Question #5: Given the following conditions:
-11A RCP tripped due to a breaker fault
- EOP-0 has been completed, no alternate actions were required
How will the RCS and Steam Generators have responded?

A. 11 and 12 loop differential temperatures will be equal and 11 and 12 S/G pressures will be equal.
B. 11 loop will have an inverted differential temperature and 11 S/G pressure will be lower than 12 S/G pressure.
C. ***12 loop differential temperature will be greater than 11 loop differential temperature and 11 and 12 S/G pressures will be equal.***
D. 12 loop will have a smaller differential temperature than 11 and 12 S/G pressure will be lower than 11 S/G pressure

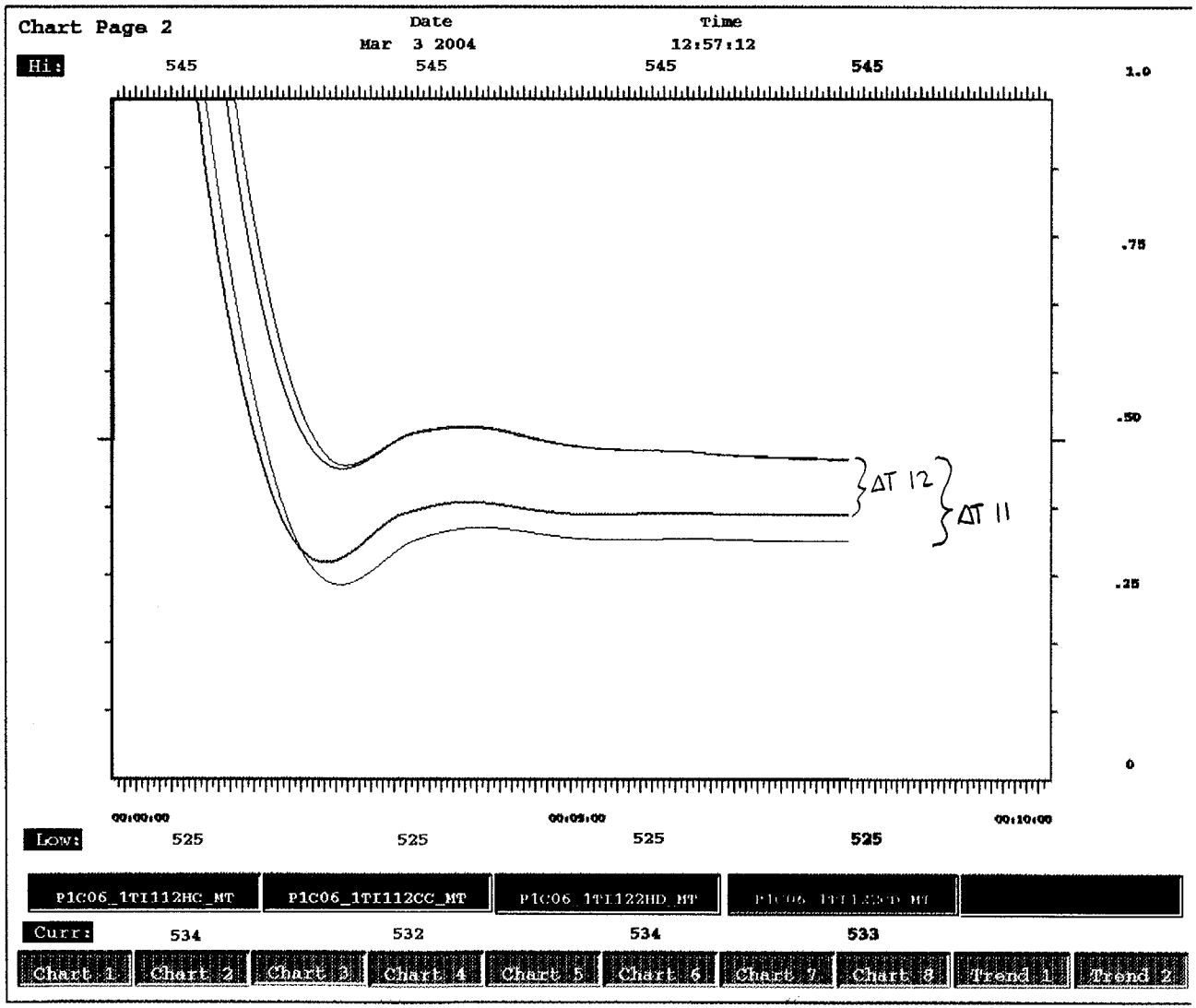
The answer key indicates that answer C is the correct response.

