<p>Question Source Comments: 1999 Braidwood NRC Exam</p>																																		
<p>Record Number: 17 RO Number: SRO Number: 13</p>																																		

Question Topic Implementation Hierarchy for EP-0

An automatic reactor trip has occurred requiring entry to BwEP-0, REACTOR TRIP OR SAFETY INJECTION. During performance of Step 4, the operator has determined that SI has NOT actuated.

What is the NEXT action required of the operator?

- a. Manually actuate SI.
- b. Transition to 1BwEP ES-0.1, "REACTOR TRIP RESPONSE."
- c. Proceed with Step 5 of BwEP 0.
- d. Check if SI is required.

Answer d Exam Level R Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.4 Emergency Procedures / Plan

2.4.13 Knowledge of crew roles and responsibilities during EOP flowchart use. 3.3 3.9

Explanation of Answer If an action in the left hand column cannot be performed or an expected response cannot be obtained, the operator should go to the response not obtained column on the right hand side to get the required response or conditional action.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Use of Procedures for Operating Department	BwAP 340-1	C.2.b.1	9	12E1	
Reactor Trip or Safety Injection	1BwEP-0	Step 1	3	WOG1 C	
EP-0 EP ES-0 Rx Trip or Safety Injection	11-EP-CL-01	II.C	9-10	13	3

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 18 RO Number: 10 SRO Number:

Question Topic EOP Term - CSF Suspended Action

As discussed in BwAP 340-1, "Use of Procedures for Operating Department," the required operator action while implementing a Critical Safety Function would be to suspend...

- a. a lower priority RED BwFR to address a higher priority ORANGE condition.
- b. a higher priority ORANGE BwFR to address a lower priority RED condition.
- c. the Status Tree pass prior to completion to address an ORANGE condition.
- d. BwCA-0.0, "Loss of All AC Power."

Answer b Exam Level R Cognitive Level Memory Facility: Braidwood Exam Date: 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.4 Emergency Procedures / Plan

2.4.17 Knowledge of EOP terms and definitions. 3.1 3.8

Explanation of Answer a. wrong because ORANGE never takes priority over RED. c. wrong because Status Trees must be completed. d. wrong because FRS are suspended while in ES-1.3 Steps 1-6.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Use of Procedures in Operating Department	BwAP 340-1	C.2.c	12-14	12E1	
Trans. to Cold Leg Recirc.	BwEP ES-1.3	Note prior to step 1	2	WOGI C	
Status Trees LP	I1-MC-XL-09	II.H	5-9	9	3

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 19 RO Number: 11 SRO Number:

Question Topic EOP procedure transitions during low power ATWS.

The following plant conditions exist:

- Unit 2 is in the process of starting up from a refueling outage.
- Reactor power is at 3% and has been stabilized to perform a power history surveillance.
- Indicated intermediate range start up rate is 0 dpm.

A loss of the Unit 2 station auxiliary transformer occurs.

The Unit Supervisor directs a reactor trip.

The reactor operator attempts to trip the reactor at 2PM05J and 2PM06J with no results.

The Unit Supervisor has entered 2BwEP-0 and is at Step 1 RNO.

The next procedure action will be to...

a. continue with 2BwEP-0, Step 2.

b. transition to 2BwCA-0.0, "Loss of All AC Power."

c. transition to 2BwFR-S.1, "Response to Nuclear Power Generation/ATWS."

d. transition to 2BwOA ELEC-3, "Loss of 4KV ESF Bus."

Answer c Exam Level B Cognitive Level Application Facility: Braidwood ExamDate: 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.4 Emergency Procedures / Plan

2.4.19 Knowledge of EOP layout, symbols, and icons. 2.7 3.7

Explanation of Answer IR SUR is greater than -0.2 dpm which requires transition to FR-S.1. BwCA 0.0 should not be entered due to DGs starting and supplying the ESF buses. Same for ELEC-3

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Reactor Trip Or Safety Injection	2BwEP-0	steps 1, 2, 3	3, 4	WOGI C	
Introduction to Emergency Procedures	I1-EP-XL-00	II	10-14	6	4d

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 20 RO Number: 12 SRO Number: 14

Question Topic Scanning requirements for the CSF Status Trees

The following conditions exist following a LOCA on unit 2:

- AF flow 420 gpm
- CNMT Pressure 18 psig and increasing
- RCS Pressure 2340 psig
- Core Exit TC's 650°F and increasing
- RCPs Tripped
- SG pressures 750 psig stable
- Narrow Range SG levels 38% (A) 34%(B) 34%(C) 35%(D)

Based on the above conditions, which of the following satisfies the minimum scanning requirements for the CSF Status Tree's?

- a. Continuously scan.
- b. Scan at 15 minute intervals.
- c. Scan at 30 minute intervals.
- d. Scanning may be terminated.

Answer b Exam Level S Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.4 Emergency Procedures / Plan

2.4.22 Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations. 3.0 4.0

Explanation of Answer Tree scanning should be continuous if any condition higher than yellow is found. If no condition higher than yellow is found, tree scanning frequency may be reduced to 10-20 minutes.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Heat Sink Unit 1	1BwST-3	N/A	1	WOG1 C	
Use of Procedures in Operating Dept	1BwAP 340-1	C.2.c.4	15	12E1	
Status Trees	I1-MC-XL-09	I	6	9	4

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method: Significantly Modified

Question Source Comments: 1996 Braidwood NRC Exam SRO Question #5

Record Number: 21 RO Number: SRO Number: 15

Question Topic Response to Fire in DG area.

The following alarms have actuated:

- Unit Two Area Fire
- CO2 Storage Tank Trouble
- On ²1PM09J, the Zone Light for the 2B DG Room is illuminated

The fire brigade has been dispatched.

The fire brigade can expect CO2 actuation in the...

- a.** 2B DG Room ONLY.
- b.** 2B DG Day Tank Room ONLY.
- c.** 2B DG Room and 2B DG Day Tank Room.
- d.** NO actuation due to low CO2 Storage Tank Pressure.

Answer c **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC

2.4 Emergency Procedures / Plan

2.4.26 Knowledge of facility protection requirements including fire brigade and portable fire fighting equipment usage. 2.9 3.3

Explanation of Answer Automatic CO2 actuation in DG room will cause CO2 actuation in the corresponding day tank room also.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Fire Protection LP	I1-FP-XL-01	II	10	5	6.a
U2 Area Fire	BwAR 0-39-A4	A	1	7	
CO2 Storage Tank Trouble	BwAR 0-38-E9	A	1	6E3	

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 22 **RO Number:** 13 **SRO Number:** 16

Question Topic Station Director Actions during emergency conditions

Unit 1 has declared an ALERT due to a Steam Generator Tube Rupture. Offsite dose assessment is in progress. The Shift Manager is the acting Station Director. Which of the following responsibilities CAN NOT be delegated by the SM?

- a. Notification of the offsite authorities of protective action recommendations.
- b. Authorize exceeding 10CFR100 site boundary limits.
- c. Decision to issue thyroid blocking agents to onsite personnel.
- d. Notify the NRC Operations Center via the ENS Red Phone.

Answer d Exam Level S Cognitive Level Memory Facility Braidwood ExamDate 10/20/00

Tier: Generic Knowledge and Abilities RO Group 1 SRO Group 1

GENERIC

2.4 Emergency Procedures / Plan

2.4.29 Knowledge of the emergency plan. 2.6 4.0

Explanation of Answer Non-delegable duties (1) Final decision to declare the emergency classification (2) Final decision to notify and make PARS to offsite authorities (3) Authorization of personnel exposure beyond 10CFR20 limits under emergency conditions (4) Issuance of thyroid blocking agents to ComED emergency workers and onsite personnel.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Emergency Director Implementing Procedure	BwZP 1000-1	F.1	3	8	

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method:

Question Source Comments: 1996 Braidwood NRC Exam SRO Question #14

Record Number: 23 RO Number: SRO Number: 17

Question Topic Actions required for dropped rod(s)

The following plant conditions exist:

- Rod D-4 rod bottom light LIT
- PWR RANGE FLUX RATE RX TRIP ALERT annunciator LIT
- Reactor Power 95%
- ROD CONTROL URGENT FAILURE annunciator NOT LIT
- 1BwOA ROD-3 "Dropped or Misaligned Rod" has been entered.

While the crew is taking data for the dropped rod per step 7 of 1BwOA ROD-3, the following indications occur:

- Rod D-8 rod bottom light LIT

Which of the following describes the action required?

- a. Reset rate trip and perform dropped rod recovery per 1BwOA ROD-3.
- b. Trip the reactor and enter 1BwEP-0.
- c. Restore Tave/Tref, then calculate QPTR.
- d. Perform SDM surveillance and reduce reactor power to less than 70%

Answer b **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:**

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

001 Control Rod Drive System

K4. Knowledge of Control Rod Drive System design feature(s) and or interlock(s) which provide for the following:

K4.09 Recovery of dropped rod 3.9 4.1

Explanation of Answer If more than 1 rod has dropped the correct action to take is to trip the reactor. All distractors are actions that would be taken if only one rod were dropped.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L O
Dropped or Misaligned Rod	1BwOA ROD-3	Step 4	4	56	
Dropped or Misaligned Rod-3	11-OA-XL-34	1B	3	7	5

Material Required for Examination

Question Source: Facility Exam Bank **Question Modification Method:** Editorially Modified

Question Source Comments: OA ROD 111

Record Number: 24 **RO Number:** 14 **SRO Number:** 18

Question Topic Determination of how much temperature change occurs due to a change in rod height.

Given the following plant conditions on Unit 1:

- 80% reactor power.
- CBD is 175 steps.
- Core Age is 5200 EFPH.
- RCS Tave is 575°F.
- RCS Boron Concentration is 600 ppm.

What will RCS Tave be following a withdrawal of CBD to 200 steps? Assume new stable plant conditions exist.

a. 576.5°F

b. 578.5°F

c. 580.5°F

d. 581.5°F

Answer b **Exam Level** B **Cognitive Level** Application **Facility** Braidwood **Exam Date** 10/20/00

Tier Plant Systems **RO Group** 1 **SRO Group** 1

001 Control Rod Drive System

K5. Knowledge of the operational implications of the following concepts as they apply to the Control Rod Drive System:

K5.54 Definition and units of reactivity 2.8 3.1

Explanation of Answer Using the 5695.6 EFPH graph Figure 2 reactivity addition is 70 pcm. Using Figure 5 MTC is 18 PCM/°F. Temperature change would be 3.9°F. Final Tave is 575°F+3.9°F=578.9°F.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Temp Coef vs Moderator Temperature	BwCB-1 Figure 5		4 of 8	12	
Rod worth vs steps CB D and C moving	BwCB-1 Figure 2		5 of 8	14	
Rx Theory - MTC and PD	I1-RK-XL-03			4	3

Material Required for Examination 1BwCB-1 Figure 2 pages 1-8 and Figure 5 pages 1-8 - Expanded Graph Only

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 25 **RO Number:** 15 **SRO Number:** 19

Question Topic Control of RCS Tave during manual operation

Given the following plant conditions on Unit 1:

- The plant is operating at 75% power with normal lineup for performing a calorimetric.
- During the calorimetric, the NSO is in the process of adjusting N-44 when a turbine runback occurs.
- 1PT-505, turbine first stage impulse chamber pressure, fails high when the turbine runsback.
- Tavg is 584°F and increasing.

Based on these conditions, the NSO should ...

- a. Drive rods in manual until rod speed drops below 48 steps/min, then switch to AUTO until temperature is restored.
- b. Drive rods in manual and continuously insert rods until temperature is restored.
- c. Allow automatic insertion until rod speed drops below 48 steps/min, then insert rods in manual until temperature is restored.
- d. Allow automatic insertion until rod speed drops below 64 steps/min, then insert rods in manual until temperature is restored.

Answer b Exam Level B Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 2

002 Reactor Coolant System

A1. Ability to predict and/or monitor changes in parameters associated with operating the Reactor Coolant System controls including:

A1.09 RCS T-ave 3.7 3.8

Explanation of Answer Nis are being adjusted, therefore rods are in manual. Pt - 505 failed high.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Rod Control System	I1-RD-XL-01	II	7,10,34	12	12,20

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 26 RO Number: 16 SRO Number: 20

The following plant conditions exist during a small-break LOCA:

- Core exit TC's read approximately 532°F
- RCS pressure is 885 psig
- S/G levels are 25% narrow range
- Steam pressure is 1092 psig
- RCS wide range cold leg temperatures are all 525°F

Based on the above conditions, the RCS is ...

- a. saturated. Decreasing RCS pressure will aid in establishing subcooling.
- b. subcooled. Increasing S/G pressure will aid in increasing subcooling.
- c. subcooled. Decreasing RCS pressure will aid in increasing subcooling.
- d. saturated. Decreasing S/G pressure will aid in establishing subcooling.

Answer d Exam Level B Cognitive Level Comprehension Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 2

002 Reactor Coolant System

A4. Ability to manually operate and/or monitor in the control room:

A4.03 Indications and controls necessary to recognize and correct saturation conditions 4.3 4.4

Explanation of Answer 885 psig + 15 psig = 900 psia. Tsat for 900 psia = 531.95°F 531.95°F < 532°F therefor not subcooled. Decreasing RCS pressure decreases subcooling.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
EP-1 Series LP	I1-EP-XL-02	II.B	13	13	1

Material Required for Examination Steam Tables

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: Question # "EP-1 - 016"

Record Number: 27 RO Number: 17 SRO Number: 21

Question Topic: Loss of ESF Bus which causes a loss of all CC pumps.

Given the following plant conditions on Unit 2:

- Mode 1
- 2A and Unit 0 CC pumps are OOS
- A fault occurs de-energizing ESF Bus 242

Which of the following actions must occur for the above plant conditions?

- a. Trip the reactor when CC heat exchanger outlet temperature is 105°F.
- b. Trip the reactor when RCP lower radial bearing temperature is 205°F.
- c. Trip the reactor when RCP upper motor bearing temperature is 195°F.
- d. No reactor trip is required, CC temperatures should remain constant.

Answer: c **Exam Level:** R **Cognitive Level:** Comprehension **Facility:** Braidwood **Exam Date:** 10/20/00

Tier: Plant Systems **RO Group:** 1 **SRO Group:** 1

003 Reactor Coolant Pump System

K2. Knowledge of bus power supplies to the following:

K2.02 CCW pumps 2.5* 2.6*

Explanation of Answer: A is not a RCP trip criteria. B radial bearing trip setpoint is 225°F. D is wrong trip setpoint is less than 200 psid.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Startup of a RCP	BwOP RC-1	E	5	9E2	9

Material Required for Examination:

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 28 **RO Number:** 18 **SRO Number:**

Question Topic Effects on RCS due to loss of an RCP above P-8

The following conditions exist on Unit 1:

- Reactor power 36%
- Pzr pressure 2235 psig
- Pzr level 35%

RCP 1A breaker trips due to sensed undervoltage from bus 157. What is expected as a result of the trip of the RCP?

- a. The reactor will automatically trip due to the open RCP breaker.
- b. The reactor will automatically trip due to RCS loop low flow condition.
- c. The reactor must be manually tripped by the operator.
- d. A normal plant shutdown will be initiated.

Answer b **Exam Level** B **Cognitive Level** Comprehension **Facility** Braidwood **Exam Date** 10/20/00

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

003 Reactor Coolant Pump System

K3. Knowledge of the effect that a loss or malfunction of the Reactor Coolant Pump System will have on the following:

K3.01 RCS 3.7 4.0

Explanation of Answer AUTO trip is expected due to power > P-8.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Reactor Coolant Pump lesson plan	Chp 13	C. 4.a 2)	18	9	8
AC Electrical Distribution lesson plan	Chp 4			8	10.b
Reactor Protection System	I1-RP-XL-02 (60b)	II	16	0	4

Material Required for Examination

Question Source: Facility Exam Bank **Question Modification Method:** Significantly Modified

Question Source Comments: 1998 Braidwood NRC Exam Review pg 20, RO only

Record Number: 29 **RO Number:** 19 **SRO Number:** 22

Question Topic Identifying leaking PZR PORV

The following plant conditions exist:

- Reactor Tripped
- All RCPs Running
- PZR level 48% increasing
- RCS pressure 1700 psig decreasing

Which of the following leak locations is consistent with the plant conditions above?

- a. Failure of charging header connection to the RCS.
- b. Weld failure on pressurizer liquid space sample line.
- c. Failure of pressurizer PORV in an intermediate position.
- d. Weld failure on RCP B discharge piping.

Answer c Exam Level B Cognitive Level Comprehension Facility Braidwood ExamDate 10/20/00

Tier Plant Systems RO Group 1 SRO Group 1

004 Chemical and Volume Control System

K1. Knowledge of the physical connections and/or cause-effect relationships between Chemical and Volume Control System and the following:

K1.29 Effect and detection of leaking PORV or relief on PZR level and pressure, including VCT makeup activity in automatic mode 3.4 4.0

Explanation of Answer

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Pressurizer System	I1-RY-XL-01 (14)	II.B	19	9	19
I&C Process Measurement LP		B	19	3	12

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: Question # "EP-1 - 107"

Record Number: 30 RO Number: 20 SRO Number: 23

Question Topic Actions required for CV pump trip

The following plant conditions exist on Unit 1:

- 100% power
- RCS Tave is 582°F
- PZR Pressure is 2235 psig

All systems were operating normally in Automatic when the 1A CV pump trips. Which of the following actions are required per BwAR 1-9-A3, "CHG PUMP TRIP?"

- a. Place 1CV121, "Cent Chg Pumps Flow Cntrl Vlv", in manual and close, then start 1B CV pump.
- b. Verify suction source, then start 1B CV pump.
- c. Isolate letdown, then start 1B CV pump.
- d. Close 1HCV182, "Chg Hdr Back Press Cntrl Vlv", then start 1B CV pump.

Answer b Exam Level B Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 1 SRO Group 1

004 Chemical and Volume Control System

K6. Knowledge of the effect of a loss or malfunction on the following will have on the Chemical and Volume Control System:

K6.04 Pumps 2.8 3.1

Explanation of Answer If RCS pressure was less than NOP, then a would be the correct answer

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Chg Pump Trip	BwAR 1-9-A3	C	1	5e4	

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 31 RO Number: 21 SRO Number: 24

Question Topic: Determination if an RH pump will have power

The following plant conditions exist on Units 1 and 2:

- Unit 1 is in Mode 5
- 1A RH pump is running supplying S/D Cooling
- 1B DG is OOS for maintenance
- Unit 2 is in Mode 6 for a Refueling Outage
- Unit 2 SATs are OOS for repairs
- 2A RH pump is running supplying S/D Cooling
- Unit 2 ESF Busses are being supplied by Unit 1

Annunciator 1-20-C3, "SAT 142-1 SUDDEN PRESS", actuates concurrent with an overcurrent condition on Bkr 1412.

Concerning the RH systems, what method would the control room operators use to remove decay heat?

Unit 1

Unit 2

- | | | |
|----|------------------|------------------|
| a. | Steam SGs | Steam SGs |
| b. | Bleed and Feed | Steam SGs |
| c. | Start an RH pump | Bleed and Feed |
| d. | Steam SGs | Start an RH pump |

Answer: d Exam Level: R Cognitive Level: Application Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group: 3 SRO Group: 3

005 Residual Heat Removal System

K2. Knowledge of bus power supplies to the following:

K2.01 RHR pumps 3.0 3.2

Explanation of Answer: Loss of Bus 141 and 142 requires steaming SG on Unit 1. DGs start on Unit 2 supplying power to RH pumps. 1A DG will start on Unit 1, but it will not load onto the bus due to a lockout which was activated when breaker 1412 tripped on overcurrent.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of RH Cooling	BwOA PRI-10	Table A	9	58A	
Bus 142 Cross Tie Breaker 1424 Trip	BwAR 1-21-A8	B	1	5E1	
Loss RH Cooling LP	I1-OA-XL-20	II	2	9	4

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 32 RO Number: 22 SRO Number:

Question Topic Tech spec actions for a CCW pump trip

The following plant conditions exist:

Unit 1 is at 100%
1A CC pump is running
1B CC pump is OOS
0 CC pump is aligned to Bus 141

Unit 2 is in MODE 4
2A CC pump is running
2B CC pump is in standby
0 CC HX is aligned to Unit 1

Which of the following applies?

- a. No Tech Spec actions apply.
- b. Unit 1 is in a 7 day LCO to restore required CC pump to operable status.
- c. Unit 2 is in a 7 day LCO to restore required CC HX to operable status.
- d. Unit 1 and unit 2 are in a 7 day LCO to restore required CC pump to operable status.

Answer b **Exam Level** S **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Plant Systems **RO Group** 3 **SRO Group** 3

008 Component Cooling Water System

2.1 Conduct Of Operations

2.1.12 Ability to apply technical specifications for a system.

2.9 4.0

Explanation of Answer 0 CC pump aligned to Bus 141 will not auto start due to 1A CC pump is not in PTL

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Tech Specs	3.7.7	Condition B	3.7.7-1	Amendment 98	
CC System LP	I1-CC-XL-01 (19)	II	19	6	16

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 33 **RO Number:** **SRO Number:** 25

What are the parameters and values used by the operator to ensure the temperature difference between the PZR and the spray fluid are within the specified limit(s) in the PRESSURE AND TEMPERATURE LIMIT REPORT when initiating PZR spray?

For normal spray, the difference between ...

- a. RCS hot leg loop temperature and PZR vapor space temperature limit is 50°F, and for aux spray, the difference between Regenerative Hx charging inlet temperature and PZR vapor space limit is 320°F.
- b. RCS cold leg loop temperature and PZR vapor space temperature limit is 50°F, and for aux spray, the difference between Regenerative Hx charging outlet temperature and PZR vapor space limit is 320°F.
- c. RCS hot leg loop temperature and PZR vapor space temperature limit is 320°F, and for aux spray, the difference between Regenerative Hx charging inlet temperature and PZR vapor space limit is 320°F.
- d. RCS cold leg loop temperature and PZR vapor space temperature limit is 320°F, and for aux spray, the difference between Regenerative Hx charging outlet temperature and PZR vapor space limit is 320°F.

Answer d Exam Level R Cognitive Level Memory Facility Braidwood ExamDate 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 2

010 Pressurizer Pressure Control System

2.1 Conduct Of Operations

2.1.10 Knowledge of conditions and limitations in the facility license. 2.7 3.9

Explanation of Answer 320°F delta T for normal and aux spray. Normal spray is cold leg and vapor space. Aux Spray is outlet regen HX (1TI-126) and vapor space

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
TRM - PZR Temperature Limits	3.4.c		3.4.c-1	1	
Plant heat up lesson plan	11-GP-XL-01	I, II	1-15	13	1,2,3
Pzr Temp Limit Surveillance	1BwOS TRM 3.4.c.1	F.5-F.7	2,3	0E2	

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1998 Braidwood NRC Exam

Record Number: 34 RO Number: 23 SRO Number:

Question Topic Pressurizer Pressure Master Controller setpoint failure

The unit is at 100% power, steady state, NOP/NOT. The Pressurizer Pressure Master Controller setpoint fails to 2185 psig. Assume a step change in the setpoint and assume that pressurizer pressure control remains in automatic.

Which of the following is the immediate automatic response of the system?

- a. Spray valves open, Variable Heaters deenergize
- b. PORV 455A opens, Spray valves open, Variable Heaters energize.
- c. Spray valves open, Variable Heaters energize.
- d. Spray valves close, Variable Heaters deenergize.

Answer a Exam Level B Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 2

010 Pressurizer Pressure Control System

K6. Knowledge of the effect of a loss or malfunction on the following will have on the Pressurizer Pressure Control System:

K6.01 Pressure detection systems 2.7 3.1

Explanation of Answer Controlling pressure fails lower than actual value - system responds to lower pressure from 2235 psig to 2185 psig.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Pressurizer System	11-RY-XL-01 (14)	III	30	9	21

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method: Editorially Modified

Question Source Comments: 1996 Braidwood NRC Exam RO Question #99 SRO Question #89

Record Number: 35 RO Number: 24 SRO Number: 26

Question Topic Why PZR Level Transmitters are Post Accident Monitors

Per Tech Specs, which of the following is NOT a reason for designating 1LT459 and 1LT460 as Post Accident Monitoring Instrumentation?

- a. Used to determine whether to terminate SI.
- b. Used to determine if SI reinitiation is required.
- c. Used to verify unit conditions necessary to establish natural circulation.
- d. Used to evaluate RCP trip criteria.

Answer d Exam Level S Cognitive Level Memory Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 2

011 Pressurizer Level Control System

2.1 Conduct Of Operations

2.1.12 Ability to apply technical specifications for a system. 2.9 4.0

Explanation of Answer PZR water level is used to determine whether to terminate SI or to re-initiate SI if it has been stopped. Also used to verify the unit conditions necessary to establish natural circulation.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Technical Specifications	3.3.3.6	Basis	B.3.3.3-7	0	
Intro to Technical Specifications LP	11-MC-XL-13 (3)	III	20	1	6

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 36 RO Number: SRO Number: 27

Question Topic RPS Protection for DNB

Which of the following Reactor Protection System Trips protects against DNB accidents?

- a. IR High Flux
- b. High Pressurizer Pressure
- c. High Pressurizer Level
- d. Power Range High Negative Rate

Answer d Exam Level B Cognitive Level Memory Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 2

012 Reactor Protection System

K5. Knowledge of the operational implications of the following concepts as they apply to the Reactor Protection System:

K5.01 DNB 3.3* 3.8

Explanation of Answer a - protects against excessive power excursions while in IR and is not taken credit for in the accident analysis. b - protects against overpressure. c - protects safety valves, prevents water hammer, and is a backup to the high pressurizer pressure trip. d - protects against high flux peaking from dropping rods.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Reactor Protection system	11-RP-XL-02 (60b)	II	9, 12, 16	6	5

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 37 RO Number: 25 SRO Number: 28

Question Topic Monitoring component status using TSLBs on an ESF actuation signal

The Status light for 1SI8801B is DARK following a SI actuation. 1SI8801B is...

- a. FULL OPEN and is NOT in its required safeguards position.
- b. CLOSED and is NOT in its required safeguards position.
- c. FULL OPEN and is in its required safeguards position.
- d. CLOSED and is in its required safeguards position.

Answer b **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

013 Engineered Safety Features Actuation System

A4. Ability to manually operate and/or monitor in the control room:

A4.01 ESFAS-initiated equipment which fails to actuate 4.5 4.8

Explanation of Answer 1SI8801B receives open signal on SI. Light comes on when valve is open.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
EP-0 Series LP	11-EP-XL-01	I	13	13	3
SI8801B P&ID	20E-1-4030 SI 6			K	

Material Required for Examination

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 38 **RO Number:** 26 **SRO Number:** 29

A normal Unit 1 heatup is in progress per 1BwGP 100-1 with the following plant conditions:

-RCS pressure 1850 psig
 -RCS pressurization rate 15 psig/min
 -RCS temperature 485°F
 -RCS heat up rate 10°F/hr
 -S/G pressure 575 psig

If the current trend continues, which of the following occurs FIRST?

- a. MSIVs close.
- b. PZR PORV opens.
- c. Lowest setpoint S/G safety valve opens.
- d. First group of steam dumps throttle open.

Answer a Exam Level R Cognitive Level Comprehension Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group 1 SRO Group 1

013 Engineered Safety Features Actuation System

K4. Knowledge of Engineered Safety Features Actuation System design feature(s) and or interlock(s) which provide for the following:

K4.03 Main Steam Isolation System 3.9 4.4

Explanation of Answer From 1850 psig. until P-11(1930) with pressurization rate of 15 psig/min takes 5.33 until P-11. PORV opens @ 2235#(larger than 1930#). Stm dumps will take 390 min to get >550°F with current HUR.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Main Steam System LP	I1-MS-XL-01 (23)	II	9,16-26, 41	1	19

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1996 Braidwood NRC Exam RO Question #22 SRO Question #25

Record Number: 39 RO Number: 27 SRO Number:

Question Topic Rod Bottom Lights during startup

Rods are being withdrawn in manual during a reactor startup, with all systems operable.

For the Control Banks, which of the following describes the status of the DRPI rod bottom lights at the moment the ROD AT BOTTOM annunciator alarm clears?

- a. Banks A, B, C, & D -- OFF.
- b. Banks A, B, C, & D -- ON.
- c. Banks A, B, C -- OFF; Bank D -- ON.
- d. Bank A -- OFF; Banks B, C, & D -- ON.

Answer d **Exam Level** B **Cognitive Level** Memory **Facility** Braidwood **ExamDate** 10/20/00

Tier: Plant Systems **RO Group** 2 **SRO Group** 1

014 Rod Position Indication System

K4. Knowledge of Rod Position Indication System design feature(s) and or interlock(s) which provide for the following:

K4.04 Zone reference lights 2.6 2.9

Explanation of Answer Control Bank A less than or equal to 9 steps withdrawn gives the alarm.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Rod Position Indication	I1-PI-XL-01	II	12	1	5
Rod at Bottom	1BwAR 1-10-E6	Setpoint	1	5	

Material Required for Examination

Question Source: Facility Exam Bank **Question Modification Method:**

Question Source Comments: 1996 Braidwood NRC Exam RO Question #37

Record Number: 40 **RO Number:** 28 **SRO Number:** 30

Question Topic Calorimetric Adjustments

Which of the following components is being DIRECTLY adjusted by the gain adjust at the NI panel potentiometer following a calorimetric calibration?

- a. Summing and level amplifier
- b. Detector output current
- c. Upper and Lower Detector Averaging Circuit
- d. Detector high voltage power supply

Answer a Exam Level B Cognitive Level Memory Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group 1 SRO Group 1

015 Nuclear Instrumentation System

A1. Ability to predict and/or monitor changes in parameters associated with operating the Nuclear Instrumentation System controls including:

A1.01 NIS calibration by heat balance 3.5 3.8

Explanation of Answer Gain potentiometer adjusts gain of summing level amplifier to calibrate PR channel.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Power Range Nis	I1-NI-XL-03 (33)	II	5-14	1	4

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments: Farley 1998

Record Number: 41 RO Number: 29 SRO Number: 31

The following plant conditions exist on Unit 2:

- Reactor is operating at 100% rated thermal power
- Annunciator 2-10-A4 "PWR RNG UPPER DET FLUX DEV HIGH" has alarmed
- All control rods are positioned within 12 steps of their group demand counters
- Maximum QPTR based on the plant computer calculation is 1.04

Assuming QPTR is not reduced, within two hours reactor power must be reduced to...

a. 50%

b. 74%

c. 88%

d. 94%

Answer: c Exam Level: S Cognitive Level: Comprehension Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group: 1 SRO Group: 1

015 Nuclear Instrumentation System

2.1 Conduct Of Operations

2.1.12 Ability to apply technical specifications for a system.

2.9 4.0

Explanation of Answer: Reduce thermal power greater than or equal to 3% from RTP for each 1% of QPTR >1.00

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Tech Specs	PD Limits	3.2.4	3.2.4-1	Amendment 98	
"PWR RNG UPPER DET FLUX DEV HIGH"	1BwAR 1-10-A4	N/A	1	6E1	
Power Range NI LP	I1-NI-XL-03 (33)	III	22-24	1	10

Material Required for Examination:

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 42 RO Number: SRO Number: 32

Question Topic Reactor trip due to failure of IR

A plant start-up is in progress. The P-10 permissive light has just ~~come "ON"~~
gone "OFF."

No operator actions have been taken.

Which of the following will result in an automatic reactor trip?

- a. Trip of one RCP.
- b. Power range channel N41 fails HIGH.
- c. Intermediate Range channel N35 fails HIGH.
- d. The NSO places the Block/Reset Switch for SR channel 31 to the "Reset" position.

Answer c Exam Level R Cognitive Level Comprehension Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group 1 SRO Group 1

015 Nuclear Instrumentation System

K4. Knowledge of Nuclear Instrumentation System design feature(s) and or interlock(s) which provide for the following:

K4.05 Reactor trip 4.3 4.5

Explanation of Answer Above P-10 and below P-8, reactor trip occurs on 2 RCPs trip (A incorrect). Above P-10, the Source Ranges are automatically blocked from energizing, (D incorrect). Power range high flux (high or low) is 2 of 4 (B incorrect). A failure of an IR will cause a trip because until the trip is blocked by the operator it will function, (C correct)

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Braidwood Big Notes	NI-3 Intermediate Range Detector	NI-3	1	5	
Reactor Protection System	I1-RP-XL-02 (60b)	II	8-11, 14	6	4

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 43 RO Number: 30 SRO Number:

Question Topic Effect of Open circuit on CETCs

Which of the following is correct for an OPEN in a RVLIS or CETC thermocouple after steady state conditions are reached?

- a. RVLIS will indicate core uncover.
- b. Subcool Margin Monitor will indicate increased subcooling.
- c. Control Board indication for the affected thermocouple will indicate less than 35°F.
- d. Control Board indication for the affected thermocouple will indicate greater than 2300°F.

Answer d Exam Level R Cognitive Level Memory Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group 1 SRO Group 1

017 In-Core Temperature Monitor System

A2. Ability to (a) predict the impacts of the following on the In-Core Temperature Monitor System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

A2.01 Thermocouple open and short circuits 3.1 3.5

Explanation of Answer When an open occurs, a capacitor discharges to ground through a resistor. This drives the display/output signal for the affected TC to > 2300.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Inadequate Core Cooling Detection	I1-IT-XL-01 (34b)	II	6, 9, 10	7	4,5,6

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 44 RO Number: 31 SRO Number:

Given the following plant conditions on Unit 1:

- 100% power.
- Train A CETC power supply (MCC 131x1 ckt15) has been deenergized for breaker replacement.
- Train B CETC has only 10 thermocouples operable which are currently indicating:
 - 1-610°F 6-613°F
 - 2-610°F 7-612°F
 - 3-613°F 8-612°F
 - 4-640°F 9-611°F
 - 5-613°F 10-613°F
- MCB display for train B CETC indicates 615°F

CETC #4 fails high.

MCB temperature would indicate

a. 612°F

b. 615°F

c. 731°F

d. 781°F

Answer: a Exam Level: B Cognitive Level: Application Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group: 1 SRO Group: 1

017 In-Core Temperature Monitor System

A4. Ability to manually operate and/or monitor in the control room:

A4.01 Actual in-core temperatures 3.8 4.1

Explanation of Answer: If less than 10 TCs are operable, the microprocessor divides by the appropriate number to obtain an average. 612°F is the average of 9 which is correct. 615°F is the average of 10. 781°F adds 2300°F for the failed TC to average 10. 731°F adds 1800°F for the failed TC to average 10.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Inadequate Core Cooling	I1-IT-XL-01	II.A.2	9	7	5

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 45 RO Number: 32 SRO Number: 33

Question Topic RCFC effects on #2 RCP seal

The following conditions exist with Unit 1 in MODE 5:

- Containment temperature - 88°F
- 2C RCP - RUNNING
- 2C RCFC - STOPPED

The adverse consequence of starting the 2C RCFC is that 2C RCP seal number ...