Answer C is incorrect for the following reason. The amount of steam demand on both 11 and 12 S/G will be the same. Both Main Steam Isolation Valves (MSIVs) are open and temperature is being controlled by the Turbine Bypass Valves (TBVs). With the steam demand on both S/Gs being equal and 11 loop having a much smaller RCS flow due to the loss of 11A RCP, the differential temperature will be greater on 11 loop. The simulator at CCNPP was used to demonstrate the conditions in this test question. With the steam demand being equal on both S/Gs and Thot being 525°F in both loops the S/G pressures will be equal at 901 psig. This fact confirms that answer D is also incorrect. S/G pressure and loop temperature plots from the simulator are included for reference.

Therefore this question has no correct answer as written. I recommend this question be removed from the test.

Question 5

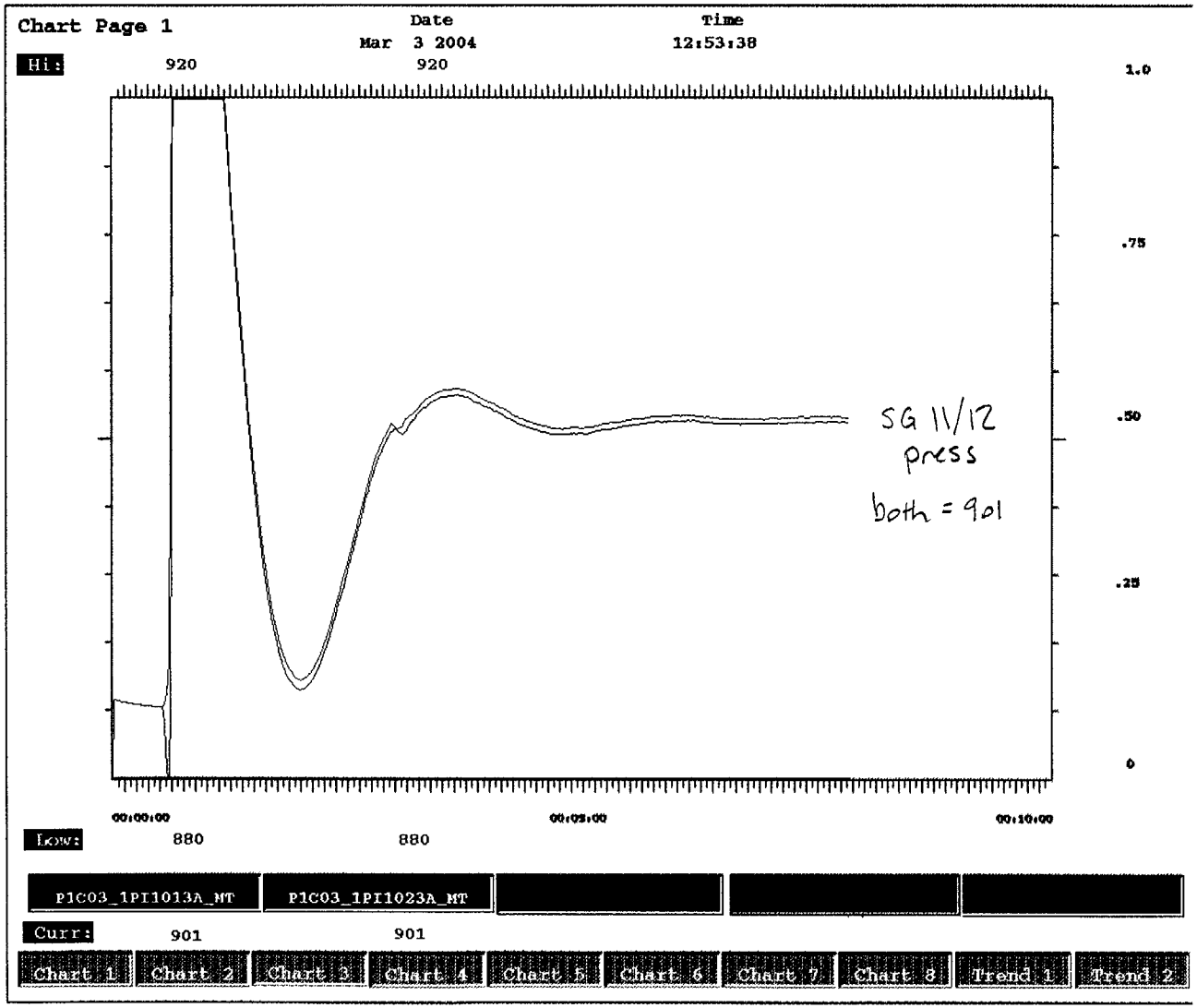
11A RCP Secured



$\Delta T\ 11 > \Delta T\ 12$

Question 5

11A RCP Secured



Question #35: RCS pressure is initially 2250 PSIG
Spray Valve Controller, 1-HIC-100 fails to a 0% output.
What is a direct result of this failure?

A. All Backup Heaters will energize if in "Auto"
B. Spray Valves 1-RC-100E and F will fully open.
C. All Backup heaters will deenergize.
D. ***Proportional heaters will receive full power***.

The answer key indicates that answer D is the correct response.

Answer D is incorrect for the following reasons. The output from Spray Valve Controller 1-HIC-100 is fed to the PZR spray valves 1-RC-100E (F) through hand switch 1-HS-100-8 (see attachment 1). The only *direct result* of 1-HIC-100 output failing to zero would be the spray valves 100E (F) would go full shut. This was not one of the four answer choices provided. As shown in the attached diagrams the proportional heaters receive their control signal from 1-PIC-100X (Y) through channel selector switch 1-HS-100 (see attachment 1). The Proportional heaters will receive full power on zero output from 1-PIC-100X (Y). As the output from 1-PIC-100X (Y) raises to 40% the proportional heaters will have less output, and finally at 40% output from 1-PIC-100X (Y) the proportional heater will have no output (see attachment 2).

Therefore this question has no correct answer as written. I recommend this question be removed from the test.

(Attachment 1)