- a. 2 may CLOSE causing the number 1 seal leakoff flow indication to INCREASE.
- b. 2 may OPEN causing the number 1 seal leakoff flow indication to DECREASE.
- c. 1 may OPEN causing the number 1 seal leakoff flow indication to INCREASE.
- d. 1 may CLOSE causing the number 1 seal leakoff flow indication to DECREASE.

Answer b Exam Level S Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 1 SRO Group 1

022 Containment Cooling System

2.1 Conduct Of Operations

2.1.10 Knowledge of conditions and limitations in the facility license. 2.7 3.9

Explanation of Answer Startup of an RCFC may affect the associated RCPs temperature sensitive seal cavity and allow the #2 seal to open causing #1 seal leakoff to decrease.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
RCFC startup	1BwOP VP-5	E.5	2	52E4	
RCP LP	I1-AP-XL-01 (13)	II	8	9	3,4

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1996 Braidwood NRC Exam RO Question #19 SRO Question #23

Record Number: 46 RO Number: SRO Number: 34

Question Topic Effect on CNMT RCFCs

Given the following Unit 2 conditions:

- 2A and 2C Reactor Containment Fan Coolers (RCFC) are operating in HIGH speed.
- 2B and 2D RCFCs are stopped and in standby.
- Normal cooling water lineup for the RCFCs exists.

What will be the status of the RCFCs 15 seconds after an SI signal occurs concurrent with a loss of offsite power?

- a. Only 2A and 2B RCFCs running in HIGH speed.
- b. Only 2B and 2D RCFCs running in LOW speed.
- c. ALL RCFCs running in LOW speed.
- d. NO RCFCs are running.

Answer d Exam Level B Cognitive Level Comprehension Facility Braidwood ExamDate 10/20/00

Tier: Plant Systems RO Group 1 SRO Group 1

022 Containment Cooling System

K2. Knowledge of bus power supplies to the following:

K2.01 Containment cooling fans 3.0* 3.1

Explanation of Answer Secured fans will start after 20 second time delay. DGs will supply electrical power on loss of bus. Fans in fast will shift to low after 20 sec time delay

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
RCFC Start-up	1BwOP VP-5	E.6	2	52E4	
Initial Licensed Operator Containment		II.C.1.a	46; 60	3	6
ESF System	I1-KF-XL-01 (61)	II.C	21	1	7

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method: Significantly Modified

Question Source Comments: 1997 Braidwood NRC Exam

Record Number: 47 RO Number: 33 SRO Number: 35

Question Topic: Actions to RCFCs on a high containment pressure

The plant has just tripped from 100% power. Which of the following will result in the RCFCs automatically shifting to low speed?

- a. Two channels of containment pressure reading 3.5 psig.
- b. Two channels of pressurizer pressure reading 1880 psig.
- c. Two channels of containment temperature reading 125°F.
- d. Two undervoltage conditions sensed on the 6.9 KV buses.

Answer: a **Exam Level:** R **Cognitive Level:** Memory **Facility:** Braidwood **Exam Date:** 10/20/00

Tier: Plant Systems **RO Group:** 1 **SRO Group:** 1

022 Containment Cooling System

K4. Knowledge of Containment Cooling System design feature(s) and or interlock(s) which provide for the following:

K4.02 Correlation of fan speed and flowpath changes with containment pressure 3.1* 3.4*

Explanation of Answer: SI Setpoints Pzr press 1829 Cnmt Temp has no effect Cnmt press 3.4 Loss of RCP is RX trip not SI

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
ESF System LP	11-KF-XL-01 (61)	II.C	11-13	5	7

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 48

RO Number: 34

SRO Number:

Question Topic Containment Spray System radiation levels

During initial actuation of the Containment Spray System during a LOCA, radiation levels in the RWST are expected to....

- a. increase due to spray add tank recirculation to the RWST.
- b. increase due to containment recirc. sump recirculation to the RWST.
- c. stay the same due to NO recirculation aligned to the RWST.
- d. stay the same due to spray add tank recirculation to the RWST.

Answer c Exam Level B Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 1

026 Containment Spray System

A2. Ability to (a) predict the impacts of the following on the Containment Spray System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

A2.09 Radiation hazard potential of BWST 2.5* 2.9*

Explanation of Answer No recirculation to the RWST from the recirc. sump or CS system. The CS eductor recirc. goes to CS pump suction, not RWST.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Containment Spray System LP	I1-CS-XL-01 (59)	III.B	2B-29	1	11
P&ID CNMT Spray	M-46	N/A	1A, 1B	AY	

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 49 RO Number: 35 SRO Number: 36

Question Topic	Fire in Containment Charcoal Filter Units				
A fire has occurred in the 2B Containment Charcoal Filter Unit. Deluge is actuated at ...					
a.	0PM02J in the Main Control Room.				
b.	1PM09J, Fire Panel in the Main Control Room.				
c.	2B Containment Charcoal Filter Unit.				
d.	2VP01J on 426' Electrical Penetration Area.				
Answer	d	Exam Level	B	Cognitive Level	Memory
		Facility	Braidwood	Exam Date	10/20/00
Tier	Plant Systems		RO Group	3	SRO Group 2
027	Containment Iodine Removal System				
A2.	Ability to (a) predict the impacts of the following on the Containment Iodine Removal System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:				
A2.01	High temperature in the filter system				3.0* 3.3*
Explanation of Answer	Self-explanatory				

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
operation of the containment Charcoal Filter Manual Deluge System	1BwOP FP-35	F.4	3	1	
Fire Protection LP	I1-FP-XL-01 (57)	I	19-22	1	5

Material Required for Examination	
Question Source: New	Question Modification Method:
Question Source Comments:	
Record Number: 50	RO Number: 36
SRO Number: 37	

Question Topic Maximum hydrogen concentration prior to which loss of hydrogen removal capability will occur

The following plant conditions exist:

- A LOCA has occurred on Unit 1
- E-0 has been completed and the crew has transitioned to E-1
- From E-1 the crew transitioned to FR-C.1
- The Post-LOCA Purge Exhaust Fan is de-energized due to an electrical fault on Bus 134V4.

Which of the following containment hydrogen concentrations is the MAXIMUM concentration which the Hydrogen Recombiners may be placed in service WITHOUT CONSULTATION WITH THE TSC?

a. 0.5%

b. 4.0%

c. 6.0%

d. 8.0%

Answer b **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Plant Systems **RO Group** 3 **SRO Group** 2

028 Hydrogen Recombiner and Purge Control System

K3. Knowledge of the effect that a loss or malfunction of the Hydrogen Recombiner and Purge Control System will have on the following:

K3.01 Hydrogen concentration in containment 3.3 4.0

Explanation of Answer >5% Consult with TSC. .5% do not put into service.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Respond to Inadequate Core Cooling	1BwFR-C.1	Step 6	11	WOG 1C	
FR Procedures LP	I1-FR-XL-02	II	5	7	3

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments: 1999 VC Summer NRC Exam

Record Number: 51 **RO Number:** 37 **SRO Number:** 38

Question Topic Containment Purge Alignment Requirements.

In Modes 1-4, the Containment Normal Purge Valves _____ and the Mini Purge Valves _____.

- a. are sealed closed, may be opened as needed.
- b. are sealed closed, are sealed closed
- c. may be opened as needed, may be opened as needed
- d. may be opened as needed, are sealed closed

Answer a Exam Level S Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 2

029 Containment Purge System

2.1 Conduct Of Operations

2.1.10 Knowledge of conditions and limitations in the facility license. 2.7 3.9

Explanation of Answer Since normal purge valves are 48" in diameter, they are not qualified to close automatically under DBA conditions and thus must be sealed closed. The 8" mini purge valves are designed to meet the cnmt isolation criteria and may be opened as needed.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Tech Specs -Containment Isolation Valves	B.3.6.3	3.6.3	3.6.3-2	0	
Cnmt Vent and Purge System LP	I1-VP-XL-01 (42)	V	32	4	10

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 52 RO Number: SRO Number: 39

Question Topic Actions for loss of SFP Cooling

The following conditions exist:

- Unit 1 is at 100% power
- Unit 2 is currently off loading fuel to the Spent Fuel Pool
- Current Spent Fuel Pool temperature is 105°F
- 1FC01P "SFP Cooling Pump" is OOS for maintenance
- 2FC01P "SFP Cooling Pump" was running and tripped for unknown reasons

Per 0BwOA REFUEL-3, which of the following actions should take place:

- a. Start one FHB Charcoal Booster Fan and two Aux Building Charcoal Booster Fans.
- b. Align a RWST to the SFP and start one Aux Building Charcoal Booster Fan.
- c. Align Recycle Hold Up Tank to the SFP.
- d. Place the Skimmer Loop in Service.

Answer a Exam Level B Cognitive Level Memory Facility: Braidwood ExamDate:

Tier: Plant Systems RO Group 2 SRO Group 2

033 Spent Fuel Pool Cooling System

A2. Ability to (a) predict the impacts of the following on the Spent Fuel Pool Cooling System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

A2.02 Loss of SFPCS 2.7 3.0

Explanation of Answer B & C are wrong; these are actions for lowering level- not temperature control. D is wrong , ensures clarity not temperature control (does not pass through SFP cooler).

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Spent Fuel Pit Cooling	0BwOA REFUEL-3	Step 1	2	0	
Loss of Spent Fuel Cooling	0BwOA REFUEL-3	PBIG		0	3

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 53 RO Number: 38 SRO Number: 40

Question Topic Controlling S/G Level Channel failure

The plant is operating at 100% power when the Controlling S/G Level Channel on 'A' S/G fails to 100%.

If no operator action is taken, what is the expected plant response?

- a. Feedwater flow to 'A' S/G will INITIALLY INCREASE, then DECREASE causing S/G level to STABILIZE at a level HIGHER THAN PROGRAM.
- b. Feedwater flow to 'A' S/G will INITIALLY DECREASE, then INCREASE causing S/G level to STABILIZE at a level LOWER THAN PROGRAM.
- c. Reactor trip will occur on Lo-Lo S/G level.
- d. Reactor trip will occur due to turbine trip.

Answer c Exam Level B Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 2

035 Steam Generator System

K4. Knowledge of Steam Generator System design feature(s) and or interlock(s) which provide for the following:

K4.01 S/G level control 3.6 3.8

Explanation of Answer A. & B. Incorrect because the level input to SGWLC will continue to see 100% level. D. Incorrect because the MFRV will close and remain closed. (P-14 causes turbine trip.)

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Steam Generator Water Level	I1-FW-XL-01	III	3	6	16

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 54 RO Number: 39 SRO Number: 41

Question Topic Isolation of MRSS

Which of the following will close the MSIVs?

- a. 3.4 psig Cnmt pressure on 2/3 channels.
- b. 640 psig steam line pressure > P-11 on 1/3 channels on 1/4 lines.
- c. -100 psi/50sec < P-11 with SI blocked on 1/3 channels on 1/4 lines.
- d. 8.2 psig Cnmt pressure on 2/3 channels.

Answer d Exam Level B Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 2

039 Main and Reheat Steam System

A3. Ability to monitor automatic operations of the Main and Reheat Steam System including:

A3.02 Isolation of the MRSS 3.1 3.5

Explanation of Answer 8.2 psig Cnmt pressure on 2/3 channels.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Main Steam system LP	I1-MS-XL-01 (23)	II	8, 9	8	5

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 55 RO Number: 40 SRO Number: 42

Question Topic Discharge pressure needed to exceed SG pressure that has increased to all the safety setpoints

All steam generator pressures increase following a transient event. Steam generator pressures are being maintained by all twenty steam generator safety valves. The LOWEST approximate discharge pressure of the MFW pumps necessary to provide flow to the steam generators would be...

- a. 1115 psig.
- b. 1175 psig.
- c. 1205 psig.
- d. 1235 psig.

Answer d **Exam Level** R **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Plant Systems **RO Group** 2 **SRO Group** 2

039 Main and Reheat Steam System

K3. Knowledge of the effect that a loss or malfunction of the Main and Reheat Steam System will have on the following:

K3.04 MFW pumps 2.5 2.6

Explanation of Answer Highest Safety setpoint is 1235 psig

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Main Steam System	11-MS-XL-01 (23)	II	5	8	3

Material Required for Examination

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 56 **RO Number:** 41 **SRO Number:**

Question Topic Steam Dump effect on fuel clad

The following conditions exist on Unit 2:

- Reactor Power is at 50%, steady state.
- The Steam Dumps are in the Tave MODE and in Automatic
- The Reactor Operator adjusts the steam dump controller potentiometer from 7.28 to 8.00

Which of the following is a correct plant effect of the potentiometer change?

Fuel Cladding Temperature...

- a. increases due to increased steam demand.
- b. decreases due to a decrease in steam demand.
- c. remains constant due to the potentiometer only in circuit during Manual Mode.
- d. remains constant due to the potentiometer only in the circuit during STEAM PRESSURE Mode.

Answer d Exam Level B Cognitive Level Comprehension Facility: Braidwood ExamDate:

Tier: Plant Systems RO Group 3 SRO Group 3

041 Steam Dump System and Turbine Bypass Control

K5. Knowledge of the operational implications of the following concepts as they apply to the Steam Dump System and Turbine Bypass Control:

K5.06 Effect of power change on fuel cladding 2.5 2.8

Explanation of Answer 7.28 maintains 1092 psig. $x/1500 = .8$ where $x=1200$ psig. Higher pressure controlled in SG; therefore steam dumps would close if in the steam pressure mode.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Steam Dump LP	I1-DU-XL-01 (24)	II	3	7	11
Big Notes	Main Steam Dumps	N/A	MS-4	4	

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 57 RO Number: 42 SRO Number: 43

Question Topic: Determination of required plant actions on a lowering condenser vacuum

Unit 2 is operating at 50% power ramping up to full power. Main Condenser pressure is slowly rising. Pressure is currently at 5"HgA and rising at 0.5"/min.

In 6 minutes the crew should ...

- a. Initiate a Turbine Runback.
- b. Increase turbine power to 620 MW.
- c. Manually trip the reactor and go to 2BwEP-0.
- d. Select MW OUT and ramp down @ 0.5 MW/min.

Answer: c **Exam Level:** R **Cognitive Level:** Application **Facility:** Braidwood **Exam Date:** 10/20/00

Tier: Plant Systems **RO Group:** 2 **SRO Group:** 2

055 Condenser Air Removal System

K3. Knowledge of the effect that a loss or malfunction of the Condenser Air Removal System will have on the following:

K3.01 Main condenser 2.5 2.7

Explanation of Answer: Current power is 1175 MW x .5 = 588MW. Turbine trip prevents main condenser overpressurization.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Condenser Vacuum	2BwOA SEC-3		3, 9	54	
Loss of Condenser Vacuum LP	11-OA-XL-38	II	3	8	5

Material Required for Examination: Figure 1BwOA SEC-3-1

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 58 **RO Number:** 43 **SRO Number:**

Question Topic Auto start of CD/CB Pump

What is the SEQUENCE that occurs when a Main Feed pump LOW NPSH signal is actuated?

- a. The CD 152 valve (CD pump recirc) opens, the CD/CB aux oil pump starts, the CD/CB pump starts.
- b. The CD/CB pump starts then the CD 152 valve (CD pump recirc) opens.
- c. The CD 152 valve (CD pump recirc) closes, the CD/CB aux oil pump starts, the CD/CB pump starts.
- d. The CD/CB pump starts then the CD 152 valve (CD pump recirc) closes.

Answer C Exam Level B Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 1 SRO Group 1

056 Condensate System

K1. Knowledge of the physical connections and/or cause-effect relationships between Condensate System and the following:

K1.03 MFW. 2.6* 2.6

Explanation of Answer Oil pump has to start and provide adequate oil pressure prior to CD/CB pump starting; CD152 will close prior to CD/CB start.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
License System Description Cond/FW System	11-CD-XL-01 Chapter 25	II.A.4.e	1, 15	12	6.d
FW Pump NPSH LOW	1BwAR 1-16-E1	N/A	1	5E2	
	20E-1-4030CB06				

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method:

Question Source Comments: 1997 Braidwood NRC Exam

Record Number: 59 RO Number: 44 SRO Number: 44

Per Tech Specs, which of the following is a correct listing of Technical Specification Feedwater Isolation Valves associated with the Unit 2 Main Feed Water System?

2FW009, "FW Isolation Valve",
 2FW035, "SG Feedwater Tempering Isolation Valve"
 2FW510, "FW Regulating Valve",
 2FW510A, "FW Regulating Bypass Valve",

AND...

- a. 2FW006A, "S/G FW Shutoff VLV" and 2FW043, "SG FWIV Bypass Isolation Valve."
- b. 2FW006A, "S/G FW Shutoff VLV" and 2FW046, "S/G FWIV Byp Flow Cont."
- c. 2FW034, "SG Tempering Flow Control Valve" and 2FW046, "S/G FWIV Byp Flow Cont."
- d. 2FW034, "SG Tempering Flow Control Valve" and 2FW043, "SG FWIV Bypass Isolation Valve."

Answer: d Exam Level: R Cognitive Level: Memory Facility: Braidwood Exam Date:

Tier: Plant Systems RO Group: 1 SRO Group: 1

059 Main Feedwater System

2.1 Conduct Of Operations

2.1.12 Ability to apply technical specifications for a system.

2.9 4.0

Explanation of Answer: Unit 2 FWIVs are FW009, 034, 035, 043, 510, 510A

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Condensate and Feedwater LP	1I-CD-XL-01 (25)	III.A	54	12	16
ESFAS Instrumentation	B.3.3.2	Basis	B3.3.2-28	0	

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number:

60

RO Number:

45

SRO Number:

Question Topic Effect of failure of S/G steam pressure channel

The following conditions exist on Unit 1:

- Reactor power is 100%
- All systems are normal
- 1FT-512 is selected for steam flow input into SGWLC for S/G 1A

With NO OPERATOR ACTION, what is the effect of the pressure transmitter associated with FT-512 failing low?

1A S/G level will decrease, feed pump speed ...

- a. will decrease, and S/G level will decrease below the LO-2 setpoint.
- b. is unaffected, and S/G level will return to normal.
- c. will increase, and S/G level will return to normal.
- d. is unaffected, and S/G level will decrease below LO-2 setpoint.

Answer a Exam Level B Cognitive Level Comprehension Facility Braidwood Exam Date 10/20/00

Tier: Plant Systems RO Group 1 SRO Group 1

059 Main Feedwater System

K3. Knowledge of the effect that a loss or malfunction of the Main Feedwater System will have on the following:

K3.03 S/Gs 3.5 3.7

Explanation of Answer Steam flow is output to summator for FW control system program Delta-P. Delta-P program will decrease causing feed pump speed and FW header pressure to decrease.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
FW EH controls/ schematic	EHC-6/DP			1	
MFP Speed Control	I1-FW-XL-02 (37b)	II	24/25	5	19
SGWLC lesson plan	I1-FW-XL-01 (27)	II	15-16	1	11

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1998 Braidwood NRC Exam

Record Number: 61 RO Number: 46 SRO Number: 45

Question Topic: Aux. Feedwater Operations During RCS Cooldown

A Unit 1 RCS cooldown is in progress with the A auxiliary feedwater pump maintaining level in all steam generators. Instrument bus 111 is deenergized.

Auxiliary feedwater system flow control valves (1AF005a-d)

- a. Fail as is.
- b. Fail Open.
- c. Fail Closed.
- d. Are not affected.

Answer: c Exam Level: B Cognitive Level: Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group: 1 SRO Group: 1

061 Auxiliary / Emergency Feedwater System

A3. Ability to monitor automatic operations of the Auxiliary / Emergency Feedwater System including:

A3.02 RCS cooldown during AFW operations 4.0 4.0

Explanation of Answer: Bus 111 affects train A and MCB pots go to 0 and valves fail closed once flow is sensed. Fails as is if no flow is sensed.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Aux. Feedwater System Lesson Plan	11-AF-XL-01 (26)	II.A.7.d.3.e	15	9	15

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 62 RO Number: 47 SRO Number: 46

Question Topic Automatic operation of SX suction valves

Which of the following will result in a shift of Unit 1 Auxiliary Feedwater (AF) System suction from the Condensate Storage Tank to the Essential Service Water System while in Mode 3 at NOT/NOP?

AF pump suction pressure of ...

- a. 17 psia coincident with a loss of offsite power.
- b. 19 psia coincident with Lo-Lo level in ALL steam generators.
- c. 17 psia coincident with Pressurizer pressure of 1850 psig.
- d. 19 psia coincident with a phase B isolation.

Answer a Exam Level R Cognitive Level Comprehension Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group 1 SRO Group 1

061 Auxiliary / Emergency Feedwater System

A3. Ability to monitor automatic operations of the Auxiliary / Emergency Feedwater System including:

A3.04 Automatic AFW isolation 4.1 4.2

Explanation of Answer Low pump suction pressure of 18.1 psia with any of the following will switch to ESW: (1) Lo-Lo SGWL (2) SI initiation (3) RCP Bus Undervoltage

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Motor Driven AFW pump _A startup on Recirc	1BwOP AF-5	E.7	3	13E2	
Auxiliary Feedwater System	11-AF-XL-01 (26)	II.C	19	9	10

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method: Editorially Modified

Question Source Comments: 1996 Braidwood NRC Exam SRO Question #34

Record Number: 63 RO Number: 48 SRO Number:

Question Topic: Determination of offsite power sources through which breakers

A Reactor Trip has just occurred on Unit 1. Following the main generator trip, Automatic Bus Transfer failed to operate for Busses 156 and 157. Which ONE of the following describes the 6.9 KV Bus AND RCP status?

- a. All Feed and Load Breakers Open on Busses 156 and 157.
Only the 1A and 1B RCPs trip due to Bus Undervoltage.
- b. All Load Breakers Open on Busses 156 and 157.
Only the 1A and 1B RCPs trip due to Bus Underfrequency.
- c. All Load Breakers Open on Busses 156 and 157.
All RCPs trip due to Bus Undervoltage.
- d. All Feed and Load Breakers Open on Busses 156 and 157.
All RCPs trip due to Bus Underfrequency.

Answer: a **Exam Level:** B **Cognitive Level:** Comprehension **Facility:** Braidwood **Exam Date:** 10/20/00

Tier: Plant Systems **RO Group:** 2 **SRO Group:** 2

062 A.C. Electrical Distribution

K1. Knowledge of the physical connections and/or cause-effect relationships between A.C. Electrical Distribution and the following:

K1.04 Off-site power sources 3.7 4.2

Explanation of Answer: RCPs A and B powered from Buses 156, 157. Undervoltage does not actuate on a de-energized bus.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Electrical Lineup- Unit 1	1BwOP RC-E1	N/A	1	1E3	
AC Electrical Power	I1-AP-XL-01 (4)	III	23-25	8	10

Material Required for Examination:

Question Source: Facility Exam Bank **Question Modification Method:**

Question Source Comments: 1996 Braidwood NRC Exam RO Question #43 SRO Question #47

Record Number: 64 **RO Number:** 49 **SRO Number:** 47

Question Topic Knowledge of how RTBs are affected due to a loss of DC Bus Power Supply

During operation at power with the Reactor Trip Breakers closed, a LOSS of 125 VDC control power to one of the Reactor Trip Breakers occurs.

Which of the following describes how that Reactor Trip Breaker will respond?

- a. Trips OPEN due to loss of power to the SHUNT coil.
- b. Trips OPEN due to loss of power to the UNDERVOLTAGE coil.
- c. Is NOT capable of tripping on a SHUNT trip.
- d. Is NOT capable of tripping on an UNDERVOLTAGE trip.

Answer c **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Plant Systems **RO Group** 2 **SRO Group** 1

063 D.C. Electrical Distribution

K2. Knowledge of bus power supplies to the following:

K2.01 Major dc loads 2.9* 3.1*

Explanation of Answer A. Incorrect because the shunt coil is normally de-energized. B. & D. Incorrect because the undervoltage coil is supplied with 48V power from SSPS.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Electrical Prints	20E-1-4030-RD6	N/A	1	P	
Solid State Protection System	11-RP-XL-01 (60a)	II	13	3	4, 10

Material Required for Examination

Question Source: New **Question Modification Method:**

Question Source Comments: 1998 Calloway NRC Exam

Record Number: 65 **RO Number:** 50 **SRO Number:** 48

Question Topic Local trips required due to loss of MCB Control Power

Given the following conditions:

- Unit 2 is in MODE 3 at 500°F
- The MCB indication for DC Bus 211 indicates 0 volts
- Pressurizer Spray Valve 2RY455B is stuck open
- RCS pressure is lowering

Which of the following will stop the RCS depressurization?

- a. Energize all Pressurizer heaters.
- b. Trip the 2D RCP locally at its breaker.
- c. Isolate Instrument Air to Containment.
- d. Secure the 2C RCP from the Main Control Room.

Answer b **Exam Level** B **Cognitive Level** Comprehension **Facility** Braidwood **Exam Date** 10/20/00

Tier: Plant Systems **RO Group** 2 **SRO Group** 1

063 D.C. Electrical Distribution

K4. Knowledge of D.C. Electrical Distribution design feature(s) and or interlock(s) which provide for the following:

K4.04 Trips 2.6? 2.9?

Explanation of Answer Tripping 2D RCP secures mode of force through spray valve. Valve is stuck open so isolating air will not help. 2C RCP provides flow through 1RY455C.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
loss of DC Bus	2BwOA ELEC-1			55B	
125VDC System LP	I1-DC-XL-01 (8c)	III	9-19	6	3

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 66 **RO Number:** 51 **SRO Number:** 49

Question Topic Amount of pressure needed in Diesel Starting Air Tanks to start diesels

The 1A DG is not running.

Which of the following combinations of Diesel Generator Air Receiver pressures is sufficient to maintain the 1A Diesel Generator OPERABLE per BwOP DG-1 "Diesel Generator Alignment to Standby Condition?"

	Receiver A (PSIG)	Receiver B (PSIG)
--	-------------------	-------------------

a.	170	100
----	-----	-----

b.	0	240
----	---	-----

c.	170	170
----	-----	-----

d.	0	170
----	---	-----

Answer b **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Plant Systems **RO Group** 2 **SRO Group** 2

064 Emergency Diesel Generators

K1. Knowledge of the physical connections and/or cause-effect relationships between Emergency Diesel Generators and the following:

K1.05 Starting air system 3.4 3.9

Explanation of Answer One air receiver >175 psig for D/G to be declared operable if DG secured.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
DG Alignment to Standby Condition	1BwOP DG-1	E.6	4	11	
Emergency DG and Auxiliaries LP	I1-DG-XL-01 (9)	I	11-12	1	2

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 67 **RO Number:** 52 **SRO Number:** 50

Question Topic: Operation of Fuel Oil Storage Tanks transfer pumps.

The 2A Diesel Generator is NOT running. The lead Fuel Oil Transfer pump starts in response to low level in the Fuel Oil Day Tank. This pump fails to develop adequate discharge pressure but continues to run.

The second Fuel Oil Transfer pump will ...

- ☐ a. NOT start because it is not selected to start on low level.
- ☐ b. NOT start unless DG engine speed reaches 100 RPM.
- ☐ c. start if in AUTO.
- ☐ d. start immediately if the running pump is placed in Pull Out.

Answer: a **Exam Level:** B **Cognitive Level:** Memory **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Plant Systems **RO Group:** 2 **SRO Group:** 2

064 Emergency Diesel Generators

K6. Knowledge of the effect of a loss or malfunction on the following will have on the Emergency Diesel Generators:

K6.08 Fuel oil storage tanks 3.2 3.3

Explanation of Answer: Both pumps auto start on DG start >280 rpm. Lead pump cycles on LO level in storage tank. Stby pump does not cycle on LO level in ST.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
EDG and Auxiliaries	11-DG-XL-01 Ch.9	II	8, 9	7	2a

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 68 **RO Number:** 53 **SRO Number:** 51

Question Topic Required termination of radioactive release on low circ water flow.

The following plant conditions exist:

- A high flow liquid radioactive waste discharge is in progress IAW BwOP WX-501T1, "Liquid Radioactive Tank 0WX01T Release Form."
- Circulating water blowdown flow in the release header indicates 6500 gpm.

The operator should...

- a.** Increase circulating water blowdown flow to greater than 8000 gpm.
- b.** Verify 0AOV WX-353, Release Tank Outlet, is closed and ensure the release is terminated.
- c.** Verify the relase tank discharge high radiation header alarm is NOT lit.
- d.** Check the high flow release rate less than the calculated value.

Answer **b** **Exam Level** R **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

068 Liquid Radwaste System

A2. Ability to (a) predict the impacts of the following on the Liquid Radwaste System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

A2.04 Failure of automatic isolation 3.3 3.3

Explanation of Answer WX 353 auto closes on less than 7000 gpm circ. water flow.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Radiation Monitoring LP	I1-AR-XL-01	2.C.2.b	13	1	4.b
Liquid Radioactive Tank 0WX01T Release Form	BwOP WX-501T1	G	1, 31-35	14	

Material Required for Examination

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 69 **RO Number:** 54 **SRO Number:**

Question Topic Waste gas high vent stack activity

The waste gas discharge control modulating valve (RCV 014)....

- a. must be opened by first dialing the controller to 50%, then placing the open control switch to the OPEN position.
- b. will close automatically and an alarm will be activated when vent stack activity exceeds the high alarm setpoint on 0PR2J.
- c. controls pressure at 1.3 psig from a gas decay tank to the hold up tanks.
- d. maintains a constant downstream pressure to ensure a constant discharge flowrate.

Answer b Exam Level B Cognitive Level Memory Facility Braidwood ExamDate 10/20/00

Tier Plant Systems RO Group 1 SRO Group 1

071 Waste Gas Disposal System

A1. Ability to predict and/or monitor changes in parameters associated with operating the Waste Gas Disposal System controls including:

A1.06 Ventilation system 2.5 2.8

Explanation of Answer valve will close automatically on high rad level.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Gaseous Rad Waste LP	I1-PS-XL-01 (46)	II.C.7	13	6	3

Material Required for Examination Provide I1-PS-XL-01, Figure 46-1

Question Source: Facility Exam Bank Question Modification Method:

Question Source Comments: Question 46-GAS RW 022/SGW0022

Record Number: 70 RO Number: 55 SRO Number: 52

Question Topic Waste Gas Decay Tank Operations

When aligned for normal operation (BwOP GW-1), what is the response to high pressure sensed at the in-service Gas Decay Tank?

An alarm is generated that...

- a.** alerts the operator to manually place a standby Gas Decay Tank in service.
- b.** indicates auto swap of in-service Gas Decay Tank to selected standby Gas Decay Tank, and alerts the operator to align another standby Gas Decay Tank.
- c.** indicates auto swap of in-service Gas Decay Tank to selected standby Gas Decay Tank and auto swap of standby Gas Decay Tank to new standby Gas Decay Tank.
- d.** shuts down the Waste Gas Compressors and isolates the in-service Gas Decay Tank.

Answer b **Exam Level** R **Cognitive Level** Memory **Facility** Braidwood **Exam Date** 10/20/00

Tier Plant Systems **RO Group** 1 **SRO Group** 1

071 Waste Gas Disposal System

2.1 Conduct Of Operations

2.1.28 Knowledge of the purpose and function of major system components and controls. 3.2 3.3

Explanation of Answer Auto swap to standby WGD Tank at 95 psig. Another tank must be manually aligned for standby.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Gas Decay Tank OA Press Hi	BwAR 0GW02J-1-A2	N/A	1	6	
Gas Radwaste sys lesson plan	Chap 46		11	6	6

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1998 Braidwood NRC Exam

Record Number: 71

RO Number: 56

SRO Number:

Question Topic: Knowledge of radiation detector and radiation detected.

The Fuel Handling Incident FHB Monitors 0AR055/56 use which of the following detector types and detect which types of radiation?

- a. Geiger-Mueller (G-M) tube, gamma and beta
- b. Geiger-Mueller (G-M) tube, gamma and alpha
- c. Compensated Ion Chamber, gamma and beta
- d. Uncompensated Ion Chamber, gamma and alpha

Answer: a **Exam Level:** R **Cognitive Level:** Memory **Facility:** Braidwood **Exam Date:** 10/20/00

Tier: Plant Systems **RO Group:** 1 **SRO Group:** 1

072 Area Radiation Monitoring System

K5. Knowledge of the operational implications of the following concepts as they apply to the ARM system:

K5.01 Radiation theory, including sources, types, units, and effects 2.7 3.0

Explanation of Answer: FHI detector is a GM tube and detects gamma and beta.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Radiation Monitoring LP	I1-AR-XL-01 (49)	II.A.1.a	6, 43	7	2

Material Required for Examination:

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 72 **RO Number:** 57 **SRO Number:**

The Main Control Room Outside Air Intake Radiation Monitors (gaseous) are separated into Train A and Train B (0RE-PR031B and 0RE-PR032B for Train A and 0RE-PR033B and 0RE-PR034B for Train B).

Which of the following is correct regarding the Main Control Room Outside Air Inlet Radiation Monitors (gaseous)?

The MINIMUM conditions to initiate automatic actions are...

- a. 0RE-PR031B and 0RE-PR034B are in the OPERATE FAILURE condition.
- b. 0RE-PR031B and 0RE-PR033B are in the OPERATE FAILURE condition.
- c. 0RE-PR031B in HIGH alarm.
- d. 0RE-PR031B and 0RE-PR033B are in HIGH alarm.

Answer c Exam Level B Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 2

073 Process Radiation Monitoring System

A1. Ability to predict and/or monitor changes in parameters associated with operating the Process Radiation Monitoring System controls including:

A1.01 Radiation levels 3.2 3.5

Explanation of Answer 2 MCR outside air monitors in OPERATE FAILURE condition (same train) 1 MCR outside air monitor in HIGH alarm condition (any train)

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
MCR OUT AIR IN OB	BwAR 2-0PR34J	N/A	1	3	
Tech Specs	3.3.7	Basis	B.3.3.7-1	0	
Radiation Monitoring	I1-AR-XL-01 (49)				5

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 73 RO Number: 58 SRO Number: 53

Question Topic	ESF Bus Power Supply SX				
<p>The unit is presently at 90% and shutting down due to a loss of Instrument Bus 114. All systems are in automatic.</p> <p>A Loss of Coolant Accident (LOCA) occurs. Which of the following statements best describes response of the 1B SX pump?</p>					
a.	Will automatically start on low system pressure.				
b.	Will have to be manually started.				
c.	Cannot be started from the control room.				
d.	Will automatically start on a Manual SI actuation.				
Answer	b	Exam Level	B	Cognitive Level	Comprehension
Facility	Braidwood		ExamDate		
Tier	Plant Systems		RO Group	2	SRO Group
				2	
075	Circulating Water System				
K2.	Knowledge of bus power supplies to the following:				
K2.03	Emergency/essential SWS pumps			2.6*	2.7*
Explanation of Answer	Train B ESF loads will not actuate or reset				

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Instrument Bus	1BwOA ELEC-2	Table D	18	7A	
Essential Service Water LP	11-SX-XL-01 (20)			1	5c

Material Required for Examination	
Question Source:	Facility Exam Bank
Question Modification Method:	Significantly Modified
Question Source Comments:	Modified OA ELEC036
Record Number:	74
RO Number:	59
SRO Number:	54

Given the following Unit 1 conditions:

- Reactor power - 100%
- 1B D/G surveillance test in progress - full load
- 1B SX pump - running
- 1A SX pump - available

The 1B SX pump tripped due to electrical problem with Bus 142. The US directs a start of the 1A SX pump.