PRESSURIZER PRESSURE CONTROL BLOCK DIAGRAM

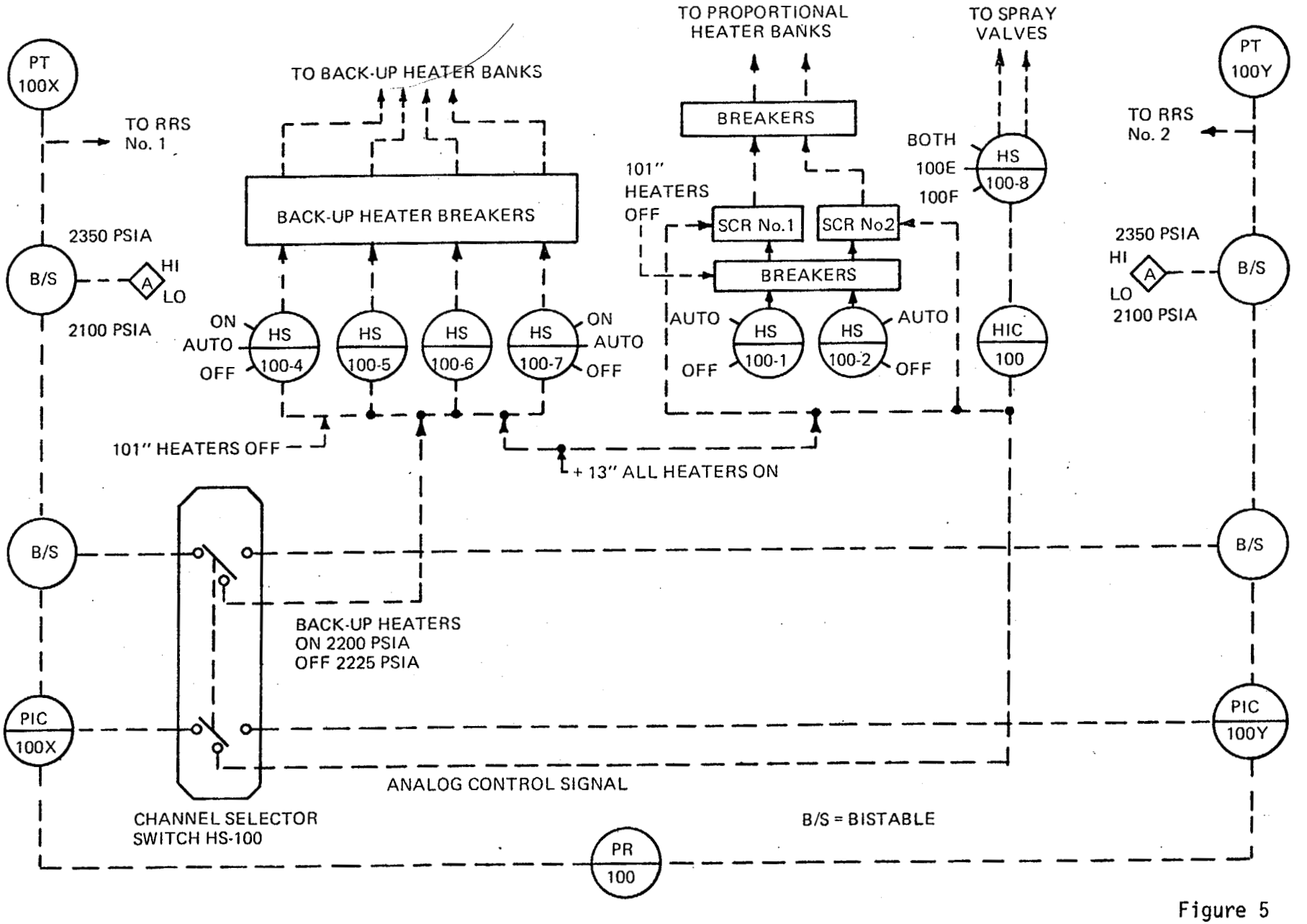


Figure 5

(Attachment 2)