What is the SEQUENCE for starting the 1A SX pump in these conditions?

The operator will ...

- a. take the 1A SX pump switch to START and release. The pump will start after a delay.
- b. take the 1A SX pump switch to START and hold until the pump starts.
- c. start the auxiliary oil pump, take the 1A SX pump switch to START and release. The pump will immediately start.
- d. start the auxiliary oil pump, wait 5 seconds, take the 1A SX pump switch to START and hold until the pump starts.

Answer b Exam Level B Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 3 SRO Group 3

076 Service Water System

A2. Ability to (a) predict the impacts of the following on the Service Water System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

A2.01 Loss of SWS 3.5* 3.7*

Explanation of Answer Lube oil pressure interlock in the start ckt creates a delay in the start of the SX pump. Per procedure emergency start does not require start of Aux Lube Oil pump.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Essential Service Water Pump Startup	BwOP SX-1	E.5 & NOTE	2	6E3	
Essential Service Water System LP	11-SX-XL-01 (20)	II	8,9,14	1	6

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1997 Braidwood NRC Exam

Record Number: 75 RO Number: 60 SRO Number: 55

Question Topic CC HX Tube Leak

Which of the following would occur on a small tube leak in the Component Cooling Water (CC) Heat Exchanger?

- a. Automatic CC System makeup from the Primary Water System only would occur, providing the necessary level for CC pump operation.
- b. CC System liquid inventory would increase, thus increasing the CC flowrate to components cooled by the CC System.
- c. CC would leak into the Essential Service Water (SX) System, potentially contaminating the SX System.
- d. CC surge tank level would increase, which would cause water to overflow through the vent valve.

Answer c Exam Level B Cognitive Level Application Facility Braidwood ExamDate:

Tier: Plant Systems RO Group 3 SRO Group 3

076 Service Water System

K3. Knowledge of the effect that a loss or malfunction of the Service Water System will have on the following:

K3.03 Reactor building closed cooling water 3.5* 3.9*

Explanation of Answer A CC HX tube leak would cause CC to leak into the SX system due to the CCs higher pressure. CC tank M/U will come from Demin Water first @50% and then from the PW (if needed) @45%. Both remaining distractors show SX leaking into the CC system.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Component Cooling System LP	I1-CC-XL-01 (19)	III	20, 21	6	3

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method:

Question Source Comments: 19CC-033

Record Number: 76 RO Number: 61 SRO Number: 56

Question Topic: Actions required due to low air pressure

When does the STBY station air compressor start?

- a. 85 psig.
- b. 90 psig.
- c. 95 psig.
- d. 105 psig.

Answer: d Exam Level: R Cognitive Level: Memory Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group: 3 SRO Group: 3

078 Instrument Air System

A3. Ability to monitor automatic operations of the Instrument Air System including:

A3.01 Air pressure 3.1 3.2

Explanation of Answer: Plant will trip on SGWL Low level

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
SA/IA System LP	I1-SA-XL-01 (53)	II	36-41	8	6

Material Required for Examination:

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 77 RO Number: 62 SRO Number:

Unit 1 is currently in Mode 4.

1A RH train is in service providing shutdown cooling.

RCS temp - 340°F

RCS pressure - 350 psig

Unit 2 is in Mode 1 at 100% power.

Equipment OOS for maintenance:

1B CW pump

"OC" WS pump

1A CC pump

U2 SA Compressor

A loss of the Unit 1 SAT occurs due to a sudden pressure actuation.

With NO operator action, Unit 1 will experience an uncontrolled _____ and Unit 2 will _____.

a. cooldown trip on Lo-Lo S/G level.

b. heatup not be affected

c. cooldown not be affected

d. heatup trip on Lo-Lo S/G level.

Answer d Exam Level B Cognitive Level Application Facility: Braidwood ExamDate: 10/20/00

Tier: Plant Systems RO Group 2 SRO Group 2

079 Station Air System

K4. Knowledge of Station Air System design feature(s) and or interlock(s) which provide for the following:

K4.01 Cross-connect with IAS 2.9 3.2

Explanation of Answer: Loss of all station air compressors. Unit 1- 144, Unit 0-143 (both powered from SAT). Unit 2 OOS. With loss of IA 1RH606/607 fail open, 1RH618/619 fail closed. Power is lost to the 1A RH pump and RH pumps will not re-start. Unit 2 FRV and FRBV fail closed.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Station Air/Instrument Air LP	11-SA-XL-01 (53)	III.D	36-41	1	11
Loss Of IA	1BWOA SEC-4	Step, Table A	3,16	3A	
DG Relaying	DG-2 (Bignotes)	N/A	1	3	

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 78 RO Number: 63 SRO Number: 57

Question Topic: Containment Design Features

The design of the Containment Equipment Hatch...

- a. is sized to allow reactor vessel head "O" ring passage.
- b. will allow only 2 personnel to enter/exit containment at one time.
- c. has a door at each end; one of which has been tested to ensure containment integrity during a design basis accident.
- d. is equipped with pneumatically interlocked inner and outer doors.

Answer: a Exam Level: R Cognitive Level: Memory Facility: Braidwood Exam Date: 10/20/00

Tier: Plant Systems RO Group: 3 SRO Group: 2

103 Containment System

K4. Knowledge of Containment System design feature(s) and or interlock(s) which provide for the following:

K4.04 Personnel access hatch and emergency access hatch 2.5 3.2

Explanation of Answer: More than 2 people can fit into the hatch. Both doors ensured to protect against DBA. Doors not pneumatically interlocked.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Primary Containment	I1-PC-XL-01 (40)	II	11,15	6	4
Technical Specifications	Bases	B.3.6.2	B.3.6.2-1	0	

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 79 RO Number: 64 SRO Number:

Question Topic: Opening disconnect switches causing Rod Control Urgent Failure Alarms

Unit 1 is at 36% power, when a rapid drop in reactor power occurs and a rod bottom light (DRPI panel) appears for a rod in Control Bank A. The crew enters 1BwOA ROD-3, Dropped or Misaligned Rod, for determining, correcting, and recovering a dropped control rod.

Which of the following actions will actuate the ROD CONT URGENT FAILURE (Annun. 1-10-C6) alarm during the dropped rod recovery?

- ☐ a. Resetting Group 1A step counter to ZERO.
- ☐ b. Resetting Control Bank A P/A Converter to ZERO.
- ☐ c. Withdrawing the dropped rod to its bank position.
- ☐ d. Opening the Lift Coil Disconnect switches for the unaffected rods in CB "A".

Answer: c **Exam Level:** B **Cognitive Level:** Comprehension **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group:** 1 **SRO Group:** 1

005 Inoperable/Stuck Control Rod

AK2. Knowledge of the interrelations between Inoperable/Stuck Control Rod and the following:

AK2.02 Breakers, relays, disconnects, and control room switches 2.5 2.6

Explanation of Answer: Opening disconnect switches for unaffected rods in group will not directly cause the urgent failure. The urgent failure will come in when the rod is withdrawn.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Dropped or Misaligned Rod	1BwOA ROD-3	Step 17	15	56	
OA ROD LP	I1-OA-XL-34	I	3-10	7	2, 5

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 80 **RO Number:** 65 **SRO Number:** 58

Given the following Unit 1 conditions:

Reactor power is at 100% steady state

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Power range NIS	102%	103%	102%	102%
PZR pressure	1880 psig(455)	1910 psig(456)	2500 psig(457)	1905 psig(458)
PZR level	90%(459)	92%(460)	90%(461)	72%(462)
Tave	584°F	585°F	582°F	586°F
SG levels	43%(1A)	34%(1B)	89%(1C)	40%(1D)

(all S/G instruments for a S/G read the same level)

What is the FIRST required action for these conditions?

- a. Verify a turbine runback is initiated.
- b. Reduce power to LESS THAN 100% indicated to ensure 8 hour average does NOT exceed 100% power.
- c. Trip the reactor and initiate actions of 1BwEP-0.
- d. Initiate a MANUAL Safety Injection and initiate actions of 1BwEP-0.

Answer: c Exam Level: B Cognitive Level: Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group: 2 SRO Group: 2

007 Reactor Trip

EA2. Ability to determine and interpret the following as they apply to Reactor Trip:

EA2.05 Reactor trip first-out indication 3.4 3.9

Explanation of Answer: SG 3 is above P-14 (SG High -2 Level) which actuates FWI, trips main feed pumps & trips turbine. Turbine trip at 100% power requires auto reactor trip.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Reactor Trip or Safety Injection Unit 1	1BwEP-0	B	1	1C	
EP-0 Series LP	I1-EP-XL-01	I	5	13	6
Steam Generator LP	I1-SM-XL-01 (22)	III	24	6	6

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1997 Braidwood NRC Exam

Record Number: 81 RO Number: 66 SRO Number: 59

Question Topic Basis for throttling AFW flow in ES-0.1

A reactor trip has occurred due to a turbine trip from full power. Narrow range steam generator levels are off scale low.

Why does 1BwEP ES-0.1, Reactor Trip Response, instruct the operator to feed the steam generators at greater than 500 GPM?

- a. Enhance natural circulation.
- b. Provide an adequate heat sink for decay heat removal.
- c. Ensure the steam generator U-tubes remain "wet" preventing dry steam generators.
- d. Prevent the formation of steam in the steam generator feed ring.

Answer b Exam Level B Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 2 SRO Group 2

007 Reactor Trip

EK3. Knowledge of the reasons for the following responses as they apply to Reactor Trip:

EK3.01 Actions contained in EOP for reactor trip 4.0 4.6

Explanation of Answer AFW flow is necessary for secondary heat sink. If SG level is in the narrow range in at least one SG, a heat sink is available. However, if narrow range level has not been established, feeding at greater than 500 GPM ensures a heat sink for decay heat removal. If adequate AFW flow for decay heat removal cannot be established, the transition to the FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, is necessary to establish an alternate source of feed flow or an alternate heat sink. (B correct). "A" incorrect, RCPs could be running, and neither steam generator level or AFW flow is checked to verify natural circulation. "C" incorrect, the "wet" U-tube concept is a concern in FR-H.1 after generators have dried out and flow is to be established to them. "D" incorrect.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
E-0, Background	ERG ES-0.1	Step Description	19	1C	
EP-0 Series LP	I1-EP-XL-01	VI	33	13	3

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 82 RO Number: 67 SRO Number: 60

Question Topic PRZ Level - effective method of control

Given the following plant conditions on Unit 1:

- A reactor trip and SI signal have been generated due to a PZR vapor space LOCA
- ALL RCPs are stopped
- RCS subcooling is inadequate
- PZR level is 68% and INCREASING
- CNMT pressure is 6 psig and slowly INCREASING

The US is directing actions of 1BwEP ES-1.2 "Post LOCA Cooldown And Depressurization" and is checking to see if an RCP should be started.

Which of the following describes the correct actions?

- a. Start the 1A or 1B RCP.
- b. Start the 1C or 1D RCP.
- c. Do NOT start an RCP since PZR level is inadequate.
- d. Do NOT start an RCP since subcooling is inadequate.

Answer d Exam Level S Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 2 SRO Group 2

008 Pressurizer Vapor Space Accident

2.1 Conduct Of Operations

2.1.20 Ability to execute procedure steps. 4.3 4.2

Explanation of Answer Must have adequate subcooling to start an RCP. S/G level is adequate.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Post LOCA Cooldown and Depressurization	1BwEP ES-1.2	Step 11	15	WOG1 C	
EP-1 Series LP	I1-EP-XL-02	IV	27, 28	13	1

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 83 RO Number: SRO Number: 61

Question Topic Determine downstream tailpipe temperature with a stuck open safety valve.

The plant is operating at 100% power when a pressurizer safety valve inadvertently lifts. The PRT pressure is 20 psig.

Which of the following most closely approximates the tail pipe temperature of the open safety valve?

- a. 235°F
- b. 265°F
- c. 295°F
- d. 325°F

Answer b **Exam Level** B **Cognitive Level** Comprehension **Facility** Braidwood **Exam Date** 10/20/00

Tier Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 2

008 Pressurizer Vapor Space Accident

AK2. Knowledge of the interrelations between Pressurizer Vapor Space Accident and the following:

AK2.02 Sensors and detectors 2.7* 2.7

Explanation of Answer Constant enthalpy process. Convert to psia.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Steam Tables	Steam Tables	Mollier Diagram	1	1967	
Thermodynamics LP	Thermo Chapt. 3		48, 49	5	9

Material Required for Examination Steam Tables

Question Source: Facility Exam Bank **Question Modification Method:** Significantly Modified

Question Source Comments: 14 PZR 092

Record Number: 84 **RO Number:** 68 **SRO Number:** 62

Question Topic RCP Seal Failure - when reactor trip is required

Given the following plant conditions on Unit 1:

- 100% power.
- RCP No. 1 SEAL LEAKOFF FLOW HIGH alarm is received.
- No. 2 seal leakoff high flow alarm has been PRINTED.
- RCP No. 1 seal leakoff recorder indication is offscale high on the HIGH range.

Which of the following has occurred and what action is indicated?

- a. The No. 1 and No. 2 seals have failed and a controlled reactor shutdown is required.
- b. The No. 2 seal has failed and continued monitoring of RCP conditions is required.
- c. The No. 1 seal has failed and an immediate reactor trip is required.
- d. The No. 2 and No. 3 seals have failed and continued monitoring of RCP conditions is required.

Answer c Exam Level R Cognitive Level Comprehension Facility Braidwood ExamDate 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 1 SRO Group 1

015 Reactor Coolant Pump Malfunctions

2.1 Conduct Of Operations

2.1.20 Ability to execute procedure steps. 4.3 4.2

Explanation of Answer: Indications are that #1 seal has failed. The Operator Action Summary of RCP-1 states to go to step 12 which states to trip the reactor and the RCP. Due to the high seal leakoff flow continued monitoring is not the proper action to take. A controlled RCP shutdown is required if seal leakoff is high but has not alarmed. #3 seal is not affected.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
RCP Seal Failure	1BWOA RCP-1	OAS	12	7	
RCS LP	AP-XL-01				8

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1999 Braidwood NRC Exam

Record Number: 85 RO Number: 69 SRO Number:

Question Topic RCS parameters with ONE RCP stopped.

If Unit 1 is operating at 20% power with control rods in MANUAL and 1C RCP trips but the reactor is NOT manually tripped, which of the following sets of conditions describes the expected conditions for the parameter listed below?

Actual Reactor Power	Steam Flow for Affected Loop SG	Steam Flow for Other SGs
-------------------------	------------------------------------	-----------------------------

- a. DECREASE, DECREASE, DECREASE
- b. CONSTANT, INCREASE, INCREASE
- c. CONSTANT, DECREASE, INCREASE
- d. DECREASE, INCREASE, CONSTANT

Answer c Exam Level S Cognitive Level Comprehension Facility: Braidwood Exam Date: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 1 SRO Group 1

017 Reactor Coolant Pump Malfunctions (Loss of RC Flow)

AA2. Ability to determine and interpret the following as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow):

AA2.07 Calculation of expected values of flow in the loop with RCP secured 2.1 2.9

Explanation of Answer RCS flow through operating loops increases. RCS flow through idle loop decreases. RX power remains constant.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Reactor Coolant Pump LP	I1-AP-XL-01 (13)	III	26-27, 42	9	13

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1997 Braidwood NRC Exam

Record Number: 86 RO Number: SRO Number: 63

The following plant conditions exist on Unit 1:

- PZR Level is 34%
- Combined RCP Seal Return flow is 12 gpm
- 1BwOA PRI-1 has been entered due to an Identified RCS leakage of 8 gpm
- Letdown Flow is isolated

Assume:

Tave constant
92 Gallons/% PZR Level

A loss of all CV pumps is preventing makeup to the RCS. With NO OPERATOR ACTION what is the longest amount of time the crew will have until they are procedurally required to trip?

- a. 78 minutes.
- b. 138 minutes.
- c. 195 minutes.
- d. 345 minutes.

Answer b Exam Level S Cognitive Level Application Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 2 SRO Group 2

022 Loss of Reactor Coolant Makeup

AA2. Ability to determine and interpret the following as they apply to Loss of Reactor Coolant Makeup:

AA2.04 How long PZR level can be maintained within limits 2.9 3.8

Explanation of Answer Required to Trip in OA PRI-1 at 4% level. Therefore 30% Level change x 92 gallons/% = 2760 gallons. Total Out Leakage is 8 gpm + 12 gpm = 20 gpm. 2760 gallons/20 gpm = 138 minutes. Distractor A is based on tripping at 17% which is Guidance in OA SEC-8 and distractors C&D are based on only identified leakage.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L O
Excessive Primary Plant Leakage	1BwOA PRI-1	4.a.RNO	7	55	
Pressurizer LP	I1-RY-XL-01 (14)			9	23

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 87 RO Number: SRO Number: 64

Question Topic Identifying uncontrolled boron dilution due to excessive cooling of demineralizers

The following plant conditions exist:

- Unit 1 40% reactor power steady state conditions
- Rod Control Automatic
- Letdown 75 gpm through 1A L/D Hx

Temperature Control Valve (1CC130A), CC flow control valve, repositions due to a loss of IA to the valve positioner. Which of the following describes the plant response to the event?

- a. 1TCV-129 opens bypassing flow around the demineralizers.
- b. Control rods step out due to a reduction in RCS temperature.
- c. Control rods step in due to rising RCS temperature.
- d. RCS temperature falls requiring dilution to restore temperature.

Answer c **Exam Level** B **Cognitive Level** Comprehension **Facility** Braidwood **Exam Date** 10/20/00

Tier Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

024 Emergency Boration

AA2. Ability to determine and interpret the following as they apply to Emergency Boration:

AA2.06 When boron dilution is taking place 3.6 3.7

Explanation of Answer CC130A fails open cooling off letdown flow. At low temperatures, mixed beds have higher affinity for boron. Less Cb of RCS will cause RCS temp to increase. Control Rods will step in.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Uncontrolled Dilution	1BwOA PRI-12	2.a.RNO	3	58	
CVCS LP	11-CV-XL-01 (15a)		9	10	14

Material Required for Examination

Question Source: New **Question Modification Method:** Concept Used

Question Source Comments: Zion 1991 NRC Exam

Record Number: 88 **RO Number:** 70 **SRO Number:** 65

Question Topic: Valve Combinations and Flows required to meet emergency boration requirements.

Which of the following valve combinations and flows for emergency boration are allowed in accordance with 1BwOA PRI-2, "Emergency Boration?"

- a. 1CV112B, VCT Outlet Isolation Valve FULL OPEN and 1CV121, Charging Line Flow Control Valve, FULL OPEN with maximum charging header flow.
- b. 1CV112C, VCT Outlet Isolation Valve, CLOSED, and 1CV8104, Emergency Boration Valve, FULL OPEN with maximum charging header flow.
- c. 1CV112D, RWST to Cent Chg Pump Suction Valve, FULL OPEN, and 1CV8485A, CV Pump Disch Valve THROTTLED to balance high head SI flow and Letdown flow.
- d. 1CV8104, Emergency Boration Valve, FULL OPEN, and 1CV8485A, CV Pump Disch Valve THROTTLED to balance high head SI flow and Letdown flow.

Answer: c **Exam Level:** B **Cognitive Level:** Memory **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group:** 1 **SRO Group:** 1

024 Emergency Boration

AK2. Knowledge of the interrelations between Emergency Boration and the following:

AK2.01 Valves 2.7 2.7

Explanation of Answer: A wrong CV112B should be closed. B wrong because either CV112D/E must be open. D wrong CV8104 is not used with CV 8485A.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Emergency Boration	1BwOA PRI-2	Attachment A	7, 8	58	
Reactor Makeup Control System	I1-CV-XL-02 (15b)			8	10

Material Required for Examination:

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 89 **RO Number:** 71 **SRO Number:** 66

Question Topic Failure of non-controlling channel effect on PORV

Given the following plant conditions on Unit 1:

- Reactor power 75%
- PZR pressure control selected to 455/456
- Pressure channel 1PT-457 fails LOW

1BwOA INST-2 "Operation With A Failed Instrument Channel" is entered and the required actions for the failed channel are performed.

How is the PZR PORV operation affected with the failed channel Out of Service?

- a.** ONLY PORV PCV-456 will NOT CLOSE, if OPEN in AUTO, when PZR pressure decreases to the PORV blocking signal.
- b.** Neither PORV will CLOSE, if OPEN in AUTO, when PZR pressure decreases to the PORV blocking signal.
- c.** ONLY PORV PCV-456 will NOT OPEN when PZR pressure increases to its OPEN setpoint.
- d.** Neither PORV will OPEN when PZR pressure increases to their OPEN setpoint.

Answer c **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 2

027 Pressurizer Pressure Control Malfunction

AA1. Ability to operate and / or monitor the following as they apply to Pressurizer Pressure Control Malfunction:

AA1.01 PZR heaters, sprays, and PORVs 4.0 3.9

Explanation of Answer PT-457 provides 2185# interlock to PCV-456

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
PZR Pressure Control	RY-2	Instrument	N/A	3	
PWR License System Training - Braidwood	I1-RY-XL-01 (14)	III.C.2.c		9	21

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1997 Braidwood NRC Exam

Record Number: 90 **RO Number:** 72 **SRO Number:** 67

Question Topic PZR Level setpoints

Given the following plant conditions on Unit 1:

- Power level 77%
- PZR pressure 2235 psig
- RCS Tave 577°F (A) 575°F (B) 579°F (C) 575°F (D)
- PZR Level Channel Selector Switch - 459/460 position

The CV121 Flow Controller, FK-121, fails such that charging flow to the RCS is increased.

What would PZR level read on 1LI-459 when annunciator 1-12-C3, "PZR LEVEL CONT DEV HIGH HTRS ON", actuates?

a. 52%

b. 56%

c. 57%

d. 61%

Answer d Exam Level S Cognitive Level Application Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 3 SRO Group 3

028 Pressurizer Level Control Malfunction

AA2. Ability to determine and interpret the following as they apply to Pressurizer Level Control Malfunction:

AA2.12 Cause for PZR level deviation alarm: controller malfunction or other instrumentation malfunction 3.1 3.5

Explanation of Answer Level uses Hi auct Tave (579) 25°F Delta T 35% Pzr level $22/.25=88\%$ $88 \times .34 = 30.8 + 26 + 5 = 61$

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
PZR LEVEL CONT DEV HIGH HTRS ON	BwAR 1-12-C3	N/A	1	51E4	
PWR License System Training - Braidwood	I1-RX-XL-01 (14)			9	3 & 22

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method: Significantly Modified

Question Source Comments: 1997 Braidwood NRC Exam

Record Number: 91 RO Number: SRO Number: 68

Question Topic Ability to perform steps in LCOAR Paperwork

Given the following conditions:

- The unit is at 8% power.
- Plant startup is in progress
- Pzr level instrument 1LT-459 has failed LOW.
- All actions of 1BwOA INST-2 "Operation with a Failed Instrument Channel" Attachment C are complete.

Which of the following describes the crews minimum course of action if there is a subsequent failure of Pzr level instrument 1LT-460 HIGH?

- a. Verify reactor trip.
- b. Stop the startup and restore one of the failed channels of pressurizer level to OPERABLE status prior to increasing power above 10%.
- c. Stop the startup and restore both of the failed channels of pressurizer level to OPERABLE status prior to increasing power above 10%.
- d. Within one hour initiate ACTION to be in at least HOT STANDBY within the next 6 hours.

Answer b Exam Level S Cognitive Level Application Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 3 SRO Group 3

028 Pressurizer Level Control Malfunction

2.1 Conduct Of Operations

2.1.20 Ability to execute procedure steps. 4.3 4.2

Explanation of Answer With all actions of the OA complete, the bistable associated with the high Pzr level Rx trip has been placed in a tripped condition. When the second channel fails high, the coincidence for a high pressurizer level reactor trip is met, however, the trip is blocked less than 10%. (A incorrect). Technical specifications require 3 channels to be OPERABLE, however, this is required above P-7 (10%), and to increase above 10%, the bistables must be tripped within 6 hours, B correct, D incorrect. It is not required to have both channels OPERABLE to increase above 10%, (C incorrect)

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Operation with a Failed Instrument Channel	BwOA INST-2	Step 4	16	57B	
Tech Specs	3.3.1	Table 3.3.1-1	3.3.1-15	Amnen dment 100	
Reactor Protection System	I1-RP-XL-02 (60b)	II	16, 17	6	4

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 92 RO Number: SRO Number: 69

Question Topic FR-S.1 RNO and local operator actions

While performing the immediate actions of BwFR-S.1, "Response to Nuclear Power Generation/ATWS", the operator was directed to verify a turbine trip. Subsequently, in Step 8, the operator is again directed to verify a turbine trip. If the main turbine has not tripped at this point, the crew is directed to trip the main turbine locally.

Why wasn't the operator directed to trip the main turbine locally during the immediate actions of the procedure?

- a. Local operators are busy isolating the steam dumps.
- b. The main turbine can still be used to draw steam for RCS temperature control.
- c. The main turbine can still be used to maintain S/G water level due to no MFW pump trip.
- d. Local operator actions are more time consuming to initiate and complete.

Answer d Exam Level B Cognitive Level Memory Facility Braidwood ExamDate 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 2 SRO Group 1

029 Anticipated Transient Without Scram

AK3. Knowledge of the reasons for the following responses as they apply to Anticipated Transient Without Scram:

AK3.07 Using local turbine trip lever 3.1* 3.4*

Explanation of Answer Local actions are more time consuming. Local operators do not isolate steam dumps (done in MCR). MSIVs are not shut during the IA as the turbine can be run back.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Background Document 1BwFR-S.1	FR-S.1		83	WOG1 C	
FRP LP	FR-XL-01				3

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 93 RO Number: 73 SRO Number: 70

Question Topic Response to a loss of shutdown margin while refueling

Refueling is in progress on Unit 2. RCS boron concentration has been verified to be 1990 ppm (two samples analyzed).

The crew is required to ...

- ☐ a. suspend core alterations and establish containment integrity.
- ☐ b. suspend core alterations and positive reactivity changes, and initiate boration.
- ☐ c. suspend core alterations and remove all personnel from the containment building.
- ☐ d. remove all personnel from the containment building, establish containment integrity, and initiate boration.

Answer ☐ b **Exam Level** R **Cognitive Level** Comprehension **Facility** Braidwood **Exam Date** 10/20/00

Tier Emergency and Abnormal Plant Evolutions **RO Group** 3 **SRO Group** 3

036 Fuel Handling Incidents

AK1 Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Incidents:

AK1.02 SDM 3.4 3.8

Explanation of Answer Cb <2000 ppm actions of TS 3.9.1 Condition A required

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
COLR (TRM)	NDIT NFM9900022	2.8	14	Cycle 8	
Boron Concentration Tech Specs	3.9.1	A	3.9.1-1	Amend 98	
Fuel Handling LP	I1-FC-XL-01 (52)	III	29	6	7

Material Required for Examination

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 94 **RO Number:** 74 **SRO Number:**

Question Topic Actions to Fuel Handling equipment during a fuel handling incident.

The following plant conditions exist:

- A fuel assembly has just been removed from the core.
- Immediately after initiating transit to the upender, the refueling cavity level is reported to be a foot below normal and dropping at a visible rate.

Which of the following is the preferred course of action?

- a.** Stop the refuel movement at the current location in transit to the upender.
- b.** Place the fuel assembly back into the reactor vessel.
- c.** Place the fuel assembly in the upender and lower it to the horizontal position.
- d.** Position the mast over the deepest part of the cavity and lower the assembly to the bottom.

Answer b **Exam Level** B **Cognitive Level** Memory **Facility** Braidwood **ExamDate** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 3 **SRO Group** 3

036 Fuel Handling Incidents

AK2. Knowledge of the interrelations between Fuel Handling Incidents and the following:

AK2.01 Fuel handling equipment 2.9 3.5

Explanation of Answer Incorrect because not defined as "Safe Locations" per step 4.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Refueling Cavity or Spent Fuel Pool Level Loss Unit 1	1BwOA REFUEL-2	Step 2,4	3,6	56	
Refueling Cavity - SFP Low Level	I1-OP-XL-29	II	4	8	3

Material Required for Examination

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 95 **RO Number:** 75 **SRO Number:** 71

Question Topic Determine the desired RCS temperature for depressurization (maintain subcooling)

A SGTR has occurred on Unit 1. Current conditions are:

- RCS pressure 1350 psig
- RCS temperature (CETCs) 545° F
- SG pressures 930 psig (A) 1145 psig (B) 940 psig (C) 940 psig (D)
- SG 1B has been confirmed as the SG with the rupture.

While performing the steps of 1BwEP-3, "Steam Generator Tube Rupture", the Unit Supervisor found ALL available copies of the procedure had an illegible page. This page contained the required temperatures for determining RCS cooldown temperatures.

The US directs you to use the steam tables to determine the required RCS (core exit) temperature with an allowance of 50° F for subcooling.

The required core exit temperature after the RCS cooldown is ...

a. 513°F

b. 518°F

c. 534°F

d. 538°F

Answer a **Exam Level** B **Cognitive Level** Application **Facility** Braidwood **Exam Date** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 2

038 Steam Generator Tube Rupture

EK1. Knowledge of the operational implications of the following concepts as they apply to Steam Generator Tube Rupture:

EK1.01 Use of steam tables 3.1 3.4

Explanation of Answer 1145 psig has a saturation temperature of 563° F - 50° F (subcooling) = 513° F . Other answers are based on 25° F subcooling; use of 1350 psig; addition of 15 psi as correction.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Steam Generator Tube Rupture	1BwEP-3	Step 13	20	WOG1 C	
ABB Steam Tables	Steam Tables	Table 2	12	1967	
ILT Simulator Phase, Steam Generator Tube	11-EP-XL-04	II.B.13	13	12	1.a

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1997 Braidwood NRC Exam

Record Number: 96 **RO Number:** 76 **SRO Number:** 72

Question Topic Effects of loss of condenser vacuum during low power operations with rods in manual

The following plant conditions exist:

- An initial plant startup is in progress, per 1BwGP 100-3, from a refueling outage.
- The reactor is initially at 13% power.
- The Main Turbine is at 600 rpm.
- Trips associated with Permissive P-10 have been blocked.
- Fouling of the circ water traveling screens has caused a reduction in condenser CW flow.
- Condenser vacuum decreases to indicate 7.0 inches Hg absolute.

Assuming no operator action, choose the statement below which describes the effect on the plant.

- a.** The reactor will trip due to a turbine trip.
- b.** The reactor will trip on NIS IR FLUX HI Setpoint.
- c.** RCS temperature will increase until steam dumps actuate.
- d.** RCS temperature will increase until Steam Generator PORVs actuate.

Answer ☐ **Exam Level** B **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

051 Loss of Condenser Vacuum

AA1. Ability to operate and / or monitor the following as they apply to Loss of Condenser Vacuum:

AA1.04 Rod position 2.5* 2.5*

Explanation of Answer Turbine trip is 10"Hg absolute. IR Hi Flux trip is blocked. Steam dumps will not actuate when >6"Hg absolute

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Condenser Vacuum	1BwOA SEC-3	Note prior to step 1	2	54	
CNDSR VACUUM LOW TURB TRIP	BwAR 1-18-D4	Setpoint	1	8	
Reactor Protection LP	I1-RP-XL-02 (61)	II	9, 18, 47	6	8

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 97 **RO Number:** 77 **SRO Number:** 73

Question Topic Autostart signals to AF LO pumps on a loss of main feedwater

While at 35% power, a main feed water regulating valve fails open causing the affected SG level to exceed the hi-hi level setpoint. The reactor trips; however, NO SG level drops below the LO-LO level setpoint. Assuming NO operator action is taken, how many AF pump Lube Oil Pumps will be running 1 minute after the trip?

a. None.

b. One.

c. Two.

d. Three.

Answer **a** **Exam Level** **B** **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 2

054 Loss of Main Feedwater

AA1. Ability to operate and / or monitor the following as they apply to Loss of Main Feedwater:

AA1.03 AFW auxiliaries, including oil cooling water supply 3.5 3.7

Explanation of Answer No auto start signals are present to the AF pumps therefore there are no auto starts for the LO pumps. "D" would be correct if there was a normal autostart signal (Both Aux LO and 1Gear Box LO Pump). "B" would be correct if there was a UV on ESF Bus 141. "C" would be correct if there was just an autostart signal to the B pump.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Securing the Auxiliary Feedwater Sys after initiation	1BwOP AF-2	E.2	1	4E2	
AFW System	11-AF-XL-01 (26)	II.A	4-6, 12, 13	9	5, 6

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 98 **RO Number:** 78 **SRO Number:** 74

Question Topic Identify indications of a feedline break inside containment.

Given the following plant conditions on Unit 1:

- Reactor power is 90%.
- RCS Tave is stable at 579°F on all 4 loops.
- RCS pressure is stable at 2235 psig.
- Containment Pressure is INCREASING.
- 1C SG Feed Flow is pegged HIGH.
- 1C SG Main FW Reg Valve is full OPEN.
- 1C SG pressure is STABLE.
- 1C SG level is DECREASING.

Which of the following events is in progress?

- a. Main FW Reg Valve failed OPEN.
- b. Feed Flow Indicator failed HIGH.
- c. Feed Line Break INSIDE Containment.
- d. Main Feed Pump trip.

Answer c **Exam Level** B **Cognitive Level** Comprehension **Facility** Braidwood **Exam Date** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 2

054 Loss of Main Feedwater

AK1. Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater:

AK1.01 MFW line break depressurizes the S/G (similar to a steam line break) 4.1 4.3

Explanation of Answer A is wrong because 1C SG level is decreasing. B is wrong because FRV would not be full open. D is wrong because feed flow would not be pegged.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Condensate & Feedwater LP	I1-CD-XL-01 (25)	All	All	12	6,11
E-2 LP	I1-EP-XL-03	I	1-4	10	4

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1996 Braidwood NRC Exam RO Question #79 SRO Question #83

Record Number: 99 **RO Number:** 79 **SRO Number:** 75

Question Topic Determination of what alternate power will be supplied to busses following a loss of DC Bus 113.

Given the following plant conditions on Unit 1:

- 100% reactor power.
- A voltage transient caused the DC Bus 113 supply fuses to blow.
- The reactor was manually tripped due to adverse secondary transients.
- One minute after performing the immediate action steps of 1BwEP-0 "Reactor Trip or Safety Injection", an operator was dispatched to open the PMG output Breaker.

After the PMG output breaker is opened, Bus 143 will be _____ and Bus 144 will be _____.

- a. energized energized
- b. energized de-energized
- c. de-energized energized
- d. de-energized de-energized

Answer c **Exam Level** S **Cognitive Level** Memory **Facility** Braidwood **Exam Date** 10/20/00

Tier Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 2

058 Loss of DC Power

AA2. Ability to determine and interpret the following as they apply to Loss of DC Power:

AA2.01 That a loss of dc power has occurred; verification that substitute power sources have come on line 3.7 4.1

Explanation of Answer Control Power to Bus 143 is DC Bus 113 Control Power to Bus 144 is DC Bus 114. There is no AUTO DC swap. Question verifies expected power supplies online.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of DC Bus	1BwOA ELEC-1	Attachment B & C	26,39	55B	
125v DC Power Systems	I1-DC-XL-01 (8a)	Att. 1	39, 43	6	3

Material Required for Examination

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 100 **RO Number:** **SRO Number:** 76

Question Topic Automatic isolation of Liquid Release

Which of the following signals will cause the Radwaste Release Tank Pump (0WX53P) to trip?