PRESSURIZER PRESSURE CONTROLLER OUTPUT
vs PRESSURIZER PRESSURE DEVIATION FROM SETPOINT

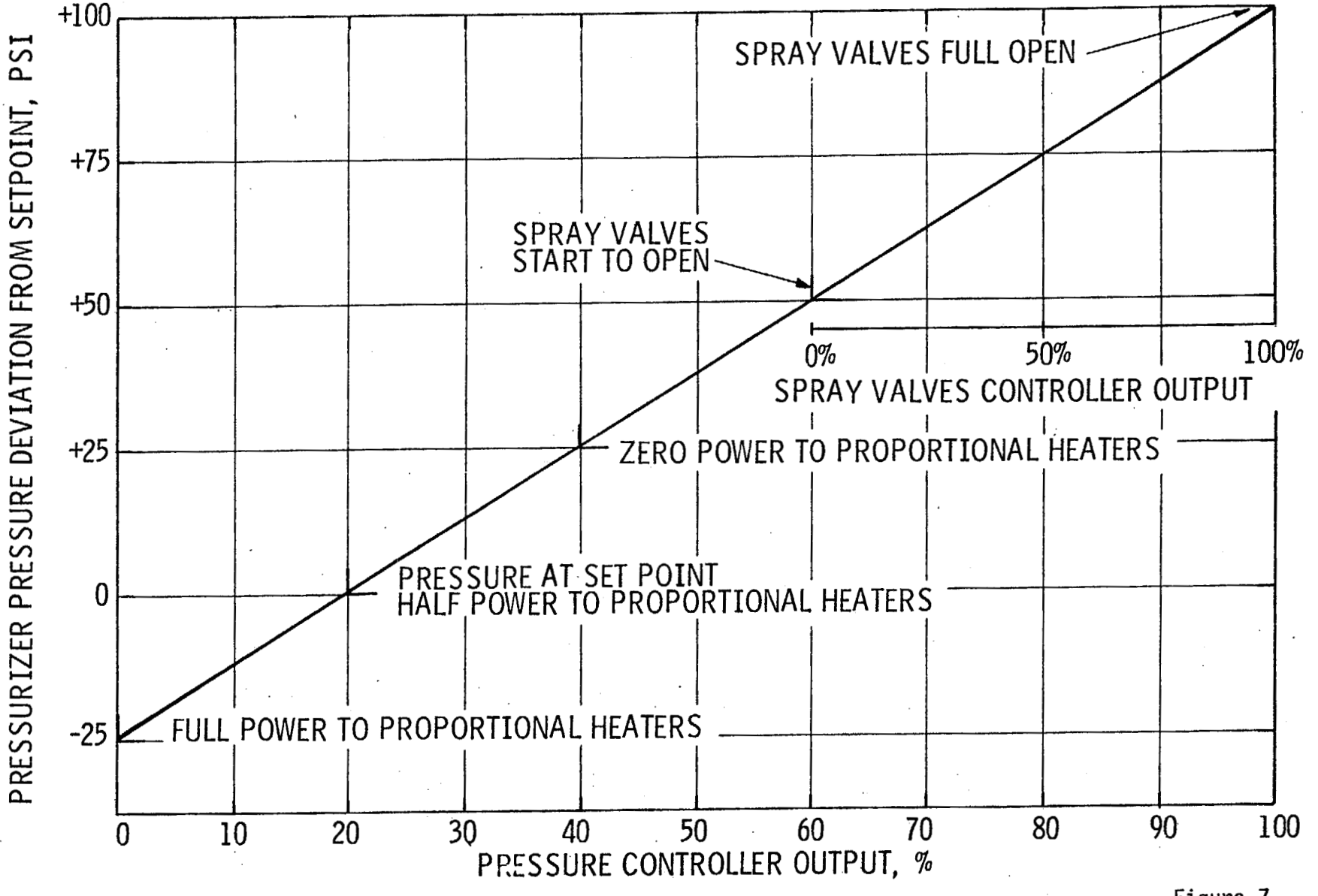
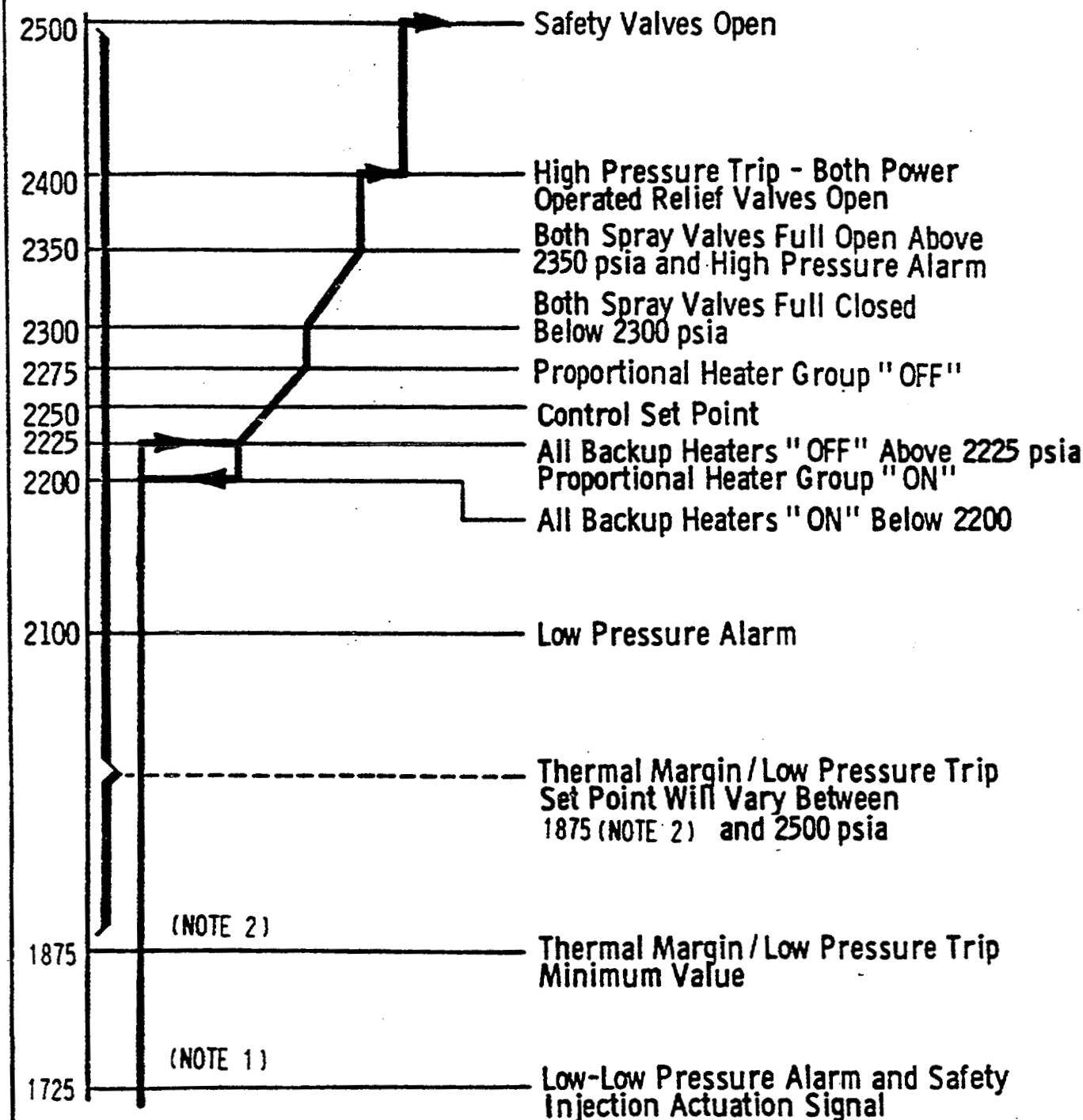


Figure 7



NOTE 1: UFSAR CHAPTER 14, TABLE 14.1-4
TECH.SPEC. 3/4-3.1,TABLE 3.3-4

NOTE 2: UFSAR TABLE 7-1
TECH.SPEC.SECTION 2.0, PAGE B2-6

BALTIMORE GAS & ELECTRIC CO. Calvert Cliffs Nuclear Power Plant	Pressure Control Program	REV. 15	Figure 7-13

Question #68: Given Nuclear Plant Operations Section Standing Order 03-03:
A known Component Cooling system leak is causing a Unit-2 Sump frequency of 3.4 hours.
Sump frequency changes to 95 minutes with a corresponding increase in unidentified RCS leak rate.

Which method informing the GS-NPO is required per administrative procedures?
A. Voicemail
B. Alpha-page
C. Alpha-page and detailed voicemail
D. Talk directly

The answer key indicates that answer D is the correct response.
NPO Section Standing Order 03-03 is included for reference.
Unit 2 containment sump is a 44 gallon sump. The initial sump frequency is stated as 3.4 hours of know Component Cooling leakage.
This corresponds to .22 GPM: 44 gallons ÷ 204 min (3.4 hrs) = .22 GPM
The 95 minute sump frequency corresponds to .46 GPM of total leakage into the Unit 2 containment sump. 44 gallons ÷ 95 min = .46 GPM
The increase in sump frequency can be attributed to .24 GPM of Unidentified RCS Leakage

Definitions: (See NPO Section Standing Orders)
Unidentified RCS Leakage – Leakage from the RCS that has not been determined to be from a specific source. For example, if total RCS leakage has been determined to be 0.6 GPM, but 0.4 GPM has been determined to be from 12 Charging Pump primary packing leakage, then the unidentified RCS leakage, as referred to in this Standing Order, would be 0.2 GPM.

Therefore both the unidentified leakage and the unexplained increase in leakage is .24gpm.

I. RCS Leakage Condition 1

Definition:

A) Unidentified RCS leakage >0.2 GPM

B) Unexplained increase of 0.1 GPM

The increase in leakage clearly meets both criteria A and B per the definition of RCS Leakage Condition 1

II. RCS Leakage Condition 2

Definition:

A) Unidentified RCS leakage >0.4 GPM

B) Unexplained increase of 0.3 GPM

C) Unexplained Containment Sump Frequency of <8 Hours concurrent with increased RCS Leakage.

The increase in leakage does not meet the criteria of A and B per the definition RCS Leakage Condition 2, but does meet the criteria of C.

III. RCS Leakage Condition 3

Definition:

A. Unidentified RCS leakage >0.5 GPM with all potential corrective actions taken.

B. Unexplained Containment Sump Frequency of <4 hours concurrent with increased RCS leakage.

The increase in leakage does not meet the criteria of A per the definition RCS Leakage Condition 3, but does meet the criteria of B.

An Unexplained Containment Sump frequency of <4 hours (as stated in Condition 3) can happen with RCS leakage as low as .2 GPM. If the intent were to take the actions of Condition 3 based solely on a sump frequency of <4 hrs the leak rate portion of the definition would never be challenged. No guidance is given in the NPO Section Standing Orders concerning the application of RCS Leakage Condition definitions. RCS Leakage Condition 1is the only definition that is met entirely. The action for this condition is to notify the GS-NPO via voicemail. This action corresponds to answer A provided in the test question.

Therefore this question should have A as the correct answer given the information provided. We recommend this question have answer A accepted as the correct answer.

Nuclear Plant Operations Section Standing Orders			
Number: 03-03, Rev. 0	Effective Date/Time: 08-01-2003 / 1200	Expiration Date/Time:	Page 1 of 4
Title: RCS Leakage			

Purpose:

This Standing Order is intended to provide basic guidance for Operations to ensure consistent response at varying levels of unidentified RCS leakage. This Standing Order is not intended to change any responses or actions dictated by the CCOM, the Tech Specs, or any other Operational guidance.

Definitions:

Unidentified RCS Leakage – Leakage from the RCS that has not been determined to be from a specific source. For example, if total RCS leakage has been *determined to be 0.6 GPM, but 0.4 GPM has been determined to be from 12* Charging Pump primary packing leakage, then the unidentified RCS leakage, as referred to in this Standing Order, would be 0.2 GPM.

Considerations:

- Historical baseline RCS leakage for both units has typically been in the range of 0.1 GPM to 0.15 GPM following a refueling outage. This value tends to increase over the fuel cycle due to minor degradations of RCS sealing interfaces (e.g., packing, etc...). Larger leakrates are typically seen very near the end of a fuel cycle (during times of increased CVCS diversion) due to inaccuracies in the diversion integrator.
- Calculated leakrate values will be greatly impacted by non-steady-state operation. Consideration of minor changes in RCS leakrates should be given only when the RCS has been in steady-state conditions.
- The sensitivity of the Containment Gaseous and Particulate detectors is based on a source term with 1%-failed fuel. Therefore, these detectors will be essentially blind to leakage within the range of this Standing Order.
- The values presented in this Standing Order are to be considered general guidance. Plant conditions may dictate that actions be taken prior to these values being reached.
- Any actions taken to attempt to identify sources of unidentified RCS leakage should be documented in the CRO logs (e.g., "*Quantified charging pump primary leakage per OI-2A. No primary leakage detected.*") This will ensure efficiency in *the search, should it go over several shifts.*
- Small changes in RCS leakage may need to be trended over several shifts before actions to find leakage need to be taken.
- Single evolutions that cause the planned loss of RCS inventory (but are not "leakage") should be annotated in the CRO logs. Examples include large quantities of charging pump venting (such as restoring from maintenance), large diversion activities (such as rinsing a CVCS IX), etc...

Guidance

I. RCS Leakage Condition 1

Definition:

A) Unidentified RCS leakage >0.2 GPM

B) Unexplained increase of 0.1 GPM

Actions:

___ Notify the GS-NPO (voicemail).

___ Evaluate Charging Pumps for increased primary packing leakage.

___ Consider performing the Miscellaneous portions of STP O-27 (e.g., RCDT leakage).

___ Consider performing the Leak Identification attachment of AOP-2A.

___ If potential leak sources are addressed, start a Supplemental STP-O-27 to verify the effect.

II. RCS Leakage Condition 2

Definition:

A) Unidentified RCS leakage >0.4 GPM

B) Unexplained increase of 0.3 GPM

C) Unexplained Containment Sump Frequency of <8 Hours concurrent with increased RCS Leakage.

NOTE

A leakrate of 0.1 GPM into a completely empty containment 49-gallon (44-gallon) sump will cause the alarm to come in every 8.2 hours (7.3 hours).

Actions:

___ Initiate an Issue Report per QL-2-100.

___ Notify the GS-NPO and PE-PSE (alpha-page).

___ Leave detailed Voicemail for Site Managers per the Notification Matrix.

___ Perform the Miscellaneous portions of STP O-27.

___ Perform the Leak Identification attachment of AOP-2A.

___ If the increased RCS leakrate is indicated in the Containment:

- Begin planning a Containment entry while carrying out other actions. After planning is complete, the decision to make the entry will be made by the GS-NPO.
- Request Chemistry obtain a fresh sample of the 12/22 ECCS pump room sump for Boric Acid and hydrazine content. Chemistry should grab the sample while the containment sump is being drained.
- Evaluate SRW and CC system leakrates for changes.
- Request Health Physics obtain a sample of the Containment atmosphere for indications of RCS leakage.

___ If potential leak sources are addressed, start a Supplemental STP-O-27 to verify the effect.

III. RCS Leakage Condition 3

Definition:

A. Unidentified RCS leakage >0.5 GPM with all potential corrective actions taken.

B. Unexplained Containment Sump Frequency of <4 hours concurrent with increased RCS leakage.

Actions:

___ Alert Site Management with alpha-page and detailed voicemail per Notification Matrix. Ensure you talk directly to the GS-NPO and PE-PSE.

___ Begin planning a controlled unit shutdown. Activate the Forced Outage Protocol Checklist per OAP 01-03.

NOTE:
A leakrate of 0.2 GPM into a completely empty containment 49-gallon (44-gallon) sump will cause the alarm to come in every 4.1 hours (3.6 hours).

___ If the increased RCS leakage is indicated in the containment:

- Implement the Rapid Containment Entry procedure. Consideration for personnel safety must be applied. If the RCS leakrate is degrading a containment entry may no be advisable.

___ Review RCS Leakage Condition 2 checklist for appropriate actions.

Approved by: GS-NPO	Original signed by J. K. Mills	08/01/03
	Printed Name and Signature	Date
Canceled by: GS-NPO		
	Printed Name and Signature	Date