- a. High radiation condition on OPR01J "Liquid Radwaste."
- b. Low flow from the Circ Water system.
- c. Low level of 16% in the Radwaste Release Tank.
- d. High level of 90% in the Regeneration Waste Drain Tank.

Answer c Exam Level B Cognitive Level Memory Facility Braidwood ExamDate 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 2 SRO Group 1

059 Accidental Liquid Radwaste Release

AK3. Knowledge of the reasons for the following responses as they apply to Accidental Liquid Radwaste Release:

AK3.01 Termination of a release of radioactive liquid 3.5 3.9

Explanation of Answer OPR01J closes 0WX353 and 0WX896. Low Circ Water flow does not affect the pump. 90% in the Regen Waste Drain Tank gives high level alarm.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Radwaste Release Tank Transfer to the Regeneration Waste Drain Tank	BwOP WX-173	E	1	2E1	
Liquid Radwaste	BwAR 1-0PR01J	B	1	0	
Liquid Radwaste	I1-CM-XL-01 (48a)	II	9	0	4

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 101 RO Number: 80 SRO Number: 77

Question Topic Waste Gas Decay Tank Release

A waste gas decay tank release is in progress. Which of the following malfunctions occurring during the release could result in a release outside of permitted limits assuming no operator action?

- a. Loss of instrument air to OGWRCV014 "Gas Decay Tank Vent Stack Effluent Isolation Valve."
- b. Gas Decay Tank Cover Gas Pressure reaches .7 psig.
- c. OPR02J "Waste Gas Processing Rad Monitor" fails low.
- d. In service Gas Decay Tank pressure reaches 95 psig.

Answer c Exam Level B Cognitive Level Comprehension Facility Braidwood Exam Date 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 2 SRO Group 2

060 Accidental Gaseous Radwaste Release

AA1. Ability to operate and / or monitor the following as they apply to Accidental Gaseous Radwaste Release:

AA1.01 Area radiation monitors 2.8 3.0

Explanation of Answer A is wrong. Valve fails closed. B is wrong. .7 psig setpoint for N2 regulator to open. C is correct. Valve closes on high radiation. D is wrong. Do not release from in service Gas Decay Tank.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Annunciator Response	1BwAR 3-OPR02J		1	2	
Gaseous Radwaste	II-PS-XL-01	II	13	0	10.d

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments: Vogtle 1999 NRC Exam

Record Number: 102 RO Number: 81 SRO Number: 78

Question Topic High Curie Content in the Gas Decay Tank

The following plant conditions exist:

0B Gas Decay Tank is now in service.

0E Gas Decay Tank is in Standby.

0A Gas Decay Tank was in service and is currently isolated.

Previously while the 0A Gas Decay Tank was in service, Chemistry reported that the curie content was 7×10^4 curies with a pressure of 88 psig. 0BwOA RAD-3 was entered and the 0A Gas Decay Tank was taken off-line and isolated.

Transferring the 0A Gas Decay Tank to another Gas Decay Tank is required until 0A Gas Decay Tank pressure is ...

a. 47 psig.

b. 58 psig.

c. 62 psig.

d. 73 psig.

Answer b **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 2

060 Accidental Gaseous Radwaste Release

AK2. Knowledge of the interrelations between Accidental Gaseous Radwaste Release and the following:

AK2.01 ARM system, including the normal radiation-level indications and the operability status 2.6 2.9*

Explanation of Answer 88 psig + 15 psig = 103. $103 \times (5 \times 10^4) / (7 \times 10^4) = 73.57$. $73.57 - 15 = 58.57$

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Decay Tank High Activity	0BwOA RAD-3	Attachment A	4	51A	
OA RAD	I1-OA-XL-26	I.C.	3,5	7	4

Material Required for Examination 0BwOA RAD-3, Attachment A

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 103 **RO Number:** 82 **SRO Number:** 79

Question Topic: Location of emergency shutdown positions on fire in the control room which requires evacuation

- You are the Unit 1 Unit Supervisor.
- A fire has occurred in the Main Control Room.
- Smoke in the Main Control Room is growing very heavy.
- The order has been given to evacuate the control room.

You should direct a reactor trip and go to the...

- a. Remote Shutdown Panel to obtain plant control.
- b. Reactor trip breakers to verify Reactor Trip.
- c. Fire Hazards Panel to obtain plant control.
- d. Auxiliary Electric Room to align needed instrumentation.

Answer: a **Exam Level:** S **Cognitive Level:** Memory **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group:** 1 **SRO Group:** 1

067 Plant Fire on Site

AA2. Ability to determine and interpret the following as they apply to Plant Fire on Site:

AA2.13 Need for emergency plant shutdown 3.3 4.4

Explanation of Answer: NSO & US go to the RSP. All other actions performed by other operators. Plant S/D includes more than the S/D of the reactor.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Control Room Inaccessability	1BwOA PRI-5	Steps 6,7	6	57c	
Control Room Inaccessability LP	I1-OA-XL-16	II	5	5	4

Material Required for Examination

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 104 **RO Number:** **SRO Number:** 80

Question Topic Design peak containment pressure rise

Per Tech Spec Basis regarding high containment pressure, which of the following events could lead to the highest pressure/leakage out of containment?

- a. Design Basis LOCA.
- b. Design Basis Steam Line Break inside Containment.
- c. Inadvertant Containment Spray Initiation.
- d. Pressurizer vapor space LOCA.

Answer a Exam Level B Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 1 SRO Group 1

069 Loss of Containment Integrity

AK1. Knowledge of the operational implications of the following concepts as they apply to Loss of Containment Integrity:

AK1.01 Effect of pressure on leak rate 2.6 3.1

Explanation of Answer worst case LOCA generates larger mass and energy release than the worst case SLB. Inadvertent CS initiation would cause pressure to decrease, even if all RCP seals failed a DB LOCA is a larger mass and energy release to containment.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
FR-Z Containment	I1-FR-XL-05	II	2	1	3
FR-Z.1, Response to High CTMT Pressure	Background Document	2	3	WOGI C	
Technical Specifications	3.6.4	Basis	B.3.6.4-1	0	

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 105 RO Number: 83 SRO Number: 81

Question Topic	High level action steps in FR-Z.1				
Which of the following is NOT a high level action of 1BwFR-Z.1, "Response to Containment High Pressure?"					
a.	Verify containment isolation.				
b.	Verify containment heat removal.				
c.	Reduce heat input to containment.				
d.	Check for and isolate faulted steam generator.				
Answer	c	Exam Level	B	Cognitive Level	Memory
		Facility	Braidwood	Exam Date	10/20/00
Tier	Emergency and Abnormal Plant Evolutions		RO Group	1	SRO Group
				1	
069	Loss of Containment Integrity				
AK3.	Knowledge of the reasons for the following responses as they apply to Loss of Containment Integrity:				
AK3.01	Guidance contained in EOP for loss of containment integrity				3.8* 4.2
Explanation of Answer	Major action categories are Verify Cnmt Isolation and Heat Removal; Check for and Isolate Faulted SG.				

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
ERG	Background Documents	FR-Z.1	5	WOG1 C	
FR-Z Containment LP	I1-FR-XL-05	II	2	1	2

Material Required for Examination	
Question Source:	Facility Exam Bank
Question Modification Method:	Editorially Modified
Question Source Comments:	Question # FR-Z 001 Distractors modified due to Rev 1C.
Record Number:	106
RO Number:	84
SRO Number:	82

Question Topic	Entry conditions for FR-C.1				
2BwFR-C.1, "Inadequate Core Cooling" must be entered if CETCs are greater than or equal to...					
a.	700°F ONLY.				
b.	1200°F ONLY.				
c.	700°F AND RCS Subcooling Unacceptable.				
d.	1200°F AND RCS Subcooling Unacceptable.				
Answer	b	Exam Level	B	Cognitive Level	Memory
Facility	Braidwood		ExamDate	10/20/00	
Tier:	Emergency and Abnormal Plant Evolutions		RO Group	1	SRO Group 1
074	Inadequate Core Cooling				
EA1.	Ability to operate and / or monitor the following as they apply to Inadequate Core Cooling:				
EA1.13	Subcooling margin indicators			4.3	4.6
Explanation of Answer	Only when CETCs >1200°F do you enter FR-C.1				

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Core Cooling	1BwST-2	N/A	1	WOG1 C 1C	

Material Required for Examination	
Question Source: New	Question Modification Method:
Question Source Comments:	

Record Number: 107	RO Number: 85	SRO Number: 83
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Question Topic calculation of RCS Subcooling

The following plant conditions exist:

A reactor trip and loss of offsite power occurred.

Reactor power was initially at 100%.

Tavg is 531°F.

Tcold is at 527°F.

Thot is at 534°F.

Average of the ten (10) hottest CETC's is 538°F.

Pressurizer pressure is at 2185 psig.

Which of the following is the subcooling that currently exists?

a. 92°F

b. 102°F

c. 111°F

d. 121°F

Answer c Exam Level B Cognitive Level Application Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 1 SRO Group 1

074 Inadequate Core Cooling

EK1. Knowledge of the operational implications of the following concepts as they apply to Inadequate Core Cooling:

EK1.01 Methods of calculating subcooling margin 4.3 4.7

Explanation of Answer Determine RCS pressure and obtain temperature from graph. Subtract avg of 10 hottest CETs from graph to obtain RCS subcooling. $2185 + 15 = 2200$ Tsat is 649.45°F $649.45 - 538 = 111.45^\circ\text{F}$

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Rx trip or SI	1BwEP-0	Fig BwEP 0-1	35	WOG1 C	
EP-0 EP ES-0 Rx Trip or SI	11-EP-CL-01	II.D	21	13	3
Steam Tables			12		

Material Required for Examination Steam Tables

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1996 Braidwood NRC Exam RO Question #67 SRO Question #69

Record Number: 108 RO Number: 86 SRO Number: 84

Question Topic Radiagnosis

A Small Break LOCA occurred on Unit 2 resulting in a reactor trip/SI.
While performing the Immediate Actions of 2BwEP-0, the Main Turbine did not trip and the crew successfully performed ALL actions of the RNO for verifying a Turbine Trip.
From 2BwEP-0 the crew transitioned to 2BwEP-1.
At step 6 of 2BwEP-1, "Check if ECCS flow should be reduced" RCS pressure starts decreasing rapidly.
The crew notes steam flows on ALL 4 Steam Generators.
The crew transitions to 2BwEP ES-0.0 "Radiagnosis"

From 2BwEP ES-0.0, the crew should transition to...

- a. 2BwEP-2, "Faulted Steam Generator Isolation."
- b. 2BwCA-2.1, "Uncontrolled Depressurization of All SGs."
- c. 2BwEP ES-1.1, "SI Termination."
- d. 2BwEP-0, "Reactor Trip or Safety Injection."

Answer b Exam Level B Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 2 SRO Group 1

E01 Radiagnosis

EA1. Ability to operate and / or monitor the following as they apply to Radiagnosis:

EA1.2 Operating behavior characteristics of the facility. 3.3 3.6

Explanation of Answer Due to the MT not tripping, the MSIVs were all closed. With MSIVs closed, the proper transition from 1BwEP ES-0.0 is to ECA-2.1.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Radiagnosis	1BwEP ES-0.0	Step 1 RNO	2	WOG1 C	
Reactor Trip or Safety Injection	11-EP-XL-01	V	26	13	3

Material Required for Examination Copy of EP 0.0 without the entry conditions or notes prior to Step 1.

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 109 RO Number: 87 SRO Number: 85

Question Topic Entry conditions of ES-0.0

Which of the following is NOT a condition in which a transition to 1BwEP ES-0.0, "Rediagnosis", is allowed?

- a. Large Break LOCA, RCS Temperature 563°F, RCS Pressure 1000 psig, PZR Level Off-Scale Low.
- b. Main Steam Line Break inside containment, Containment Pressure 23 psig.
- c. Main Steam Line Break outside containment, SG Pressures - 1A - 560 psig, 1B - 570 psig, 1C - 570 psig, 1D - 590 psig.
- d. Reactor Trip due to P-14, RCS Temperature 557°F, RCS Pressure 2100 psig, PZR Level 20%.

Answer d Exam Level S Cognitive Level Comprehension Facility: Braidwood Exam Date: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 2 SRO Group 1

E01 Rediagnosis

2.4 Emergency Procedures / Plan

2.4.1 Knowledge of EOP entry conditions and immediate action steps. 4.3 4.6

Explanation of Answer SI is required for ES-0.0 Entry

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Rediagnosis	1BwEP ES-0.0	B	1	Wog 1C	
EP-0 EP ES-0 Rx Trip or SI	I1-EP-CL-01	V	26	13	6

Material Required for Examination

Question Source: New Question Modification Method:

Question Source Comments:

Record Number: 110 RO Number: SRO Number: 86

Question Topic Parameters used to determine RCS Subcooling

A small break LOCA has occurred on Unit 1. The crew has transitioned to 1BwEP-1, "Loss of Reactor or Secondary Coolant" and is evaluating SI termination criteria in step 6.

Which of the following is used to determine if adequate core cooling exists?

- a. RCS wide range temperature.
- b. ECCS injection flow rate.
- c. RVLIS indication.
- d. Subcooling margin.

Answer d Exam Level S Cognitive Level Memory Facility Braidwood ExamDate 10/20/00

Tier Emergency and Abnormal Plant Evolutions RO Group 2 SRO Group 1

E02 SI Termination

EA2. Ability to determine and interpret the following as they apply to SI Termination:

EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations. 3.3 4.2

Explanation of Answer SI termination requires the verification of subcooling margin per Step 6 of BwEP 1.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Reactor or Secondary Coolant	1BwEP-1	Attachment A	26	WOG1 C	
EP-1 Series LP	I1-EP-XL-02	II	8	13	1

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method:

Question Source Comments: 1996 Braidwood NRC Exam RO Question #71 SRO Question #74

Record Number: 111 RO Number: SRO Number: 87

Question Topic Depressurization methods for RCS, Post LOCA

Which of the following describes the methods in order of preference used in 1BwEP ES-1.2, "Post LOCA Cooldown and Depressurization" during the performance of step 10, Depressurize RCS to Refill PZR?

- a. One Pzr PORV, Normal Spray, Aux. Spray.
- b. One Pzr PORV, Aux. Spray, Normal Spray.
- c. Normal Spray, Aux. Spray, One Pzr PORV.
- d. Normal Spray, One Pzr PORV, Aux. Spray.

Answer d **Exam Level** B **Cognitive Level** Memory **Facility** Braidwood **ExamDate** 10/20/00

Tier Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 2

E03 LOCA Cooldown and Depressurization

2.1 Conduct Of Operations

2.1.20 Ability to execute procedure steps. 4.3 4.2

Explanation of Answer Procedure specifies Normal spray then One PZR PORV, and last is Aux. Spry.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Post LOCA Cooldown and Depressurization	1BwEP ES-1.2	Step 10	12	WOG1 C	
EP-1 Series LP	I1-EP-XL-02	IV	28	13	1

Material Required for Examination

Question Source: Facility Exam Bank **Question Modification Method:**

Question Source Comments: 1999 Braidwood NRC Exam

Record Number: 112 **RO Number:** 88 **SRO Number:** 88

Question Topic Operation of components before transitioning

A Large Break LOCA has occurred on Unit 1 and a transition to 1BwEP-1, "Loss of Reactor or Secondary Coolant," has been made. Subsequently, 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation," was implemented. Currently, the operators are aligning the SI and CV pumps for Cold Leg Recirculation per Step 5. The STA reports a RED path in Heat Sink.

The proper course of action for the operator is to...

- a. immediately suspend 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation," and implement 1BwFR H.1, "Loss of Secondary Heat Sink."
- b. only complete aligning ECCS for Cold Leg Recirculation steps of 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation," and then implement 1BwFR H.1, "Loss of Secondary Heat Sink."
- c. complete all steps of 1Bw EP ES-1.3, "Transfer to Cold Leg Recirculation," and then implement 1BwFR H.1, "Loss of Secondary Heat Sink."
- d. immediately implement 1BwFR H.1, "Loss of Secondary Heat Sink," while concurrently aligning ECCS for Cold Leg Recirculation per 1BwEP ES-1.3, "Transfer to Cold Leg Recirculation."

Answer b Exam Level B Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 2 SRO Group 2

E03 LOCA Cooledown and Depressurization

EK3. Knowledge of the reasons for the following responses as they apply to LOCA Cooledown and Depressurization:

EK3.3 Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations. 3.9 3.9

Explanation of Answer Do not implement FRs prior to completion of steps 1-6 because these steps are related to the maintenance of core cooling

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
EP-1 Series LP	11-EP-XL-02	V	36	13	1
Transfer to Cold Le Recirculation	1BwEP ES-1.3	Note	2	WOG 1C	

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: Question Number "EP-1 - 113"

Record Number: 113 RO Number: 89 SRO Number: 89

Question Topic Determine the desired RCS temperature for depressurization (maintain subcooling)

Unit 1 is in MODE 4 on RH cooldown with the following plant conditions:

RCS Temperature 340°F slowly lowering
RCS pressure 300 psig lowering
PZR level 42% lowering
CNMT pressure 0.2 psig
Alarm received for ECCS cubicle radiation (GRID 2)
SG levels 42% (A) 40% (B) 43% (C) 40% (D)
SG pressures 115 psig (A) 115 psig (B) 115 psig (C) 115 psig (D)

What event is taking place?

- a. A steam leak has occurred inside CNMT.
- b. The Cold Overpressure system has actuated.
- c. Letdown line pressure control valve, 1PCV-131, has failed open.
- d. A LOCA has occurred on the suction of the RH pump.

Answer d **Exam Level** B **Cognitive Level** Comprehension **Facility** Braidwood **Exam Date** 10/20/00

Tier Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 1

E04 LOCA Outside Containment

EA1. Ability to operate and / or monitor the following as they apply to LOCA Outside Containment:

EA1.2 Operating behavior characteristics of the facility. 3.6 3.8

Explanation of Answer indications rule out containment malfunction. Radiation alarm rules out COPP and 1PCV-131 failures.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Shutdown LOCA	1BWOA S/D-2	Step 15	1, 16	51A	
ILT Emergency Operations Loss of RX or	I1-EP-XL-02			11	10.a

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1997 Braidwood NRC Exam

Record Number: 114 **RO Number:** 90 **SRO Number:** 90

Question Topic Control room ventilation response to an SI Signal

An SI Signal has been initiated due to a LOCA outside Containment.

Which of the following describes the lineup of the Control Room Ventilation System?

- a. Makeup Air Fan autostarts and Recirc Charcoal Absorber unisolates.
- b. Makeup Air Fan autostarts and Supply Fan trips.
- c. Makeup Air Fan trips and Normal intake from outside isolates.
- d. Makeup Air Fan trips and Purge Exhaust Damper opens.

Answer a **Exam Level** R **Cognitive Level** Memory **Facility** Braidwood **Exam Date** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 1

E04 LOCA Outside Containment

EK1. Knowledge of the operational implications of the following concepts as they apply to LOCA Outside Containment:

EK1.1 Components, capacity, and function of emergency systems. 3.5 3.9

Explanation of Answer On SI signal makeup air fan auto starts, recirc charcoal absorber unisolates and normal intake from outside isolates. B is wrong because supply fan does not trip. C and D are wrong because makeup air fans do not trip. Purge exhaust damper receives a close signal.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Rx Trip or Safety Injection	1BwEP-0	Step 21	13-15	WOG1 C	
Big Notes "Control Room Ventilation"	VC-1			4	
Control Room HVAC	I1-VC-XL-01 (43b)	III.D	34	1	8

Material Required for Examination

Question Source: New **Question Modification Method:**

Question Source Comments:

Record Number: 115 **RO Number:** 91 **SRO Number:**

Question Topic Interlocks affecting reestablishment of feed

The following conditions exist on Unit 2:

- Reactor power was 8% prior to the event below.
- A failure in the feedwater control system caused ONE S/G level to rise to 83%.
- The main turbine tripped.
- S/G levels have returned to their normal level range
- The Startup FW Pump is running

What are the minimum set of conditions that would have to be met to feed the S/Gs using the 2FW034s Feedwater Tempering Flow Control valves?

- a. The FW Isolation Aux Relays would have to be reset and 2FW035 Feedwater Tempering Isol valves opened.
- b. The reactor trip breakers would have to be cycled, the FW Isolation Aux Relays would have to be reset and 2FW035 Feedwater Tempering Isol valves opened.
- c. The FW Isolation Main Relays and Aux Relays would have to be reset and 2 FW035 Feedwater Tempering Isol valves opened.
- d. The reactor trip breakers would have to be cycled and FW Isolation Main Relays and Aux Relays reset and 2FW035 Feedwater Tempering Isol valves opened.

Answer a **Exam Level** B **Cognitive Level** Application **Facility** Braidwood **Exam Date** 10/20/00

Tier Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 2

E05 Loss of Secondary Heat Sink

EK2. Knowledge of the interrelations between Loss of Secondary Heat Sink and the following:

EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features. 3.7 3.9

Explanation of Answer The P-14 signal, once clear, only maintains FWI signal via the FW Isol Aux relays if NO reactor trip signal is present. So resetting the FW Isolation Aux relay allows opening of FW035s (normal feed path at low power) and throttling of FW034s

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Plant heatup	1BwGP 100-1	F.12	15	13E2	
Big Notes- Feedwater	FW-1	N/A	1	3	
ESF lesson plan	11-KF-XL-01 (61)	II.C	16-17	1	7.c

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1998 Braidwood NRC Exam

Record Number: 116 **RO Number:** 92 **SRO Number:** 91

Question Topic	Reason why transfer to FR-C.2 is required				
All reactor core heat removal systems have failed and the RCS temperature is increasing.					
When core exit thermocouple temperatures are greater than 700°F...					
a.	the DNBR decreases to less than 1.3.				
b.	the core is superheated.				
c.	RCP damage is prevalent.				
d.	fuel cladding failure is prevalent.				
Answer	b	Exam Level	B	Cognitive Level	Memory
		Facility	Braidwood	Exam Date	10/20/00
Tier	Emergency and Abnormal Plant Evolutions		RO Group	1	SRO Group 1
E06	Degraded Core Cooling				
EK2.	Knowledge of the interrelations between Degraded Core Cooling and the following:				
EK2.2	Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.				3.8 4.1
Explanation of Answer	Degraded core cooling-superheated steam exiting the core >700°F				

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Inadequate Core Cooling	11-IT-XL-01 (34b)	III	13	7	2
Response to Degraded Core Cooling	1BwFR-C.2	Step 6	12	WOG 1C	

Material Required for Examination	
Question Source: Facility Exam Bank	Question Modification Method:
Question Source Comments: Question # "FR-C - 020"	
Record Number: 117	RO Number: 93 SRO Number: 92

Question Topic Use of procedures for saturated core cooling.

A steam void has been detected in the Unit 2 reactor vessel head during natural circulation cooldown. RVLIS is NOT available.

Which of the following means can be utilized by the operators to estimate the growth of the steam void per 2BwEP ES-0.4, "Natural Circulation Cooldown with Steam Void in Vessel (Without RVLIS)"?

- a. Pressurizer pressure indication changes.
- b. Pressurizer level indication changes.
- c. RCS Hot Leg temperature indications.
- d. Core Exit Thermocouple indications.

Answer b **Exam Level** S **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

E07 Saturated Core Cooling

EA2. Ability to determine and interpret the following as they apply to Saturated Core Cooling:

EA2.2 Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments. 3.3 3.9

Explanation of Answer

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
E-0 Lesson Plan	11-EP-CL-01			13	3
ES-0.4 Background Document		Step Description	19	1C	

Material Required for Examination

Question Source: Facility Exam Bank **Question Modification Method:**

Question Source Comments: Question # "EP-0 002"

Record Number: 118 **RO Number:** **SRO Number:** 93

Question Topic Saturated Core Cooling

Step 1 of 1BwFR-C.3, "Response to Saturated Core Cooling," checks if the RH system has been placed in shutdown cooling mode.

Which of the following describes the basis for this step?

- a. To ensure a ORANGE or RED condition in Core Cooling will not arise while performing this procedure.
- b. To verify RH is aligned for long term cooling if the appropriate conditions are met.
- c. If RH is in shutdown cooling mode, the saturated core cooling condition is a problem with RH and this procedure will not address this condition.
- d. If RH is in shutdown cooling mode, the saturated core cooling condition is a problem with RH and this procedure will identify and isolate the affected train.

Answer c Exam Level S Cognitive Level Memory Facility: Braidwood ExamDate:

Tier: Emergency and Abnormal Plant Evolutions RO Group 1 SRO Group 1

E07 Saturated Core Cooling

2.1 Conduct Of Operations

2.1.20 Ability to execute procedure steps. 4.3 4.2

Explanation of Answer Procedure does not address a loss of S/D cooling. Other procedures cover this condition.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Saturated Core Cooling	1BwFR-C.3	Step 1	2	WOG1 C	
FR-C Series LP	11-FR-XL-02			7	3

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: FR-C 028

Record Number: 119 RO Number: SRO Number: 94

Question Topic Natural Circ conditions and limits

The following conditions exist on Unit 1:

- A natural circulation cooldown is in progress per 1BwEP ES-0.2 "Natural Circulation Cooldown."
- Pressurizer pressure is being controlled using Aux. Spray and Pzr heaters.
- As pressure is being lowered through 1300 psig, a rapid increase is noted in Pzr level.
- Charging and letdown are in manual and are balanced.

What action is required to be taken by the operators?

- a. Repressurize the RCS.
- b. Isolate the SI Accumulators.
- c. Increase the RCS cooldown rate.
- d. Place excess letdown in service.

Answer a Exam Level B Cognitive Level Memory Facility Braidwood ExamDate 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 1 SRO Group 1

E09 Natural Circulation Operations

EK1. Knowledge of the operational implications of the following concepts as they apply to Natural Circulation Operations:

EK1.2 Normal, abnormal and emergency operating procedures associated with (Natural Circulation Operations). 3.3 3.7

Explanation of Answer If unexpected large variations in Pzr level occur, repressurize the RCS to collapse potential voids in system and continue cooldown.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
EP-0 Series LP	I1-EP-XL-01	VII	38	13	3
Natural Circulation Cooldown	1BwEP ES-0.2	Step 14 RNO	11	WOG1 C	

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method:

Question Source Comments: 1998 Braidwood NRC Exam

Record Number: 120 RO Number: 94 SRO Number: 95

Question Topic CRDM fans on Nat Circ

Which of the following describes why it is important to run CRDM fans when performing a natural circulation cooldown?

- a. Provides the heat removal mechanism for the vessel head area.
- b. Aids in natural circulation flow through the RCS vessel head region.
- c. Prevents erratic indication of SR instrumentation.
- d. Aids in natural circulation flow through the RCS.

Answer a Exam Level B Cognitive Level Memory Facility: Braidwood Exam Date: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 1 SRO Group 1

E09 Natural Circulation Operations

EK2. Knowledge of the interrelations between Natural Circulation Operations and the following:

EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility. 3.6 3.9

Explanation of Answer CRDM fans cool the upper head region that may not be cooled by NC flow. Rx Cavity vent fans provide cooling to the SR NIs.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
EO Series LP	I1-EP-XL-01	VII	38	13	3
Natural Circulation Cooldown	1BwEP ES-0.2	Step 22 RNO	14	WOG1 C	

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1999 Braidwood NRC Exam

Record Number: 121 RO Number: 95 SRO Number: 96

Question Topic Effects of RVLIS unavailability on High Level Actions

What are the MAXIMUM cooldown rates that apply for a cooldown from normal operating temperature for the RCS to 500°F in the following indicated procedures? (NOTE: all choices are applicable in any ONE hour period.)

1BwEP ES-0.3 "Natural Circulation Cooldown With Void In Vessel (With RVLIS)"

1BwEP ES-0.4 "Natural Circulation Cooldown With Void In Vessel (Without RVLIS)"

1BwEP ES-0.3 1BwEP ES-0.4
value value

a. 50°F 50°F

b. 50°F 100°F

c. 100°F 50°F

d. 100°F 100°F

Answer c Exam Level B Cognitive Level Comprehension Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 1 SRO Group 1

E10 Natural Circulation with Steam Void in Vessel with/without RVLIS

EK1. Knowledge of the operational implications of the following concepts as they apply to Natural Circulation with Steam Void in Vessel with/without RVLIS:

EK1.3 Annunciators and conditions indicating signals, and remedial actions associated with the (Natural Circulation with Steam Void in Vessel with/without RVLIS). 3.3 3.6

Explanation of Answer In ES-0.4 100°F/hr is applicable when cooling down from 500°F to 450°F

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Natural Circulation Cooldown With Steam Void	1BwEP ES-0.3	Step 4	5	WOG1 C	
Natural Circulation Cooldown With Steam Void	1BwEP ES-0.4	Step 3-5	4-6	WOG1 C	
EP-0 Series LP	I1-EP-XL-01	IX	51,61	13	3

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1997 Braidwood NRC Exam

Record Number: 122 RO Number: 96 SRO Number: 97

Question Topic Knowledge of High Level Action Step to reduce PZR Level in 1BwEP ES-0.3

Unit 1 reactor tripped approximately 1 hour ago due to a large steam break inside containment. The crew is currently in 1BwEP ES-0.3, "Natural Circulation Cooldown with Steam Voids in Vessel (with RVLIS)". Pressurizer level is currently at 95%.

Per 1BwEP ES-0.3, PZR Level should be reduced to less than 90% by ...

- a. cycling PZR heaters and securing the RCS cooldown.
- b. controlling charging and letdown.
- c. closing PZR sprays and energizing PZR heaters.
- d. ONLY establish maximum letdown.

Answer b **Exam Level** B **Cognitive Level** Comprehension **Facility** Braidwood **ExamDate** 10/20/00

Tier Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

E10 Natural Circulation with Steam Void in Vessel with/without RVLIS

EK3. Knowledge of the reasons for the following responses as they apply to Natural Circulation with Steam Void in Vessel with/without RVLIS:

EK3.3 Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations. 3.4 3.6

Explanation of Answer Reduce level to less than 90% by controlling charging and letdown as necessary.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Natural Circulation Cooldown with Steam Voids in Vessel (with RVLIS)	1BwEP ES-0.3	Step 5	6	WOG 1C	
EP-0 EP ES-0 Rx Trip or Safety Injection	11-EP-CL-01	VIII	54-57	13	3

Material Required for Examination

Question Source: New

Question Modification Method:

Question Source Comments:

Record Number: 123 **RO Number:** 97 **SRO Number:** 98

Question Topic: Reason for rapid S/G depressurization

Why are the S/Gs depressurized to less than 670 psig according to 1BwCA-1.1, "Loss of Emergency Coolant Recirculation"?

- a. To allow maximum AF flow to the S/Gs.
- b. To ensure adequate subcooling for restart of the RCPs.
- c. To set up conditions for controlled injection to the RCS from the accumulators.
- d. To decrease RCS temperature and pressure which reduces break flow in a LOCA condition.

Answer: c **Exam Level:** B **Cognitive Level:** Memory **Facility:** Braidwood **Exam Date:** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group:** 2 **SRO Group:** 2

E11 Loss of Emergency Coolant Recirculation

EK3. Knowledge of the reasons for the following responses as they apply to Loss of Emergency Coolant Recirculation:

EK3.2 Normal, abnormal and emergency operating procedures associated with (Loss of Emergency Coolant Recirculation). **3.5** **4.0**

Explanation of Answer: The concern is maximizing cooling volumes that supply water to RCS. By cooling RCS, depressurization of RCS can be initiated (while maintaining subcooling) to the point where the SI accumulators inject their volumes into the RCS.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Emergency Coolant Recirc	1BwCA-1.1	Step 29	26,27	WOG 1C	
Westinghouse Owners Guide	Background Document	ECA-1.1	69	WOG1 C	
CQA Contingency Action 1.1	I1-CA-XL-02	I	II	9	3

Material Required for Examination

Question Source: Facility Exam Bank **Question Modification Method:**

Question Source Comments: 1998 Braidwood NRC Exam

Record Number: 124 **RO Number:** 98 **SRO Number:** 99

Question Topic Actions taken after required NaOH Addition

The NSO reports that the Spray Additive Tank low-2 level light has just been received as a result of a Containment spray system actuation during a steam line break. Containment Pressure is currently 24 psig. Which of the following is correct concerning this situation? (Assume CS Actuation signal has been RESET)

- a.** Allow the Containment spray system to operate AS-IS until containment pressure is < 15 psig.
- b.** Manually shift the Containment spray system lineup to the post accident recirculation lineup.
- c.** Manually close the motor operated isolation valve between the eductor and the spray additive tank (1CS019A/B).
- d.** Stop all containment spray pumps until the spray additive tank is filled and vented per BwOP CS-3.

Answer c **Exam Level** B **Cognitive Level** Comprehension **Facility** Braidwood **Exam Date** 10/20/00

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

E14 High Containment Pressure

EA2. Ability to determine and interpret the following as they apply to High Containment Pressure:

EA2.2 Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments. 3.3 3.8

Explanation of Answer Close eductor spray add valves if spray add tank Lo-2 lights lit. Stop CS pumps if criteria satisfied Cnmt pressure <15# (A wrong). B wrong because cold leg recirc based on RWST level. D wrong because spray add only used once per design.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Reactor or Secondary Coolant	1BwEP-1	CAS	Fold Out Page	WOG1 C	
EP-1 Series LP	11-EP-XL-02	II.G	14	13	1

Material Required for Examination

Question Source: Facility Exam Bank

Question Modification Method:

Question Source Comments: 1996 Braidwood NRC Exam RO Question #95

Record Number: 125 **RO Number:** 99 **SRO Number:** 100

Question Topic Containment Flooding Sources

Per 1BwFR-Z.2, "Respond to Containment Flooding," the MAXIMUM level of water in containment following a major accident is based upon the entire contents of the RCS, RWST,

- a. CST and SI accumulators.
- b. SX and CC water.
- c. SX and FP.
- d. CC water and PW.

Answer a Exam Level R Cognitive Level Memory Facility: Braidwood ExamDate: 10/20/00

Tier: Emergency and Abnormal Plant Evolutions RO Group 3 SRO Group 3

E15 Containment Flooding

EA1. Ability to operate and / or monitor the following as they apply to Containment Flooding:

EA1.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features. 2.9 3.0

Explanation of Answer Based on the total contents of RCS, RWST, CST and SI accumulators.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
FR-Z LP	I1-FR-XL-05	B	8	6	3
Respond to Containment Flooding	1BwFR-Z.2	Step 1	1	WOG1 C	

Material Required for Examination

Question Source: Facility Exam Bank Question Modification Method: Significantly Modified

Question Source Comments: FR-Z 006

Record Number: 126 RO Number: 100 SRO Number: