

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.: 50-528; 50-529; 50-530
License Nos.: NPF-41; NPF-51; NPF-74
Report No.: 50-528/99-301; 50-529/99-301; 50-530/99-301
Licensee: Arizona Public Service Company
Facility: Palo Verde Nuclear Generating Station, Units 1, 2, and 3
Location: 5951 S. Wintersburg Road
Tonopah, Arizona
Dates: August 29 through September 3, 1999
Inspectors: T. O. McKernon, Chief Examiner, Senior Reactor Engineer
Operations Branch
G. W. Johnston, Examiner, Senior Reactor Engineer
Operations Branch
Approved By: John L. Pellet, Chief, Operations Branch
Division of Reactor Safety

ATTACHMENTS:

Attachment 1: Supplemental Information
Attachment 2: Licensee Written Examination Analysis
Attachment 3: Final Written Examination and Answer Key

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EXECUTIVE SUMMARY

Palo Verde Nuclear Generating Station, Units 1, 2, and 3
NRC Inspection Report No. 50-528/99-301; 50-529/99-301; 50-530/99-301

NRC examiners evaluated the competency of five senior operator applicants for issuance of operating licenses at the Palo Verde Nuclear Generating Station, Units 1, 2, and 3. The licensee developed the initial license examinations using the guidance in NUREG-1021, Revision 8, April 1999. NRC examiners reviewed and approved the examinations. The initial written examinations were administered to the applicants on August 30, 1999, by facility proctors in accordance with the guidance in NUREG-1021, Revision 8. The NRC examiners administered the operating tests August 31 through September 2, 1999.

Operations

- All five applicants for senior operator licenses passed the licensing examinations and were issued the appropriate licenses. Strong applicant performance with good communication techniques, peer checking, and crew briefings was observed during the operating test (Sections O4.1 and O4.2).
- The licensee developed and submitted a high quality examination, which was administered with only minor changes (Section O5.1).
- The simulation facilities and simulation facility staff supported the examination well (Section O5.2).
- The licensee maintained excellent examination security (Section O5.3).

Report Details

Summary of Plant Status

All three units operated at essentially 100 percent power for the duration of this inspection.

I. Operations

04 Operator Knowledge and Performance

04.1 Initial Written Examination

a. Inspection Scope

On August 30, 1999, the facility licensee proctored the administration of the written examination, approved by the chief examiner and NRC Region IV supervision, to five individuals who had applied for senior operator licenses. The licensee proposed grading for the written examinations and evaluated the results for question validity and generic weaknesses. The examiners reviewed the licensee's results.

b. Observations and Findings

All five applicants passed the written examination. Written examination scores ranged from a low of 85 to a high of 96 with an average of 90.8 percent overall. Greater than 50 percent of the applicants missed three questions in diverse areas. Post-examination review by the licensee of those questions with other examination responses indicated no broad knowledge or performance weaknesses and the chief examiner's review supported this conclusion. The licensee's post-examination review resulted in an answer change to the answer key; an error not previously identified. The answer key and question worksheet for Question 18 listed distractor 'B' as the correct answer when, in fact, distractor 'C' was the correct answer. The answer key was changed and examinations reevaluated. The licensee's post-examination comments are included in Attachment 2.

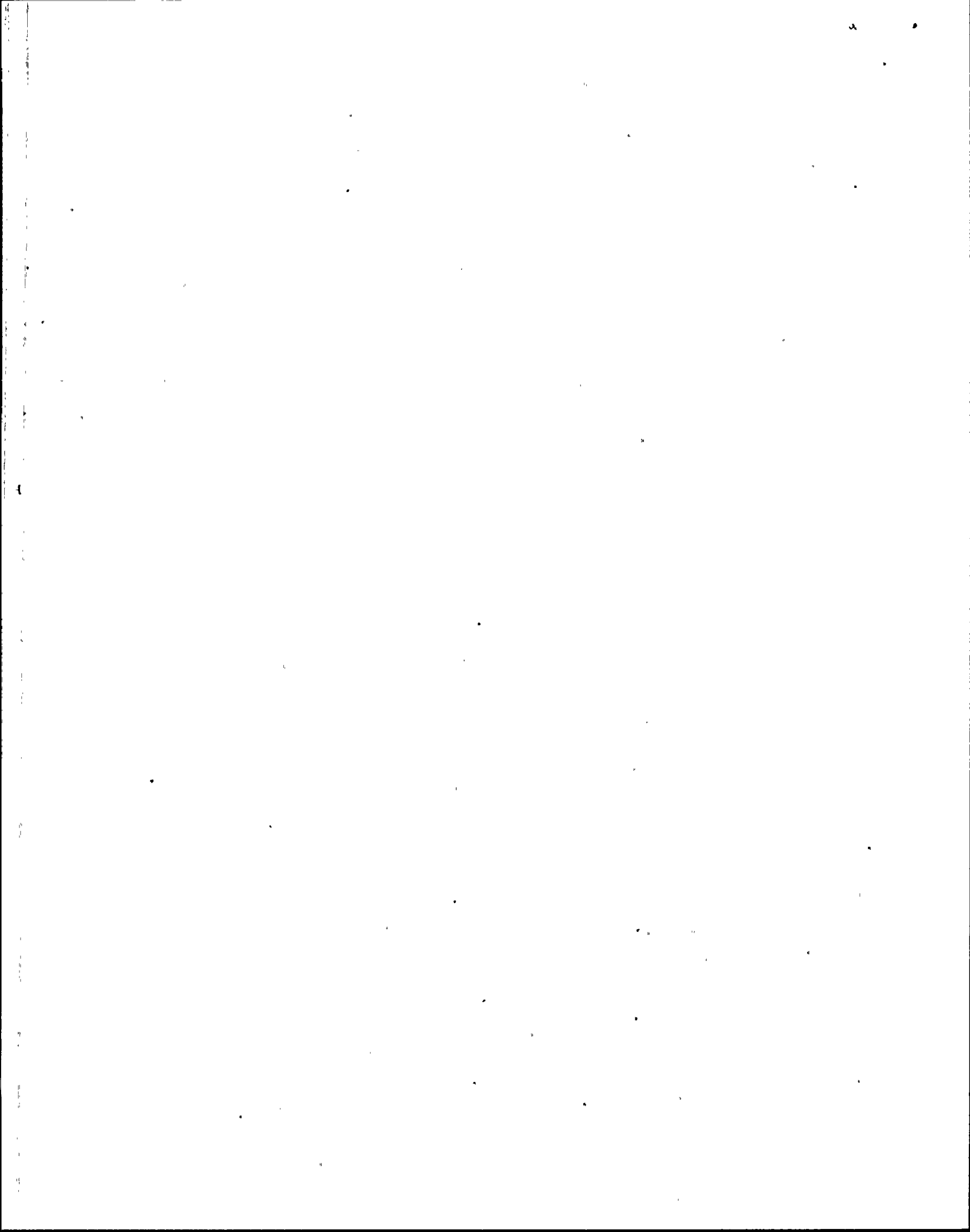
c. Conclusions

All five license applicants passed the written examination. No broad knowledge or training weaknesses were identified as a result of the analysis and review of the questions.

04.2 Initial Operating Test

a. Inspection Scope

The examination team administered the various parts of the operating examination to the five applicants on August 31 through September 2, 1999. Most applicants participated in two scenarios. Each of the applicants also received a control room and facilities walkthrough test. This test consisted of five tasks for current licensed



operators and ten tasks for an instant senior operator applicant. Also, there was an administrative portion, which consisted of five tasks in four administrative areas for all applicants.

b. Observations and Findings

All applicants passed all sections of the operating test. The applicants demonstrated strong performance and used good communication techniques such as peer checks and crew briefings. For example, one crew effectively and promptly responded to a station blackout event which required startup of the gas turbine generator and electrical distribution system alignment and tie-in. In the job performance measures, an applicant identified a valid error on a safety significance determination sheet which had not been previously identified during the validation. Correcting the identified error did not change overall grading results.

c. Conclusions

All applicants passed all parts of the operating test. Strong applicant performance with good communication techniques, peer checks, and crew briefings was demonstrated.

05 **Operator Training and Qualification**

05.1 Initial Licensing Examination Development

The facility licensee developed the initial licensing examination in accordance with NUREG-1021, Revision 8, "Operator Licensing Examination Standards for Power Reactors."

05.1.1 Examination Outline

a. Inspection Scope

The facility licensee submitted the initial examination outline on May 7, 1999. The chief examiner reviewed the submittal against the requirements of NUREG-1021, Revision 8.

b. Observations and Findings

Region IV approved the initial examination outline with minor comments for enhancement, which were promptly resolved, and advised the licensee to proceed with examination development.

c. Conclusions

The licensee submitted an adequate examination outline.

05.1.2 Examination Package

a. Inspection Scope

The facility licensee submitted the completed draft examination package on July 8, 1999. Prior to formal submittal of the examination package, the chief examiner reviewed samples of the proposed test items and provided verbal comments to the examination team. The chief examiner and a peer reviewer reviewed the formal submittal against the requirements of NUREG-1021, Revision 8. An on-site review of the revised examination was conducted during the exam validation on August 29-30, 1999.

b. Observations and Findings

The draft written examination contained 100 questions, which were predominantly new for this examination. The draft examination was considered technically valid to discriminate at the proper level and responsive to the sample plan submitted by the licensee on May 7, 1999. The chief examiner provided enhancement suggestions on approximately 7 percent of the questions. The licensee reviewed the enhancement suggestions and modified questions appropriately. As discussed above, it was necessary to make only one post-examination change to the answer key.

The operating test consisted of dynamic scenarios, administrative tasks and questions, and system tasks. The licensee submitted four dynamic scenarios, including one backup scenario, which was not used during the examination. The submitted scenarios conformed to NUREG-1021. The licensee subsequently incorporated several minor enhancement suggestions provided by the examiners and the operating test was validated on August 29-30, 1999.

To support the administrative section of the operating test, the licensee submitted five administrative tasks for the senior operator applicants. The administrative section of the test conformed to NUREG-1021. Enhancement suggestions provided by the reviewers were incorporated by the licensee.

To support the systems walkthrough section of the operating test, the licensee submitted ten system job performance measures for the instant senior operator applicant and five for the upgrade applicants. The systems walkthrough section of the test conformed to NUREG-1021. Enhancement suggestions provided by the reviewers were incorporated by the licensee. All changes made to the examination were appropriately justified and documented.

The licensee developed a detailed examination schedule and test items were clearly and effectively scheduled. The use of both simulators aided in accomplishing all simulator job performance measures in one day. Placing a daily schedule in the front of the examination book for each examiner was useful, and no scheduling problems were encountered. Excellent administrative and technical support was received for all aspects of the examination.

The materials in the individual examination packages were conveniently identified and assembled. All materials were placed in examination order for each applicant and materials that were to be handed to the applicants were on colored paper, which facilitated the prevention of handing applicants materials which contained solutions to test items. The constant involvement of the training staff and training management made examination administration well orchestrated.

c. Conclusions

The examination submitted for administration was of high quality. The licensee staff was highly responsive to incorporating enhancement suggestions developed during the review process. The licensee involvement in exam administration ensured good coordination between other onsite organizations.

05.2 Simulation Facility Performance

a. Inspection Scope

The examiners observed simulator performance with regard to fidelity during the examination validation and administration.

b. Observations and Findings

The simulation facilities supported the validation and administration of the examination well. No simulator fidelity problems were identified.

c. Conclusions

The simulation facilities and simulation facility staff supported the examinations well.

05.3 Examination Security

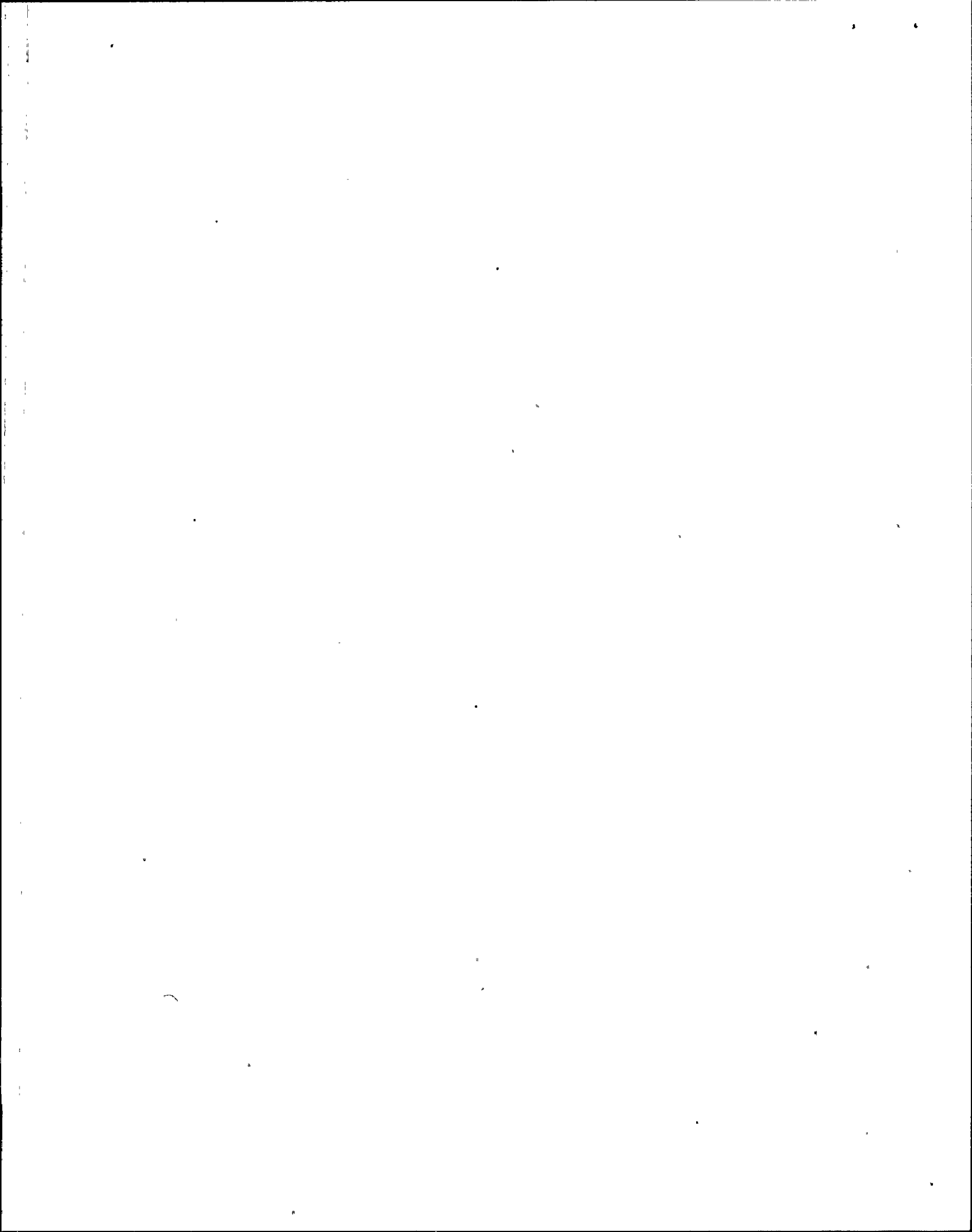
a. Scope

The examiners reviewed examination security during the examination administration week for compliance with NUREG-1021 requirements.

b. Observations and Findings

Members of the licensee's operations and training staff signed onto the NUREG-1021 examination security agreement, acknowledging their responsibilities for examination security. Daily security briefings were conducted for the examinees. The security plans were excellently implemented. Applicants were maintained under constant supervision and were always escorted to and from examination points. Simulator security was strictly maintained.

c. Conclusions



Excellent examination security was maintained. The licensee's conduct of daily security briefings and constant security vigilance were notable.

V. Management Meetings

X1 Exit Meeting Summary

The chief examiner presented the inspection results to members of the licensee management at the conclusion of the inspection on September 2, 1999. The licensee acknowledged the findings presented.

The licensee did not identify as proprietary any information or materials examined during the inspection.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Carnes, Unit Department Leader, Operations
R. Hazelwood, Engineer, Regulatory Affairs
J. Hoover, Operations Instructor, Nuclear Training
W. Ida, Vice President Nuclear Production
P. Kirker, Unit Department Leader, Operations
D. Marks, Section Leader, Regulatory Affairs
R. Nunez, Operations Support Department Leader
W. Potter, Section Leader, Nuclear Training
F. Reidel, Department Leader, Nuclear Training
M. Shea, Director, Nuclear Training
D. Smith, Director, Operations
R. Taylor, Operations Support
J. Wood, Section Leader, Nuclear Training

NRC

D. Corporandy, Resident Inspector

ATTACHMENT 2

Post Examination Analysis

PVNGS 1999 License Examination
Post-examination Assessment

Written Examination Question Assessment

Three or more candidates answered three questions incorrectly.

Question #	Success Rate	Description
18	60%	Answer key and worksheet listed distracter B as the correct answer. This is not correct, distracter C is the correct answer. Modified the question worksheet and answer key to reflect this change. The question is valid as written.
24	0%	Question asked the Technical Specification basis for cooling down the RCS when activity limits are exceeded. Two candidates selected the distracter aligned with minimizing fuel damage and three candidates selected the distracter that minimizes Iodine spiking. Additional training will be provided on this item during examination review. The question is valid as written.
60	40%	Question asked which of the listed systems could be pumped directly to the LRS system. Three candidates selected the Low Activity Spent Resin Tank. Clarification will be provided during examination review. The question is valid as written.
99	40%	Question asked which of the listed responsibilities the Emergency Coordinator could delegate. Three candidates selected the distracter of Offsite notifications. Clarification will be provided during the examination review. The question is valid as written.

All examination questions missed by any candidate have been reviewed and there are no other issues identified with any other questions.

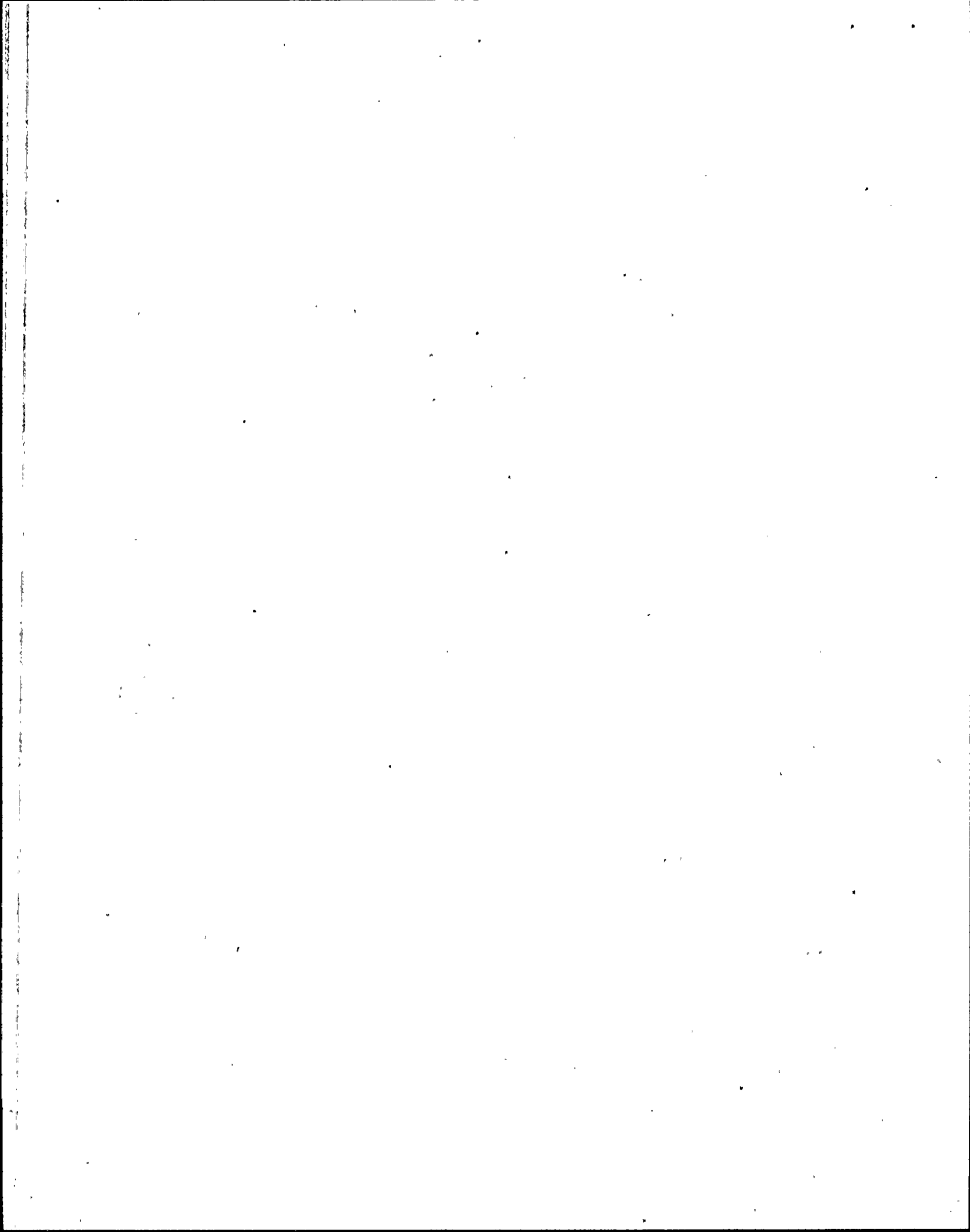
Administrative Task Assessment

Administrative Task A2

Candidates were asked to discover three errors on a completed Safety Function Determination Appendix B and C. An unanticipated valid error was discovered by one candidate. He correctly identified that the out of service equipment alphanumeric was incorrectly listed on Appendix B. This is a valid identified error.

ATTACHMENT 3

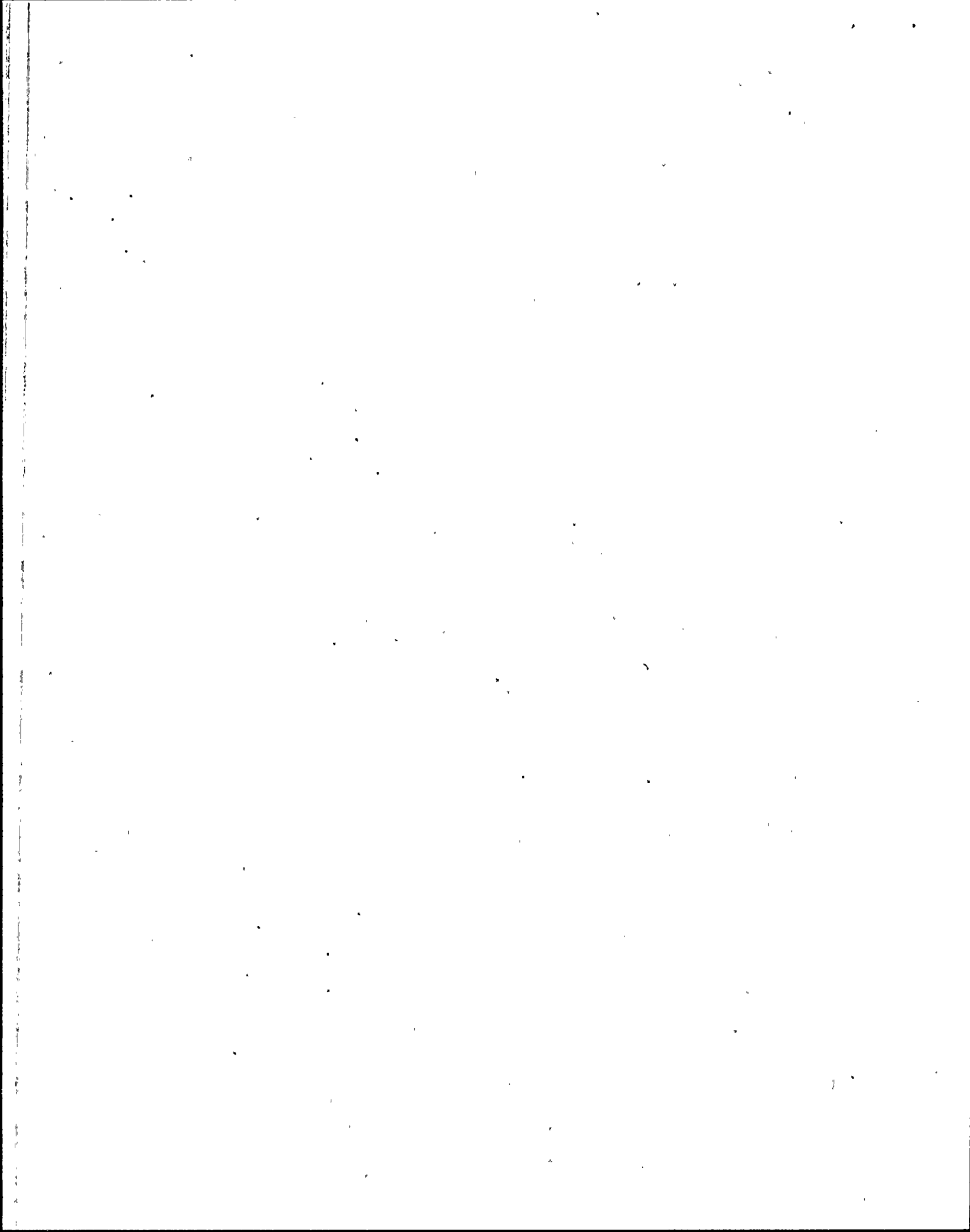
As-Given Written Examination and Answer Key



Site-Specific Written Examination
PVNGS 1999
Senior Reactor Operator
Answer Key

1.	C	26.	A	51.	D	76.	B
2.	C	27.	B	52.	A	77.	D
3.	D	28.	B	53.	C	78.	D
4.	D	29.	C	54.	C	79.	D
5.	C	30.	D	55.	C	80.	C
6.	A	31.	A	56.	B	81.	A
7.	B	32.	B	57.	D	82.	A
8.	B	33.	A	58.	D	83.	D
9.	A	34.	A	59.	B	84.	D
10.	D	35.	D	60.	A	85.	A
11.	D	36.	A	61.	C	86.	D
12.	B	37.	C	62.	D	87.	A
13.	D	38.	B	63.	B	88.	B
14.	B	39.	C	64.	C	89.	A
15.	D	40.	A	65.	C	90.	C
16.	D	41.	C	66.	B	91.	D
17.	C	42.	D	67.	B	92.	C
18.	C	43.	A	68.	A	93.	A
19.	B	44.	C	69.	C	94.	D
20.	A	45.	D	70.	B	95.	A
21.	D	46.	A	71.	B	96.	B
22.	B	47.	B	72.	C	97.	A
23.	A	48.	C	73.	D	98.	D
24.	C	49.	A	74.	A	99.	A
25.	A	50.	A	75.	A	100.	B

A is correct = 29
B is correct = 22
C is correct = 23
D is correct = 26



U.S.N.R.C. 1999 Site-Specific Written Examination
Palo Verde Nuclear Generating Station
Senior Reactor Operator

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

Applicant Information

Name:	Region: IV
Date: 08/30/99	Facility/Unit: PVNGS Units 1,2,3
License Level: SRO	Reactor Type: CE PWR
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.

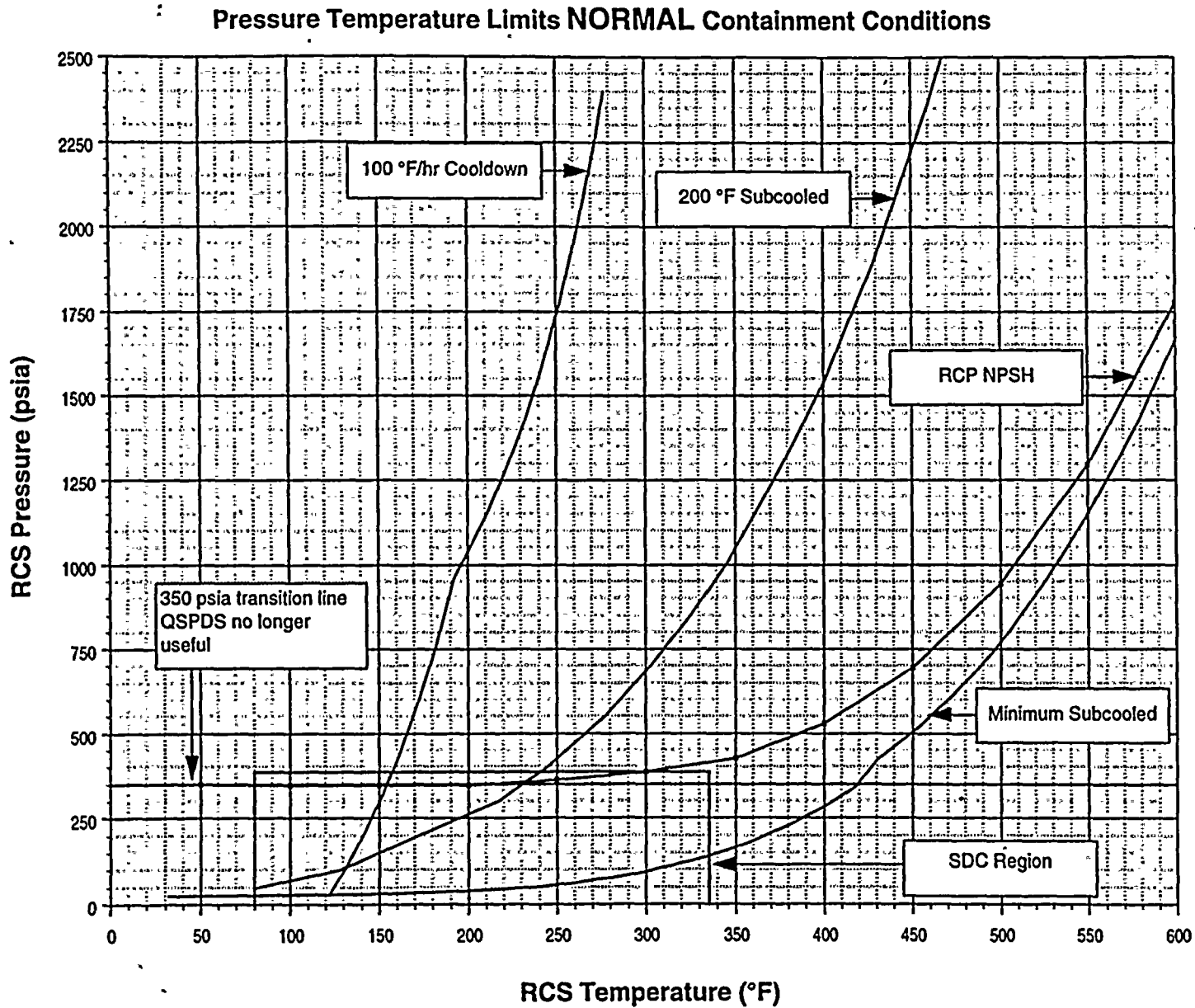
Applicant Certification

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

Applicant's Signature

Results

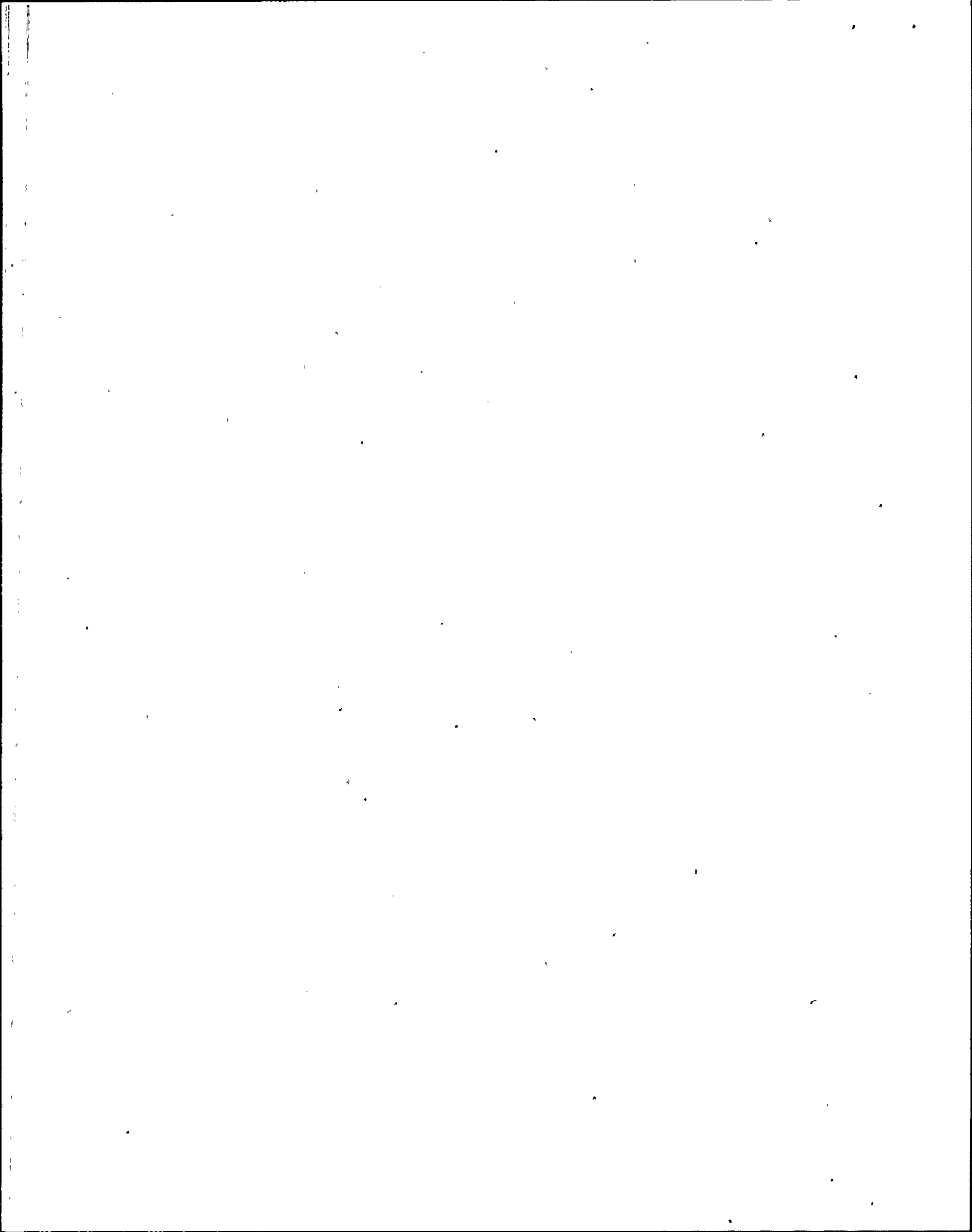
Examination Value	_____ Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent



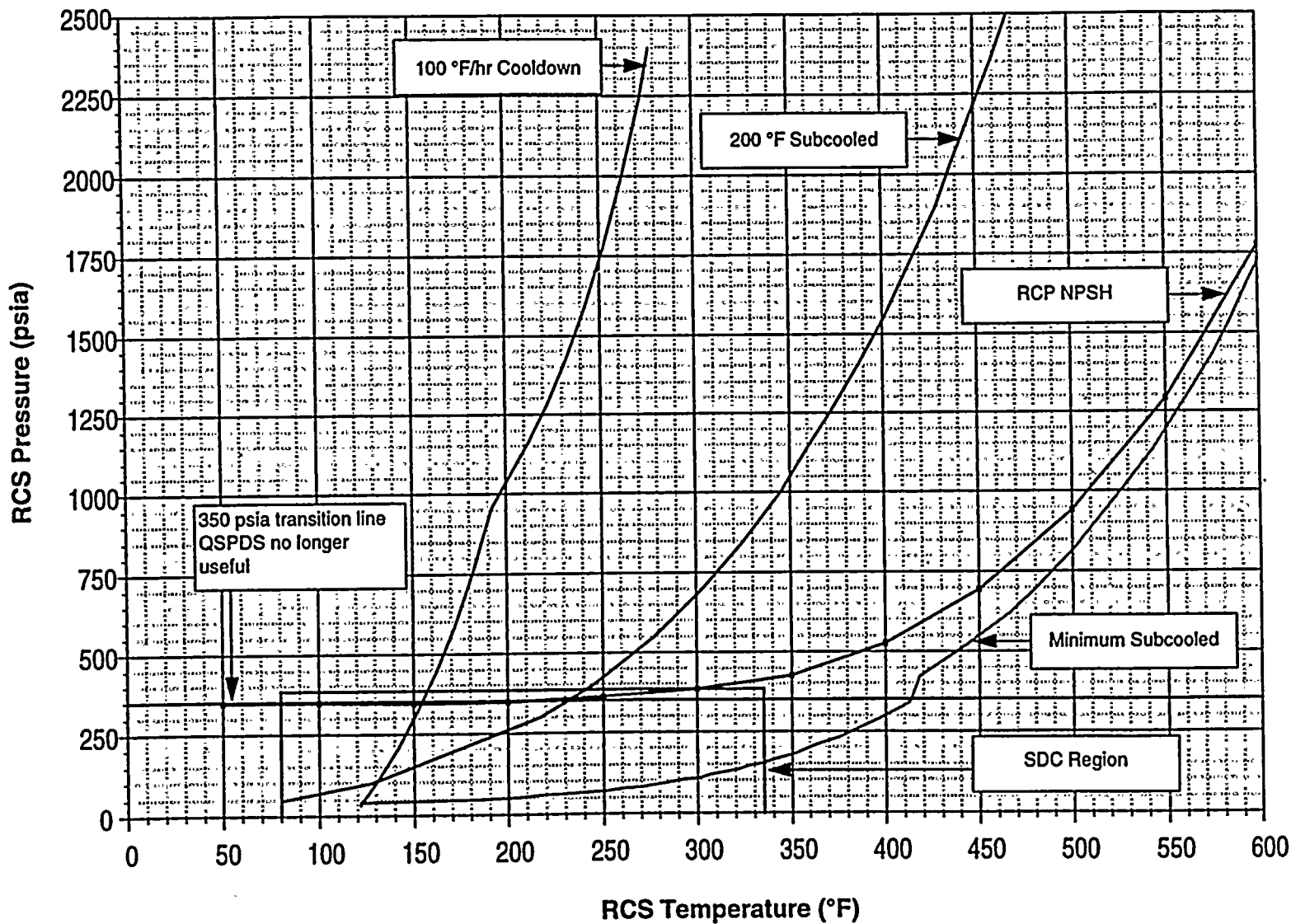
Forced Circulation - Th indication used

Natural Circulation - REP CET

Appendix 2,
 Figures

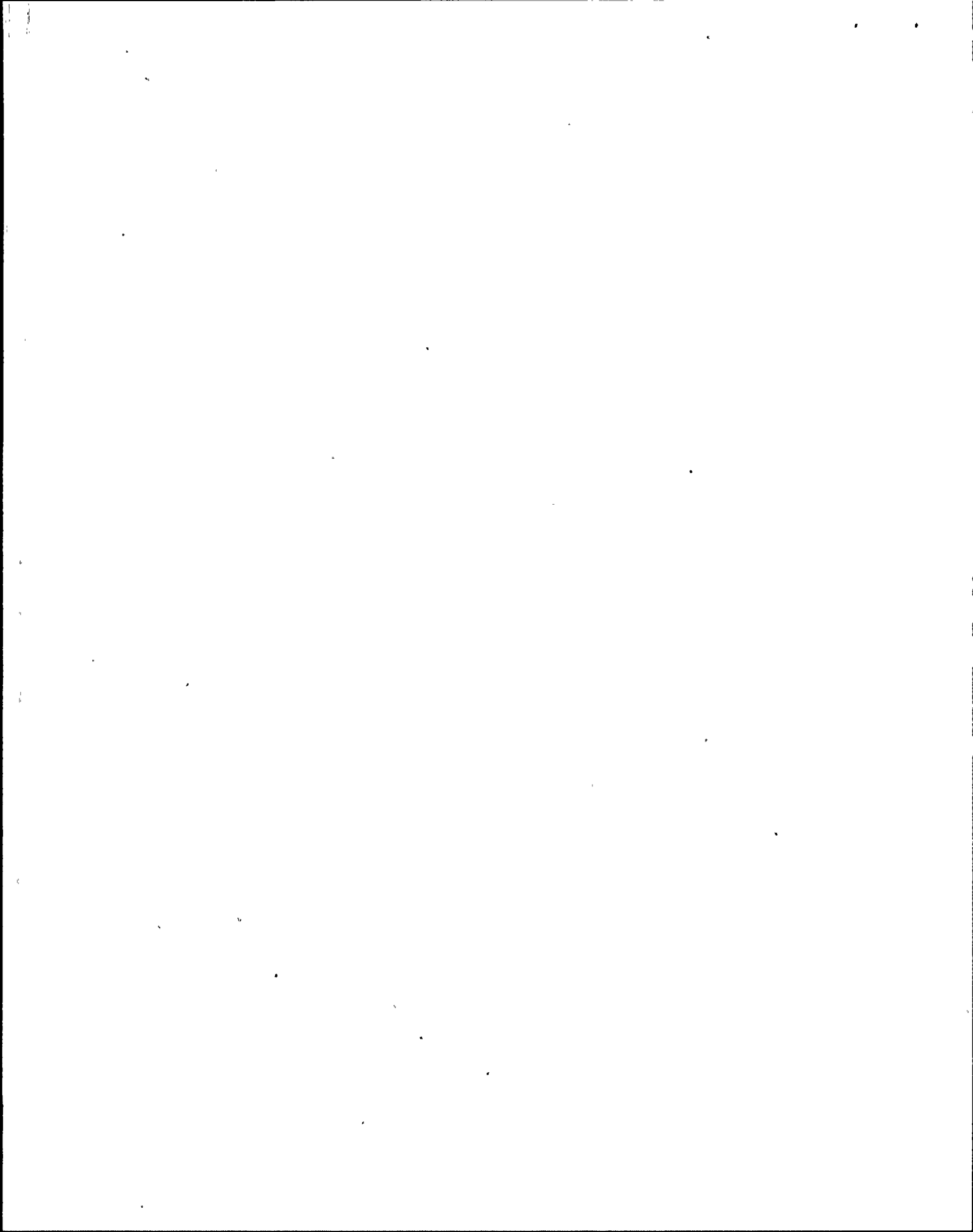


Pressure Temperature Limits HARSH Containment Conditions



Forced Circulation - Th indication used

Natural Circulation - REP CET used

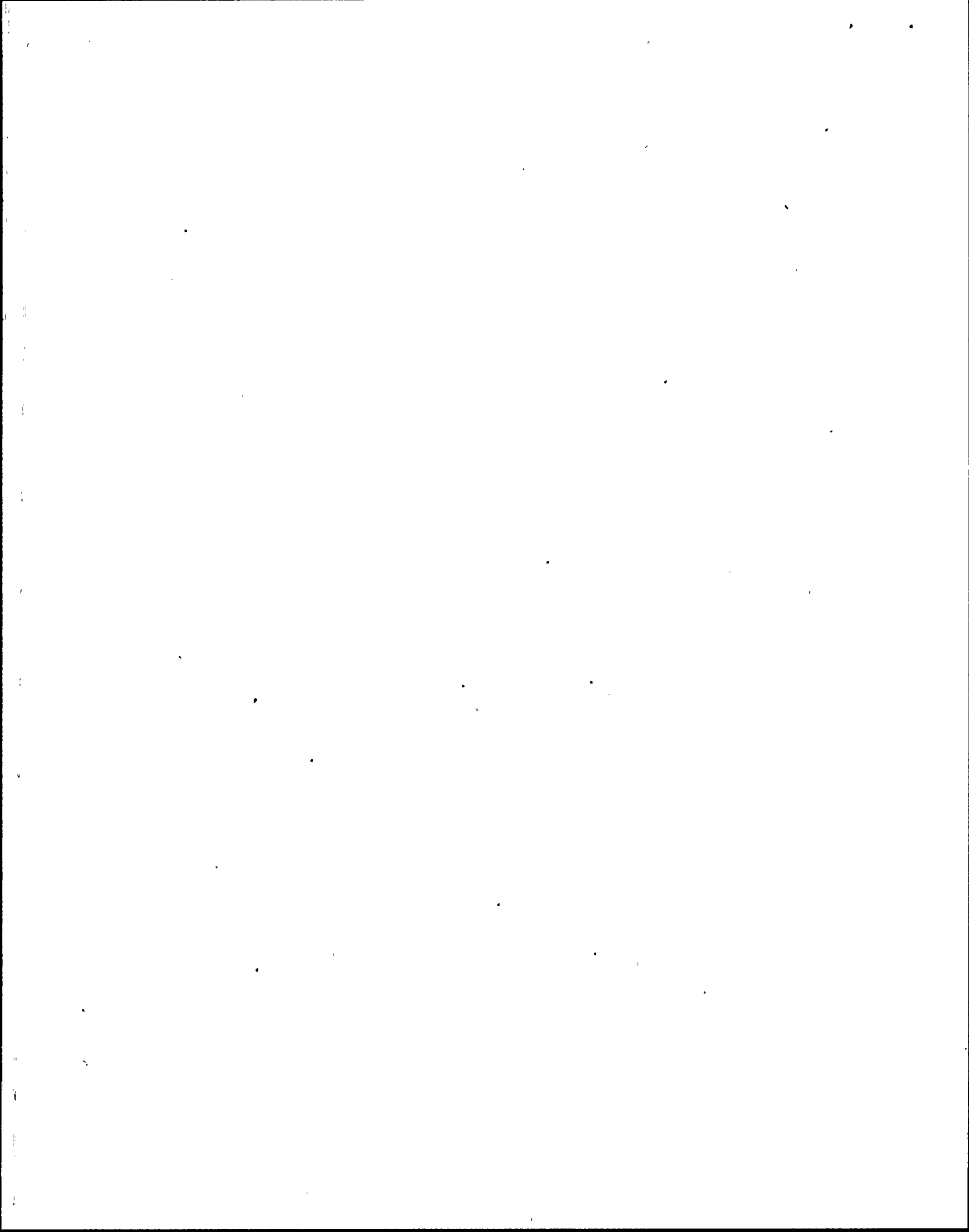


U.S.N.R.C. 1999 Site-Specific Written Examination
Palo Verde Nuclear Generating Station
Senior Reactor Operator

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

U.S.N.R.C. 1999 Site-Specific Written Examination
Palo Verde Nuclear Generating Station
Senior Reactor Operator

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



U.S.N.R.C. 1999 Site-Specific Written Examination
Palo Verde Nuclear Generating Station
Senior Reactor Operator

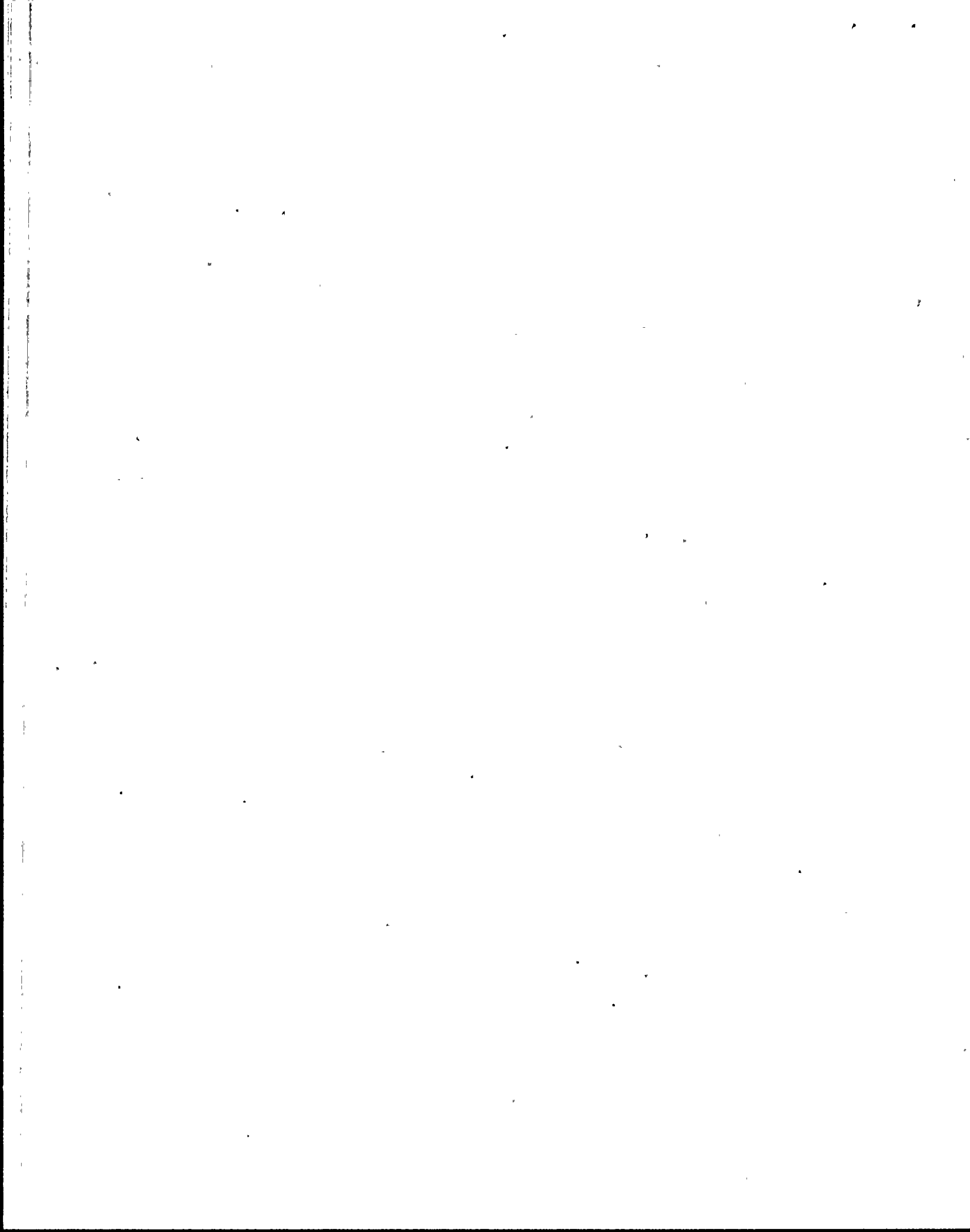
Question 001

Given the following plant conditions:

- Unit 1 Reactor Power is 9% and INCREASING
- Tave/Tref is +2.5°F and INCREASING
- Pressurizer pressure is 2270 psia and INCREASING
- Pressurizer level is 53% and INCREASING

Which one of the following events is the likely cause?

- A. 20% load rejection.
- B. Pressurizer vapor space leak.
- C. Uncontrolled CEA withdrawal.
- D. Main Steam Safety Valve stuck open.



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Palo Verde Nuclear Generating Station
Senior Reactor Operator

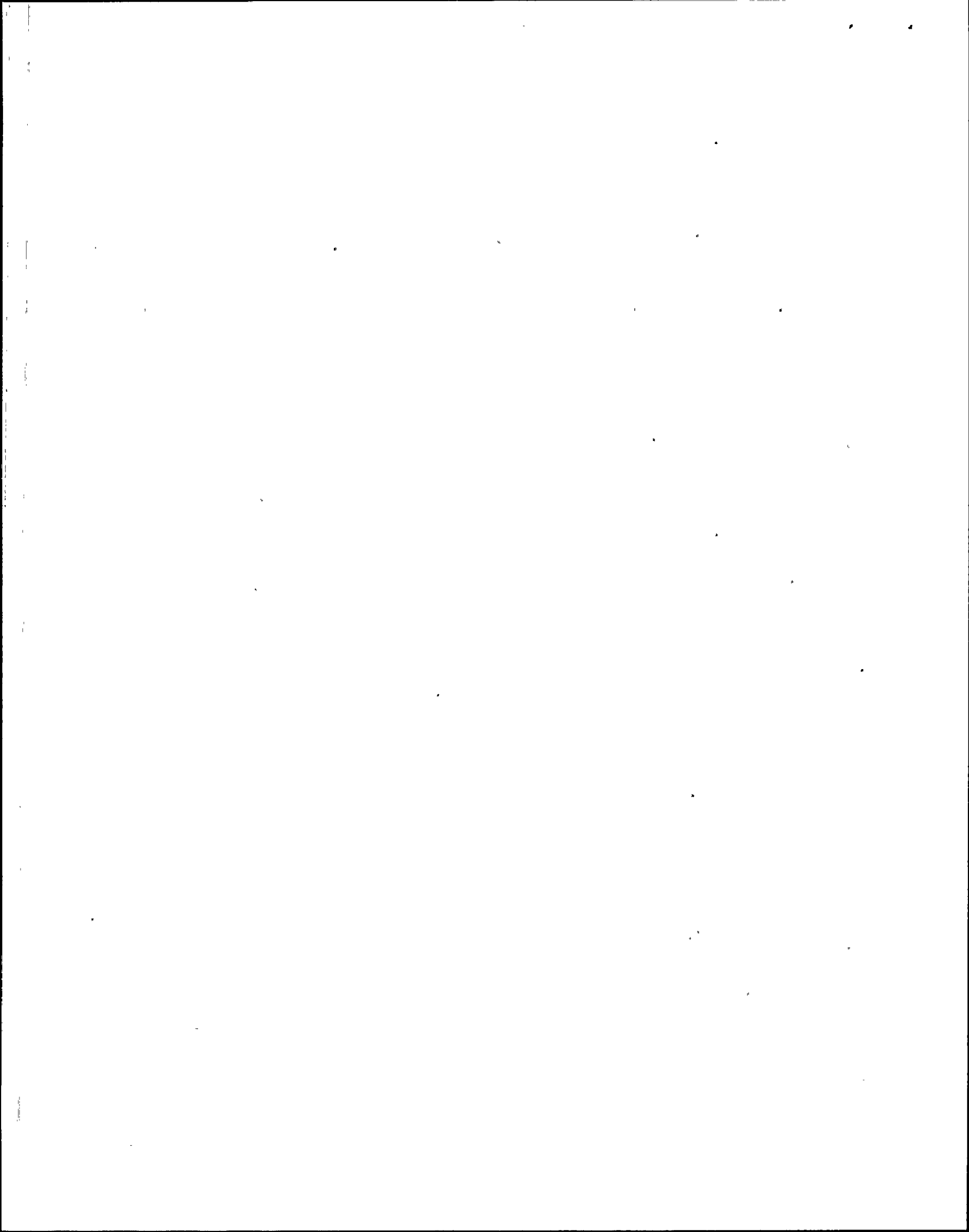
Question 002

Given the following plant conditions:

- Unit 3 is at 60% power performing a power ascension
- A Regulating Group 5 CEA, CEA #15, drops into the core

A power reduction to a MAXIMUM power level of _____ must be completed within _____ hour(s).

	<u>Power Level</u>	<u>Completed Time</u>
A.	40%	1 hour
B.	40%	2 hours
C.	55%	1 hour
D.	55%	2 hours



U.S.N.R.C. 1999 Site-Specific Written Examination
Palo Verde Nuclear Generating Station
Senior Reactor Operator

Question 003

Given the following plant conditions:

- Unit 2 is at 12% power
- A Regulating Group 5 CEA, CEA #14, is stuck at 104"
- Engineering has determined the CEA is NOT TRIPPABLE

Which one of the following is the basis contained in Condition 3.1.5.C, Control Element Assembly (CEA) Alignment, Required Action C.1, to be in Mode 3 within 6 hours?

- A. The reactor is in an unanalyzed condition.
- B. To limit fission energy input to less than 280 cal/gm.
- C. Core Monitor Computer (CMC) does not know CEA 14 position.
- D. Loss of Shutdown Margin and power distribution effects of the CEA.

U.S.N.R.C. 1999 Site-Specific Written Examination
Palo Verde Nuclear Generating Station
Senior Reactor Operator

Question 004

Unit 1 is in Mode 3 with Main Turbine shell warming in progress using 40OOP-9ZZ01, Cold Shutdown to Hot Standby.

A plant transient occurs resulting in the following plant conditions:

- SIAS, CIAS, and MSIS have actuated
- Tc 560°F
- Th 562°F
- RCS pressure 1250 psia
- RU 16 Alert and High level alarms

The CRS has implemented 40EP-9EO03, Loss of Coolant Accident.

Which one of the following is correct concerning the operation of the Reactor Coolant Pumps (RCPs)?

- A. All RCPs should be left in operation.
- B. Trip one RCP in each loop.
- C. Trip both RCPs in loop 2.
- D. Trip all RCPs.

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Palo Verde Nuclear Generating Station
Senior Reactor Operator

Question 005

Unit 2 trip due to a LOCA.

Which one of the following actions will enhance heat removal due to reflux boiling?

- A. Raising CET temperature's to $> 550^{\circ}\text{F}$.
- B. Raising Pressurizer level from 10% to 35%.
- C. Raising S/G level from 30% WR to 50% WR.
- D. Raising Pressurizer pressure from 750 psia to 850 psia.

U.S.N.R.C. 1999 Site-Specific Written Examination
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Question 006

Unit 2 is in Mode 1 at 100% power.

The following annunciator windows are in alarm:

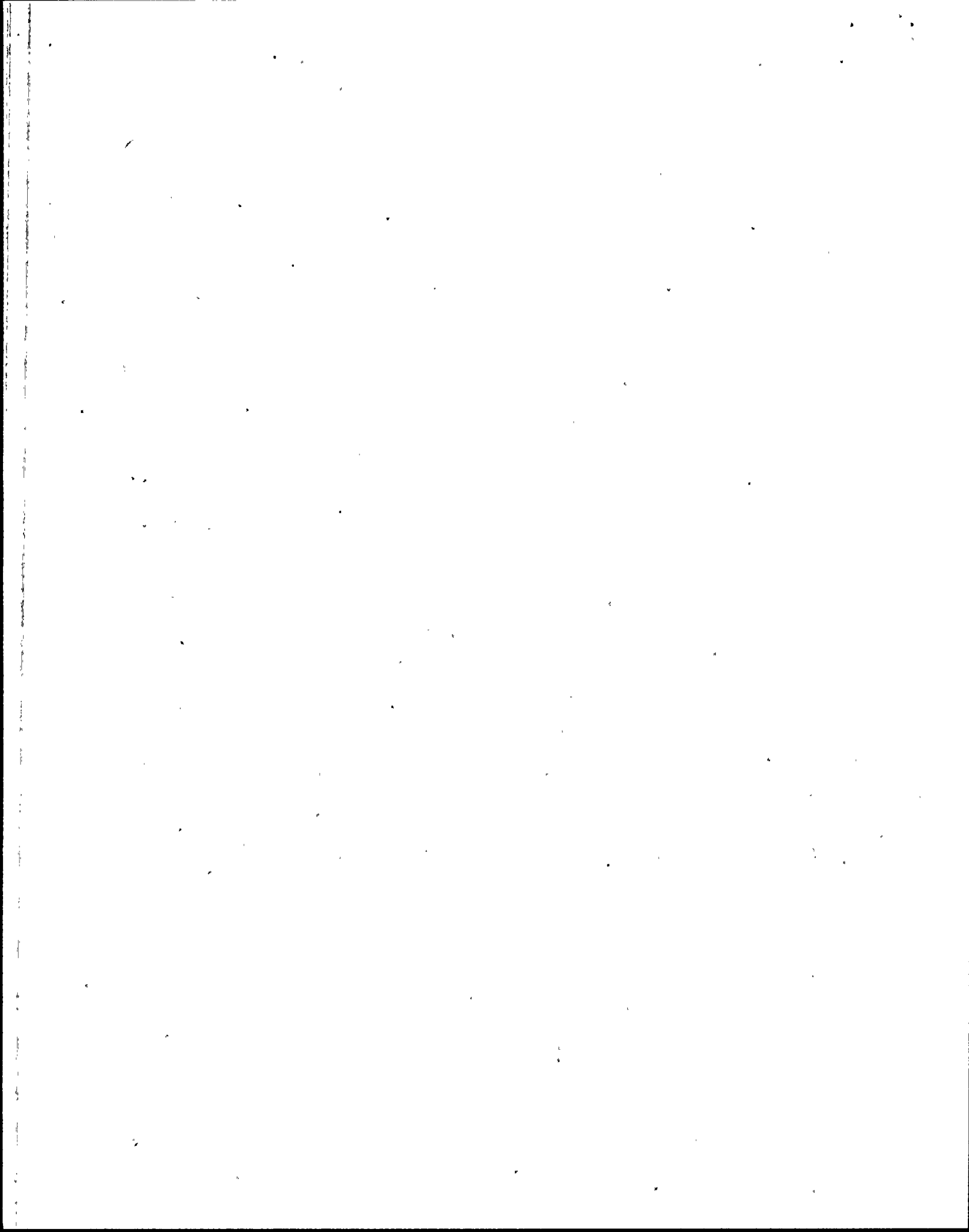
- 4A02A – RCP 1A TRBL
- 7B06B – Multipoint Recorders Above Setpoint

The PO has assessed and validated the following indicators and alarm points:

- RCN-TT-156, RCP 1A THRUST BRG TEMP 295°F and TRENDING UP
- PMS PT ID RCTS 156 THRUST BRG TEMP 297°F and TRENDING UP
- RMN-TJR-2 Point 10 RCP1A PUMP LOWER JOURNAL BEARING Temp 225°F and TRENDING UP

Which one of the following is correct regarding RCP operations?

- A. Trip the Reactor and Trip RCP 1A.
- B. Trip the Reactor and Trip all RCPs.
- C. Increase seal injection flow to RCP 1A.
- D. Note the temperature increase, place RCP 1A on increased monitoring frequency.



U.S.N.R.C. 1999 Site-Specific Written Examination
Palo Verde Nuclear Generating Station
Senior Reactor Operator

Question 007

Given the following plant conditions:

- Unit tripped 20 minutes ago due to a Loss of Offsite Power
- Pressurizer level is 44% and TRENDING UP
- Pressurizer pressure is 2150 psia and TRENDING UP
- Thot is 580°F and TRENDING UP
- Representative CET is 585°F and TRENDING UP
- Maximum quadrant CET is 600°F and TRENDING UP
- Tcold is 550°F and TRENDING UP
- S/G levels are 5% WR and TRENDING UP
- AFA-P01 is supplying Auxiliary Feedwater to each S/G at 300 gpm

Which one of the following indications shows that Natural Circulation does NOT exist by procedure?

- A. S/G levels must be > 10% WR.
- B. Temperatures are not lowering.
- C. Less than required Auxiliary Feedwater flow.
- D. Difference between Maximum Quadrant CET and Thot is too large.

U.S.N.R.C. 1999 Site-Specific Written Examination
Palo Verde Nuclear Generating Station
Senior Reactor Operator

Question 008

Given the following plant conditions:

- Emergency boration is required
- RWT level is 60%
- SFP level is 132 feet
- RWT boron is 4100 ppm
- RCS pressure is 2200 psia and STABLE

Which one of the following flowpaths is available for emergency boration?

- A. CHN-HV-536, RWT to Charging Pump Suction
- B. CHB-V-327, Charging Pump Alternate Suction
- C. CHN-V-164, Boric Acid Filter Bypass
- D. PCN-V-215 and CHN-V-144, Spent Fuel Pool to Charging Pump Suction

U.S.N.R.C. 1999 Site-Specific Written Examination
Palo Verde Nuclear Generating Station
Senior Reactor Operator

Question 009

Given the following plant conditions:

- Nuclear cooling water has been lost due to a pipe rupture
- Essential cooling water train 'A' has been cross-connected to supply priority loads

Which one of the following identifies a plant condition that will isolate essential cooling water to the RCPS?

- A. Containment pressure rises to 4.0 psig.
- B. Pressurizer pressure drops to 1900 psia.
- C. Instrument Air header pressure drops to 60 psig.
- D. Loss of power to the EW to NC Cross Connect Valves.

U.S.N.R.C. 1999 Site-Specific Written Examination
Palo Verde Nuclear Generating Station
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Question 010

Given the following plant conditions:

- An inadvertent MSIS has occurred
- Reactor trip circuit breakers have NOT opened
- Alarm 5A07A, SPS TRIP has actuated

Which one of the following describes how the Supplemental Protection System (SPS) mitigates this event?

- A. De-energizes 480V Buses L03 and L10.
- B. De-energizes PPS Initiation Logic relays.
- C. Opens CEDMCS MG set input BREAKERS.
- D. Opens CEDMCS MG set output CONTACTORS.

U.S.N.R.C. 1999 Site-Specific Written Examination
Palo Verde Nuclear Generating Station
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Question 011

Given the following plant conditions for Unit 1:

- Pre-Trips and Trips for DNBR and LPD are in for all four channels
- Manual trip buttons on control board B05 have been depressed
- Breaker for load center NGN-L10 will NOT open
- Unit 1 is operating at 101% power

Which one of the following identifies the required action(s) for reactivity control?

- A. Fast Close the Main Steam Isolation valves.
- B. Open NAN-S02F, feeder breaker to NGN-L04/L10/L12.
- C. Dispatch Area Operator to locally trip the Main Turbine.
- D. Dispatch Area Operator to locally open reactor trip circuit breakers and initiate boration.

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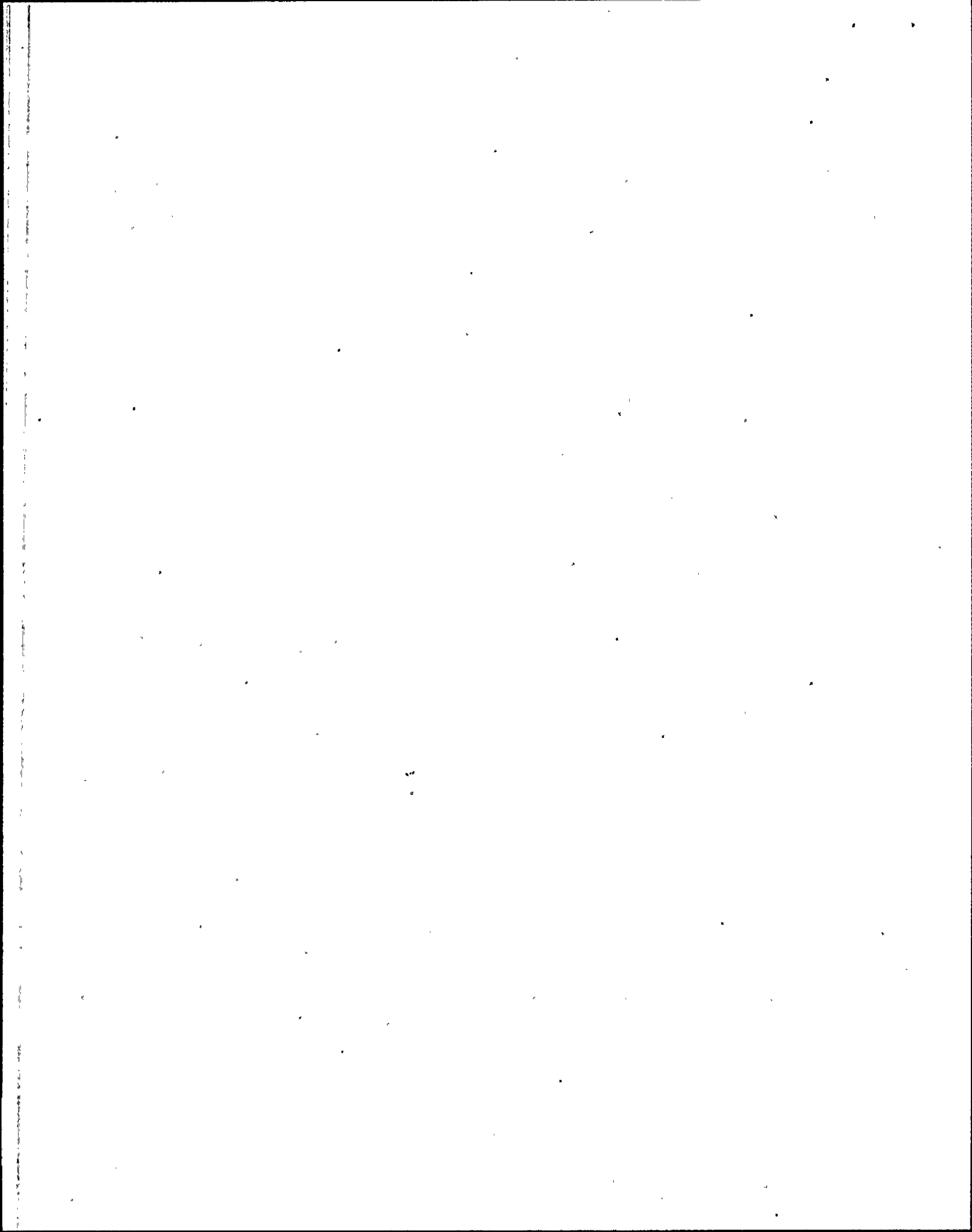
Question 012

Given the following plant conditions:

- Unit 2 tripped due to an ESD in the MSSS
- SIAS, CIAS, and MSIS have actuated
- 40EP-9EO05, Excessive Steam Demand is in progress
- S/G #1 pressure is 115 psia and TRENDING DOWN
- S/G #1 T-hot is 495°F and STABLE
- S/G #1 T-cold is 420°F and TRENDING UP
- S/G #2 pressure is 900 psia and TRENDING DOWN
- S/G #2 T-hot is 485°F and TRENDING DOWN
- S/G #2 T-cold is 472°F and TRENDING DOWN
- Pressurizer Pressure is 1800 psia and TRENDING UP
- Pressurizer Level is 25% and TRENDING UP

Which one of the following indicates the target pressure required to stabilize RCS temperature?

- A. 340 psia.
- B. 525 psia.
- C. 590 psia.
- D. 650 psia.



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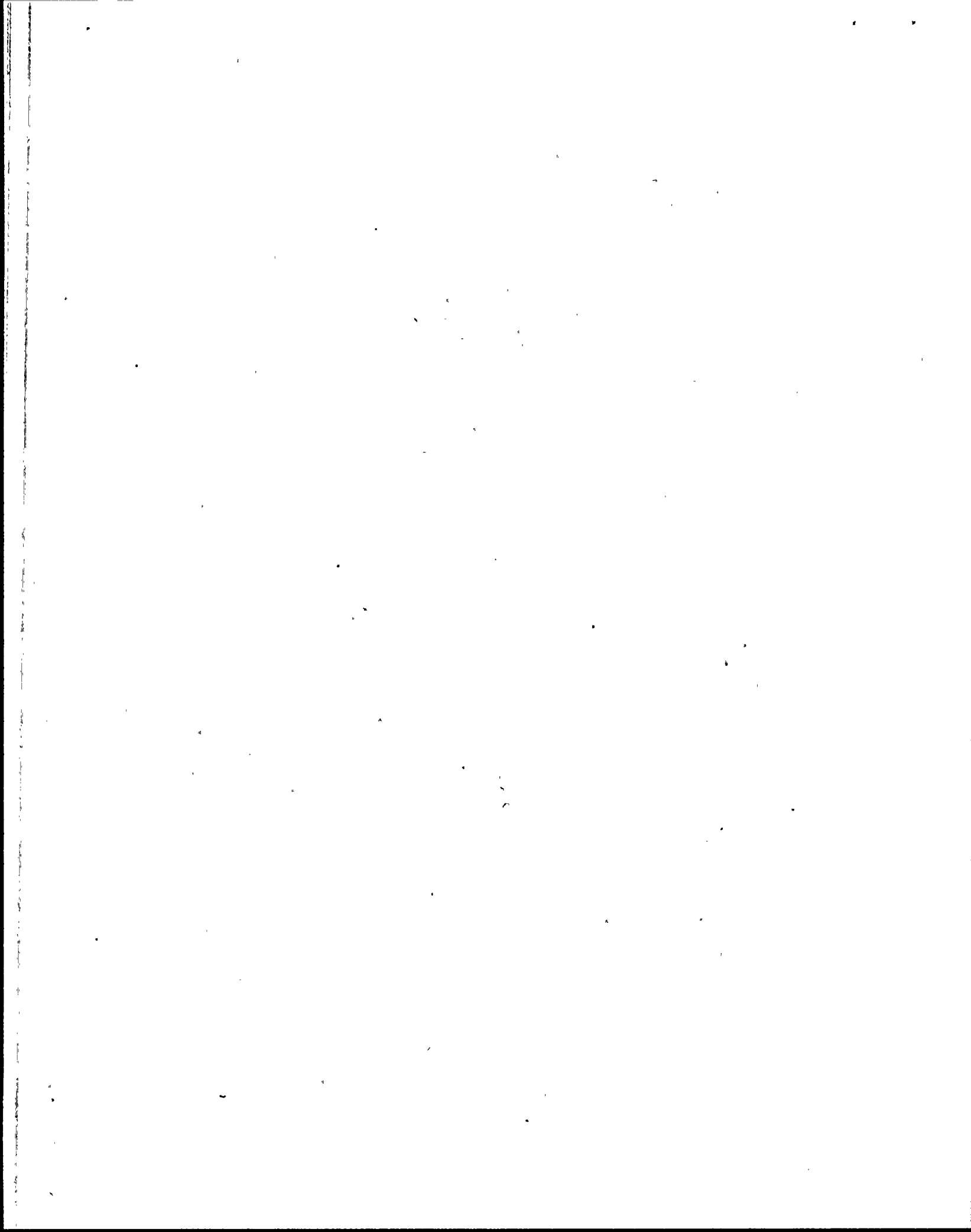
Question 013

Given the following plant conditions:

- Unit 2 has tripped, SPTA's in progress
- RCS temperature is 565°F and STABLE
- RCS Pressure is 2230 psia and STABLE
- S/G pressures are 1165 psia and STABLE, maintained by SBCS
- #1 S/G level is 45% WR and STABLE, feeding in RTO at 1325 gpm
- #2 S/G level is 65% WR and INCREASING, feeding in RTO at 1200 gpm
- Containment pressure is 1.1 psig and INCREASING
- Containment temperature is 95°F and INCREASING
- East and West Containment Radwaste Sump levels are INCREASING
- RU 1 not in alarm and indication is STABLE

Which one of the following describes the event in progress and the Optimal Recovery Procedure that will be used to mitigate the event?

- A. SGTR on #2 S/G - SGTR ORP
- B. LOCA on Loop 1 - LOCA ORP
- C. Economizer line break #1 S/G in the MSSS - ESD ORP
- D. Downcomer line break #1 S/G in containment - ESD ORP



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Question 014

Given the following plant conditions:

- Unit 3 tripped from 100% power
- ESD outside containment occurred on #1 SG
- 1A and 2A RCPs are running
- 40EP-9EO05, Excess Steam Demand, is in progress
- Crew has taken actions to stabilize Tcold
- S/G #2 Tcold is 417°F and STABLE
- S/G #2 Thot is 420°F and STABLE
- RCS pressure is 2000 psia and STABLE

Which one of the following describes required crew actions regarding P/T limits?

- A. Repressurize to 2250 psia.
- B. Depressurize to < 1750 psia.
- C. Cooldown to < 400 degrees.
- D. Heatup to > 450 degrees.

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Question 015

Given the following plant conditions:

- Unit 3 was operating at 100% power
- 'A' Shell Main Condenser Vacuum Breaker inadvertently opened
- The reactor was manually tripped on loss of Condenser Vacuum

Which one of the following describes the methods the Secondary Operator has available to maintain RCS heat removal?

	<u>Feed With</u>	<u>Steam With</u>
A.	Main Feed pumps	Steam Bypass Valves 1-6
B.	Auxiliary Feed pumps	Steam Bypass Valves 1-6
C.	Main Feed pumps	Atmospheric Dump Valves
D.	Auxiliary Feed pumps	Atmospheric Dump Valves

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Question 016

Given the following plant conditions:

- Unit 1 tripped due to a Loss of Offsite Power
- DG 'A' Tagged out of service for maintenance
- PBB-S04 has an 86 lockout with a 50G ground fault
- Damage to PBB-S04 has been reported to the Control Room

All Off-Site AC power will be de-energized for 3 hours.

The preferred EOP mitigation strategy for this event is:

- A. Crosstie the Unit 1 DG 'B' to PBA- S03.
- B. Energize NAN-S03 from the Unit 3 NAN-S06.
- C. Initiate a cooldown at $\leq 100^{\circ}\text{F/hr}$ to conserve inventory.
- D. Stabilize RCS temperature and pressure and pursue energizing PBA-S03 with a GTG.

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Question 017

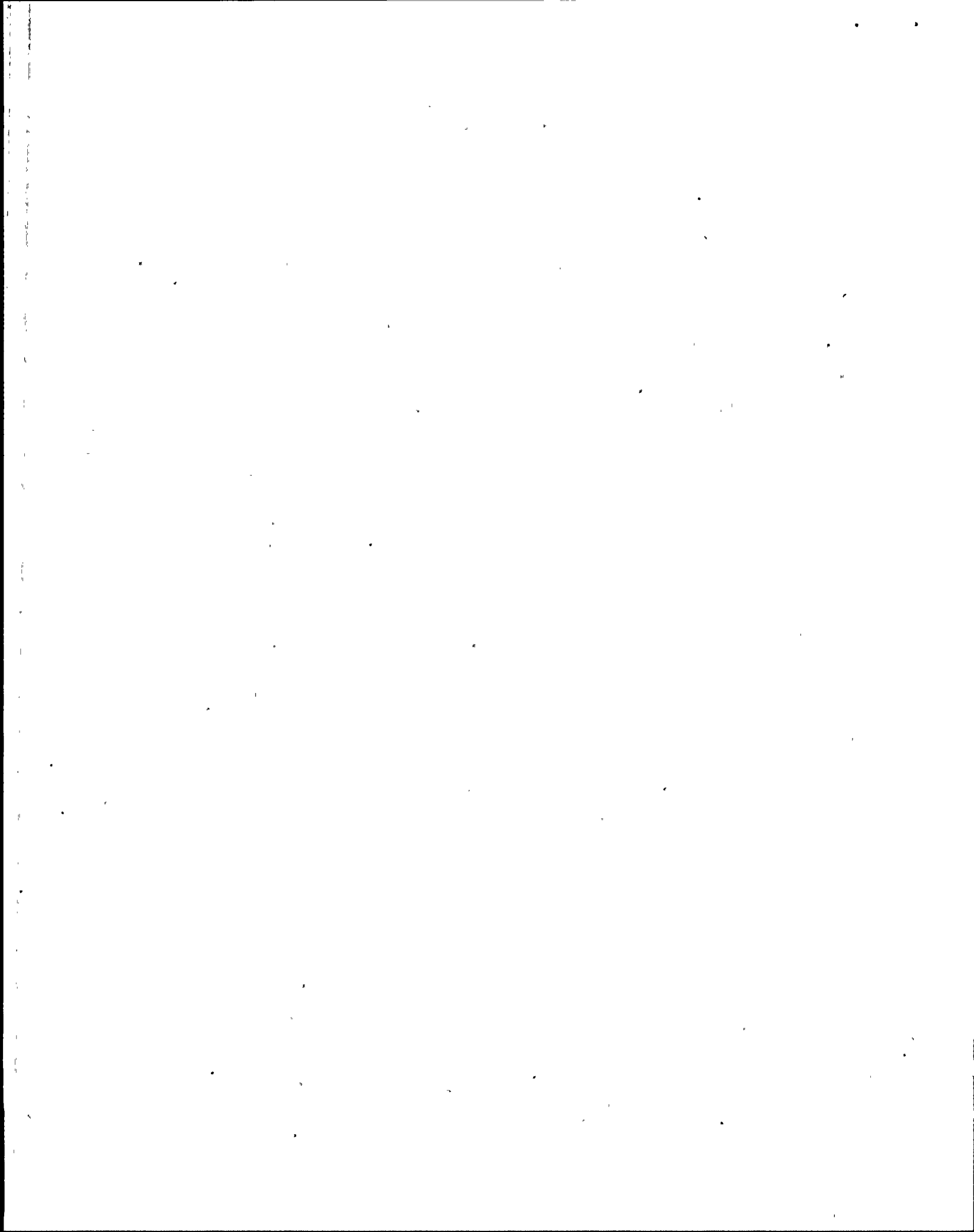
Given the following plant conditions:

- Unit 3 is at 100% power
- A loss of PNC-D27 occurs
- $\frac{3}{4}$ of all rod bottom lights are on
- $\frac{3}{4}$ of all UEL and LEL lights are on

Which one of the following statements is correct regarding CEA movement?

CEA movement is allowed in _____

- A. Manual group.
- B. Manual Sequential.
- C. Manual Individual.
- D. No CEA motion is possible.



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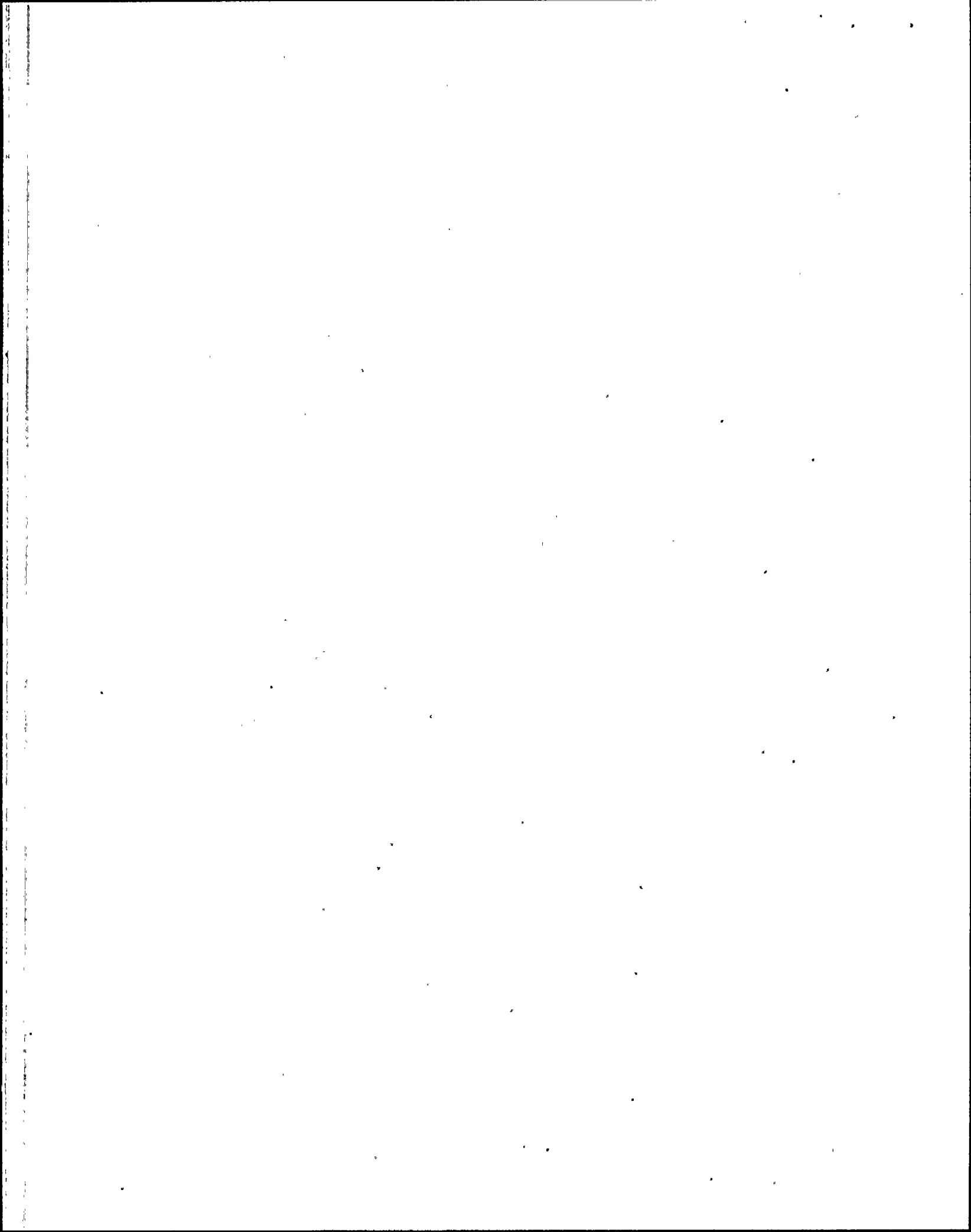
Question 018

Given the following plant conditions:

- Unit 3 has tripped due to a Loss of Coolant Accident
- Containment Pressure is 15 psig and INCREASING
- RCS Pressure is 1100 psia and DECREASING
- SIAS, CIAS, MSIS, and CSAS have actuated
- 'B' Spray Pond pump breaker did NOT close

Which one of the following describes the MAXIMUM time allowed to close the 'B' Spray Pond pump breaker for plant equipment protection?

	<u>Time Frame</u>	<u>Plant Equipment</u>
A.	2.6 minutes	'B' D/G
B.	10 minutes	1B RCP
C.	15 minutes	'B' D/G
D.	40 minutes	'B' CEDM AHU



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Question 019

Unit 2 is at 75% power. At 0855 the following alarms were received due to a loss of both NC pumps:

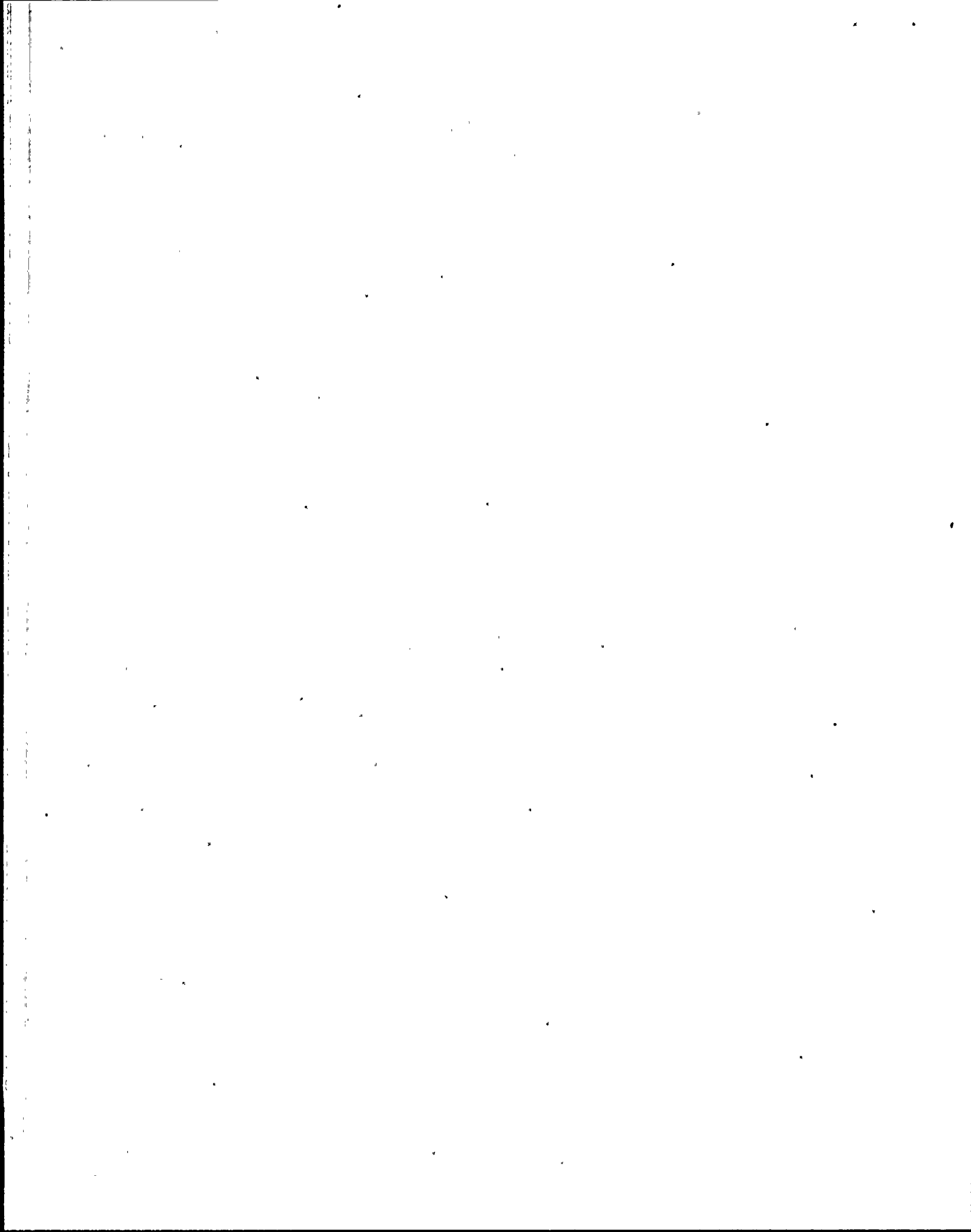
- 4D01A through D – RCP LO NC FLOW
- 4E01A through D – RCP LO NC FLOW
- 7A07A – NC CLG WTR SYS TBL
- 7A07B – NCWS PUMPS DSCH HDR PRESS HI-LO

At 0858 the CRS directs the Primary Operator to cross-connect 'A' EW to NC per 40AO-9ZZ03, Loss of Cooling Water.

At 0903 the Primary Operator and CRS determine that EWA-UV-145, Cross-Tie Valve to Nuclear Cooling Water, CANNOT be opened from the Control Room.

Which one of the following actions should the CRS direct?

- A. Trip the reactor and initiate a plant cooldown by 0905.
- B. Trip the reactor, stop the RCPs, and isolate seal bleedoff by 0905.
- C. Direct cross-connecting 'B' EW to NC and ensure it is completed by 0915.
- D. Direct an Area Operator to locally open EWA-UV-145 and ensure 'A' EW is cross-connected to NC by 0915.



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Question 020

Given the following plant conditions:

- Fire verified on 1E-QAN-D09C, Normal Lighting Panel, 140' Control Building.

Which one of the following is the preferred method of extinguishing the fire?

- A. CO₂
- B. Foam
- C. Water
- D. Dry Powder

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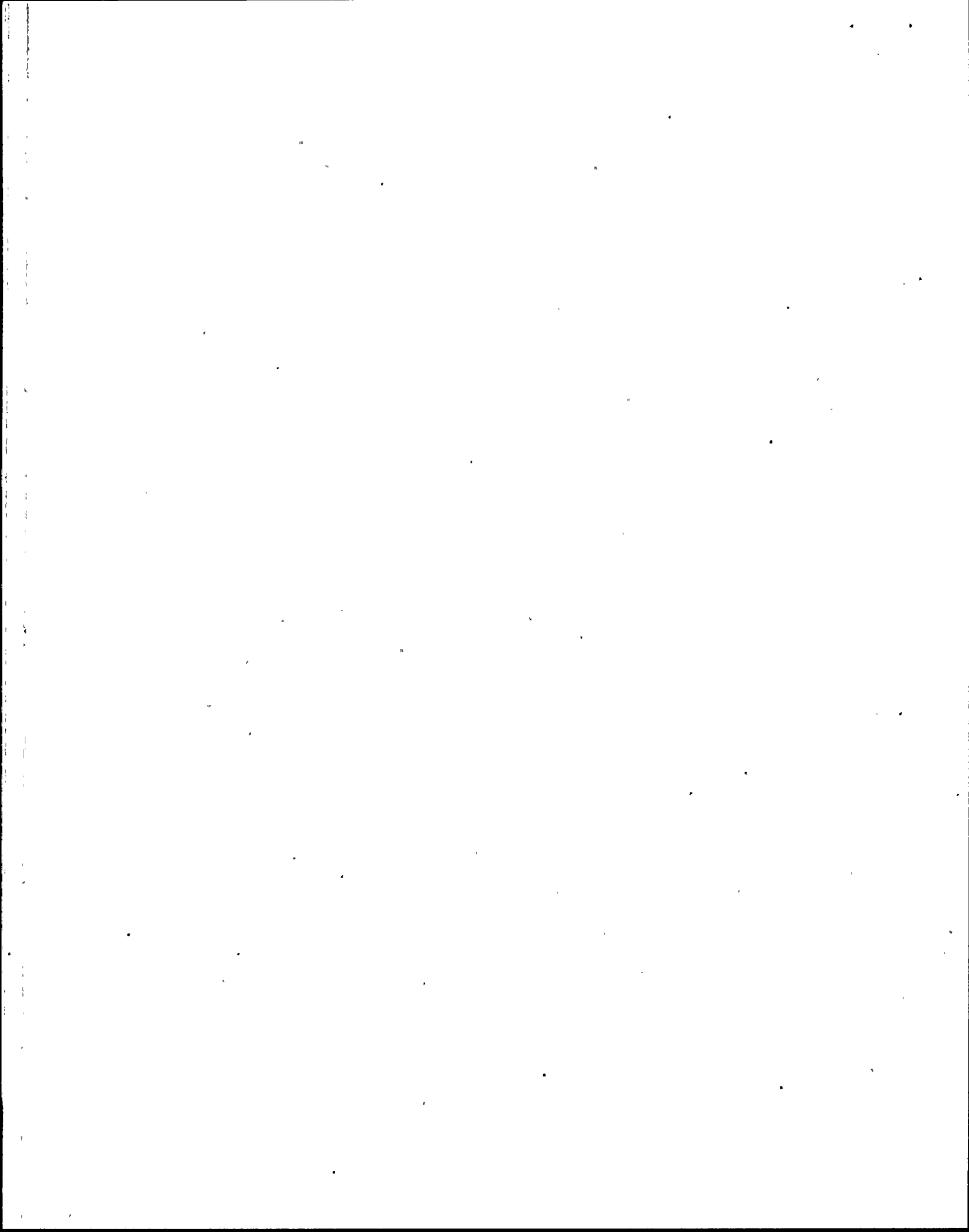
Question 021

The crew has just established control at the Remote Shutdown Panel (RSP) due to a fire in the Control Room.

S/G pressures are 1190 psig and TRENDING UP.

Which of the following describes how S/G pressure control is established from the RSP?

- A. Place Steam Bypass Control Valves 1007 and 1008 in LOCAL-AUTO and initially set at 30% demand.
- B. Place Steam Bypass Control Valves 1007 and 1008 in LOCAL-AUTO and initially set at 50% demand.
- C. For ADVs SGB-HV-178 and SGB-HV-185 select REMOTE on the controllers, then adjust demand as required.
- D. For ADVs SGB-HV-178 and SGB-HV-185 press LOCAL on the controllers, place ADV permissive switches to "OPEN PERM", and adjust to 30% demand.



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Question 022

Given the following plant conditions:

- Control room has been evacuated due to fire
- CRS has directed a plant cooldown from the Remote Shutdown Panel
- RCS temperature is being maintained at 335°F.

Which one of the following describes the reason for maintaining this RCS temperature for 50 hours?

- A. Allows for CRUD cleanup of RCS.
- B. Allows the reactor vessel head to cool.
- C. Allows for boration, RCS mixing, and sampling.
- D. Allows enough time to isolate SITs prior to depressurizing the RCS.

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Question 023

Given the following plant conditions:

- LOCA has occurred in Unit 2
- RCS pressure indicates 210 psia and INCREASING slowly
- Loop 1 Thot indicates 385°F and INCREASING slowly
- Loop 2 Thot indicates 361°F and INCREASING slowly
- Loop1A and 1B Tcold indicates 310°F and STABLE
- Loop 2A and 2B Tcold indicates 312°F and STABLE
- Core Exit Thermocouples indicates 411°F and INCREASING slowly

Based on these conditions, which one of the following represents the fluid condition of the primary system?

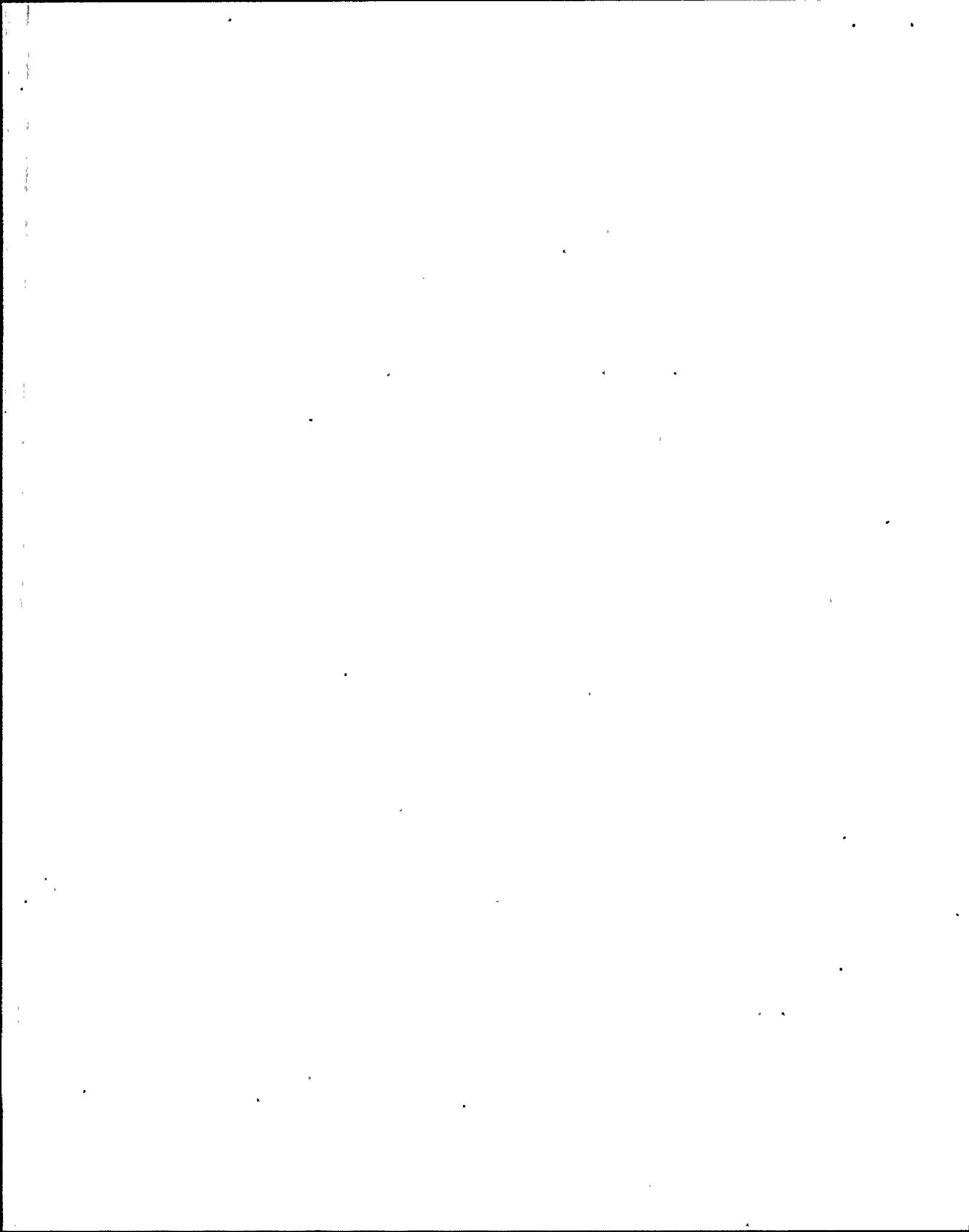
- A. 25°F superheat.
- B. Saturated.
- C. 25°F subcooled.
- D. 75°F subcooled.

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Question 024

Which one of the following is the basis for reducing RCS Tcold to $< 500^{\circ}\text{F}$ if RCS activity limits are exceeded?

- A. Minimize the fuel damage that occurred.
- B. Prevent Iodine spiking phenomenon that occurs at Normal Operating Temperatures.
- C. Lower the saturation pressure of the reactor coolant below the lift setpoint of the main steam safety valves.
- D. Increases accuracy of chemistry samples allowing a more accurate determination of fuel damage.



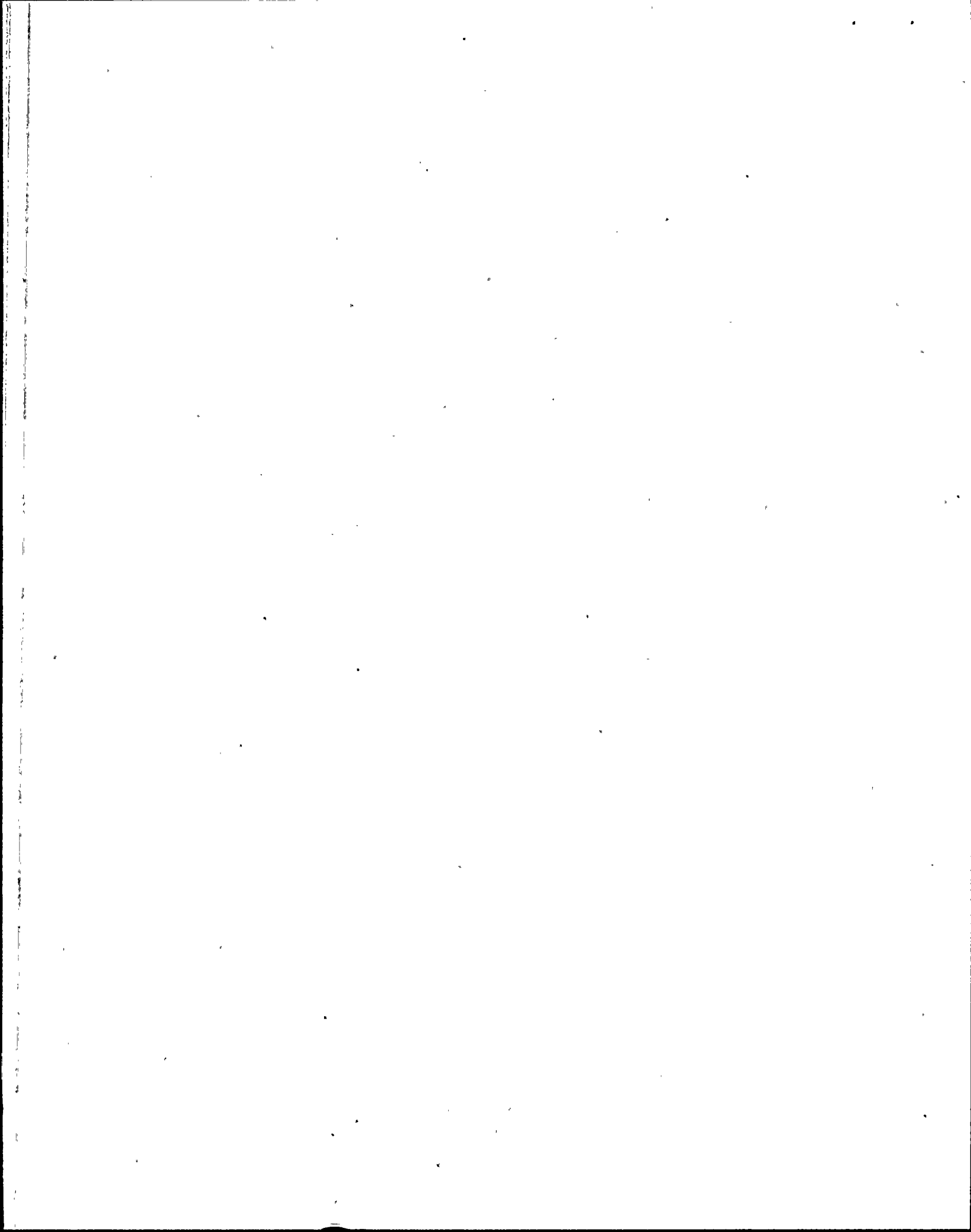
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Question 025

A reactor trip has occurred from 100% power in unit 3. While performing the SPTAs the RO observes that the Main Turbine has not tripped.

Which one of the following may be performed to trip the Main Turbine?

- A. Stop the EHC pumps.
- B. Deenergize excitation.
- C. Reduce load limit pot to zero.
- D. Open Generator output breakers.



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Question 026

Given the following plant conditions:

- Unit 1 tripped due to an ESD on #1 S/G
- SIAS, CIAS, and MSIS have actuated
- SPTAs are in progress

Which one of the following describes what minimum feed flow rate the Secondary Operator must establish and why?

<u>Feed Rate</u>	<u>Why</u>
A. 500 gpm to #2 S/G	Maintain adequate Secondary Heat Removal
B. 500 gpm to #2 S/G	Prevent water hammer in the feed ring
C. 500 gpm to both S/Gs	Maintain adequate Secondary Heat Removal
D. 500 gpm to both S/Gs	Prevent water hammer in the feed rings

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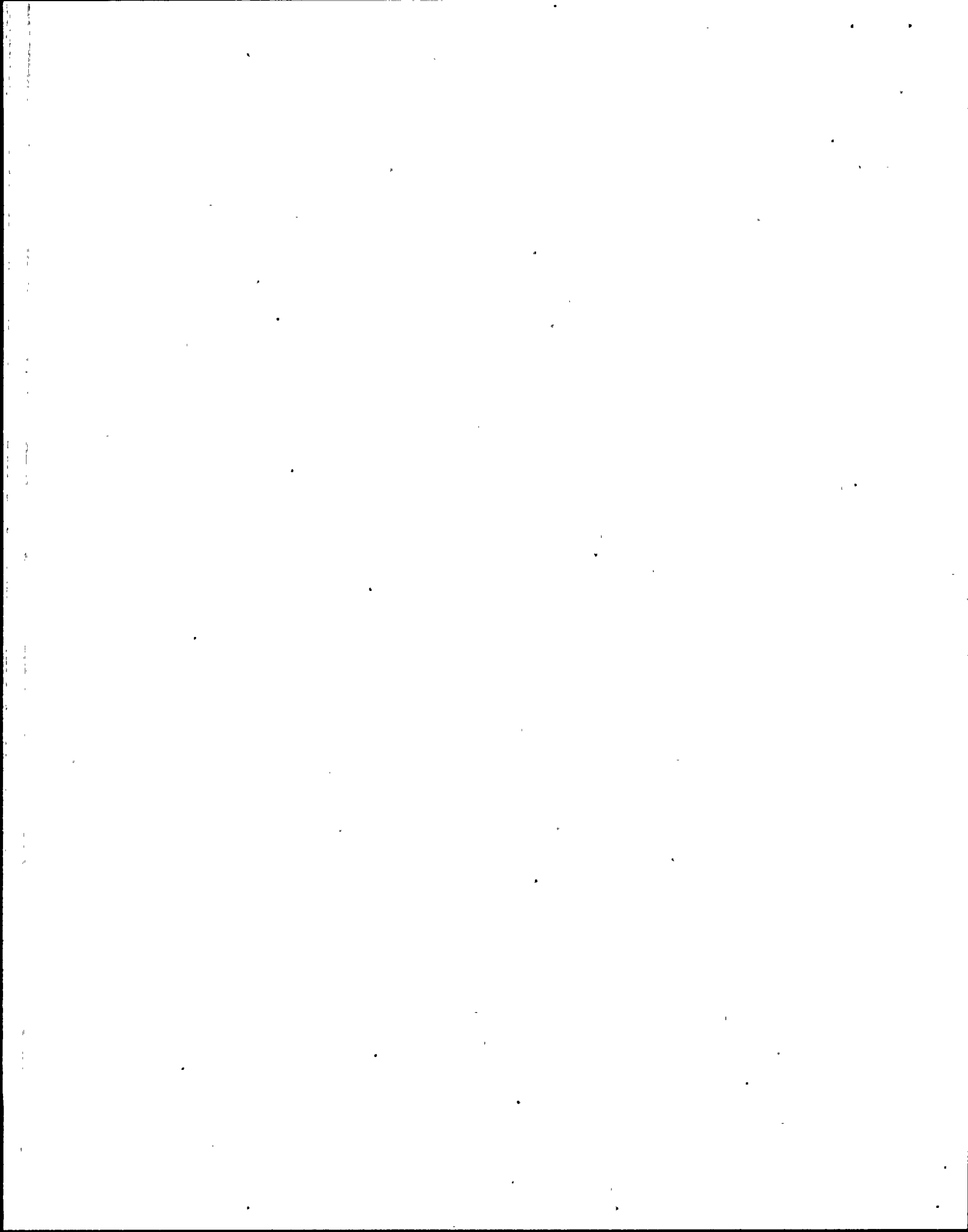
Question 027

Given the following plant conditions:

- Unit 2 reactor has tripped
- SIAS, CIAS, and MSIS have actuated
- A pressurizer code safety has lifted
- Pressurizer level indicates 100%
- Pressurizer pressure is 1620 psia and STABLE
- High pressure safety injection flow indicates 120 gpm per loop (adequate flow) and STABLE

Which one of the following indications is expected if the Pressurizer code safety reseated?

- A. HPSI flow will increase.
- B. RCS pressure will increase.
- C. Pressurizer level will decrease.
- D. Reactor vessel upper head level will decrease.



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Question 028

Given the following plant conditions:

- Unit 1 tripped due to a loss of offsite power
- A LOCA developed on Loop 1 Hot Leg
- 40EP-9EO03, Loss of Coolant Accident, is in progress

While checking parameters, the PO reports the following values:

- RCS Tc 515°F
- RCS Th 540°F
- Rep CET 544°F
- RCS Pressure 1000 psia
- Pressurizer level 55% and increasing slowly
- HPSI has been throttled fully

Based on the current plant conditions, which one of the following actions is required?

- A. Restore letdown.
- B. Restore full HPSI flow.
- C. Cooldown primary to maintain pressurizer level 33-53%.
- D. No additional action required, maintain pressurizer level 30-70%.

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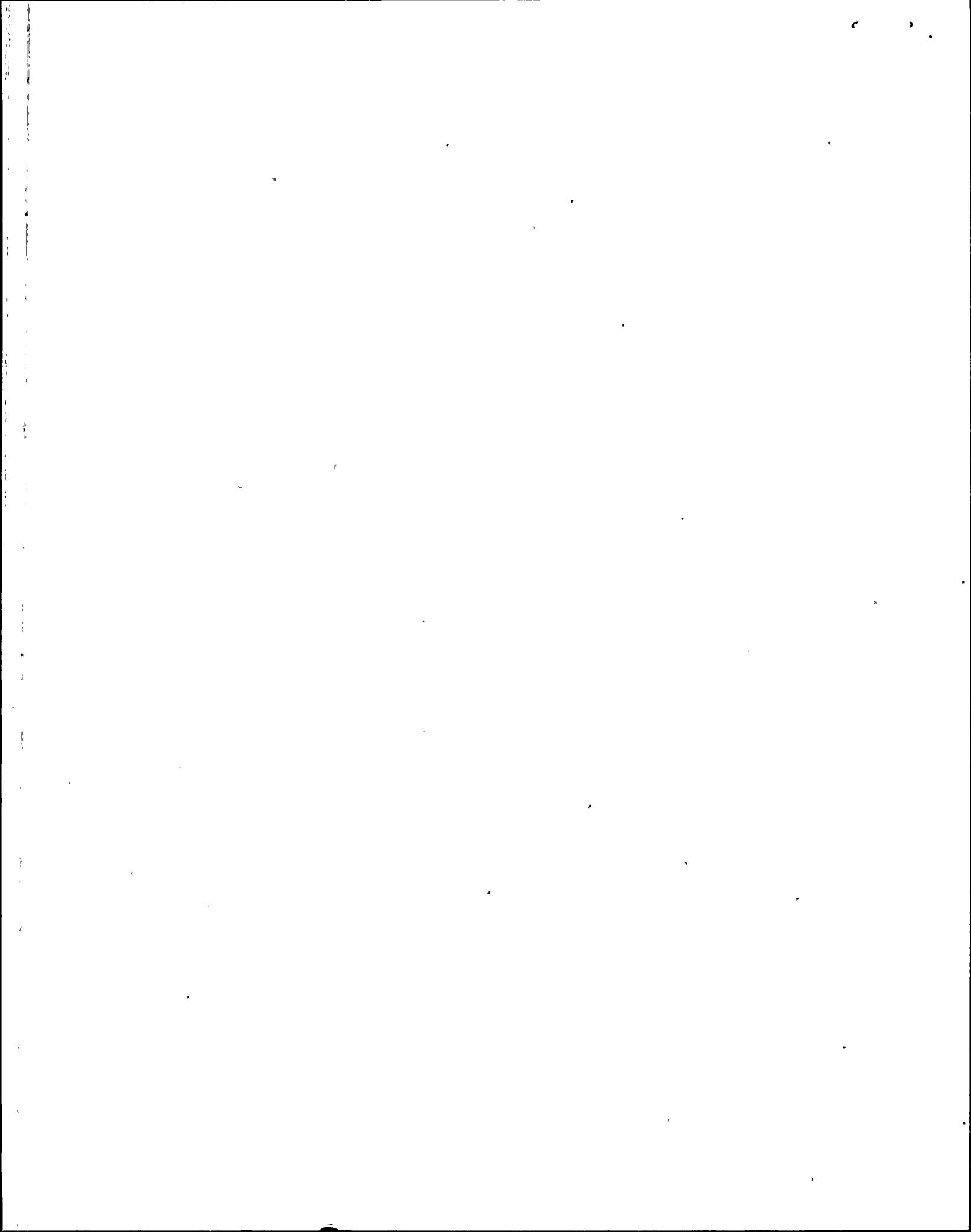
Question 029

Given the following plant conditions

- Unit 1 has lost letdown capability
- Charging has been secured per 40AO-9ZZ05, Loss Of Letdown, Appendix C, Extended Operations Without Letdown
- Power is 100% and stable
- Pressurizer level is 66% and slowly lowering
- Current RCP seal bleedoff is 3 gpm per pump
- L.C.O. 3.4.9, Pressurizer level Action A.1, has been entered

Determine from the following the minimum time when pressurizer level will be within Technical Specifications limits.

- A. 15-25 minutes
- B. 35-45 minutes
- C. 55-65 minutes
- D. 75-85 minutes



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Question 030

Given the following plant conditions:

- Unit 3 is in Mode 5
- RCS Temp is 118°F
- Pressurizer manway is off
- SDC Train 'A' is under clearance and drained
- Pressurizer level is off scale low due to SI-PSV-189, 'B' Train LTOP, failing open

The Crew has implemented 40EP-9EO11, Lower Mode Functional Recovery (LMEOP) to mitigate the event.

Which one of the following Heat Removal success paths should be implemented?

- A. HR-1 Forced Circulation
- B. HR-2 Shutdown Cooling
- C. HR-3 Natural Circulation
- D. HR-4 SI once through cooling

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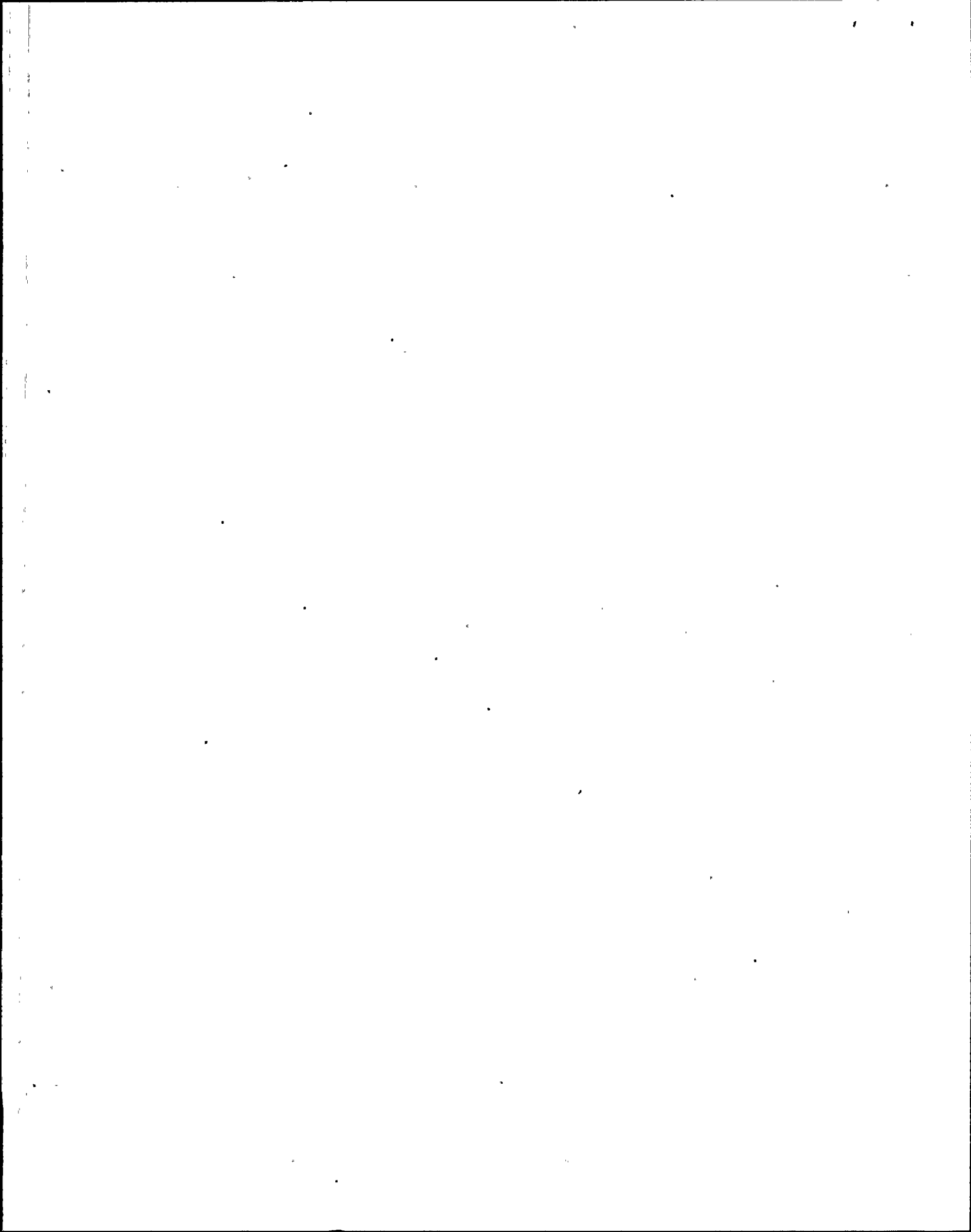
Question 031

Given the following conditions:

Unit 1 is in MODE 3 when pressurizer pressure exceeds 2750 psia.

Which of the following correctly describes the ACTION that must be taken?

- A. Restore compliance within 5 minutes and notify the NRC within 1 hour.
- B. Restore compliance within 1 hour and notify the NRC within 1 hour.
- C. Restore compliance within 5 minutes and notify the NRC within 4 hours.
- D. Restore compliance within 1 hour and notify the NRC within 4 hours.



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Question 032

Given the following plant conditions:

- Unit 2 was shutdown for a Refueling Outage @ 0000
- 40EP-9EO02, Reactor Trip has been implemented

When must BDAS be confirmed OPERABLE?

- A. 0030
- B. 0100
- C. 0200
- D. 0400

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Question 033

Given the following plant conditions:

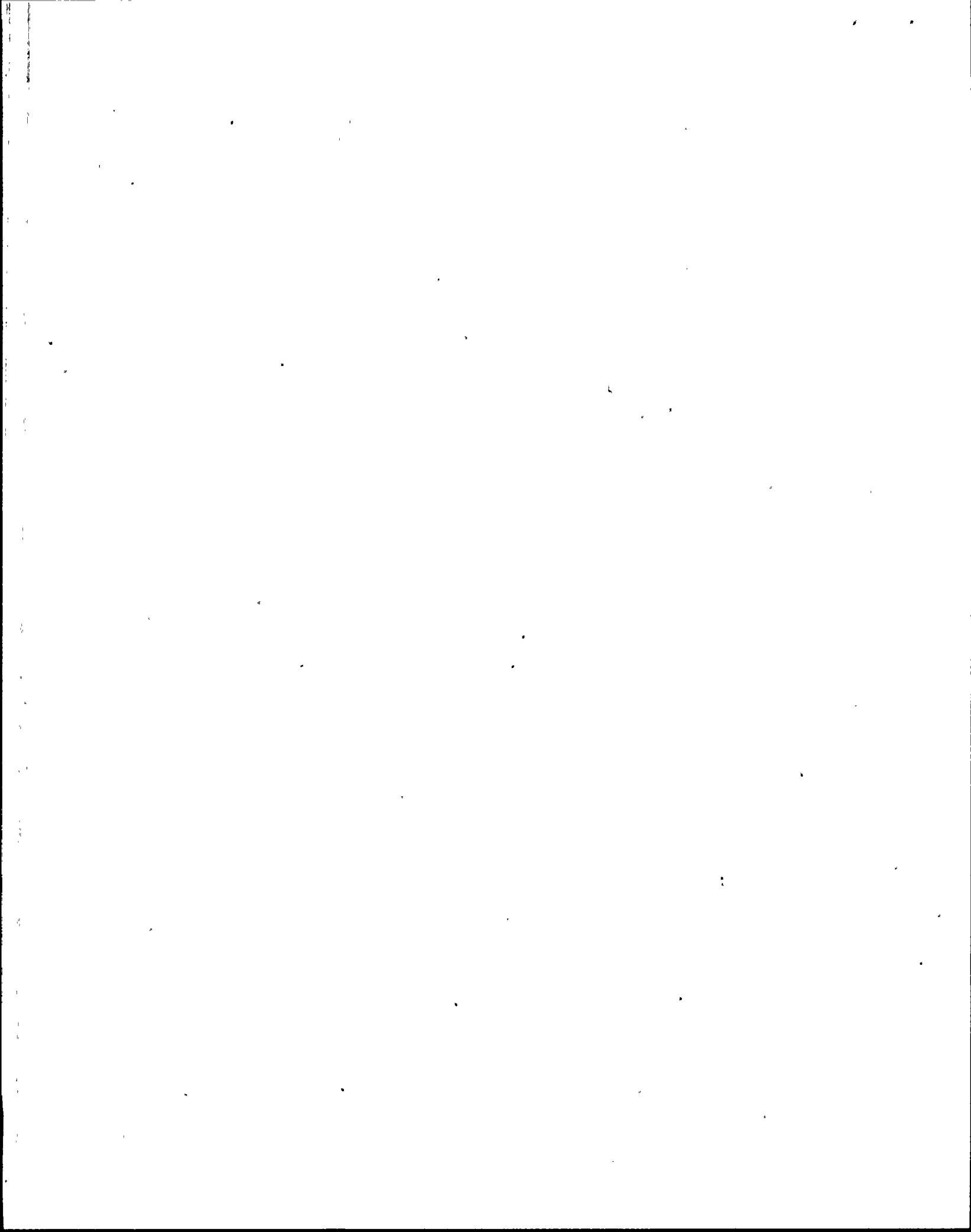
- Unit 2 is at 78% power, end of life
- Primary to secondary leakage is 1.4 gallons per day
- Down power is in progress in preparation for a refueling outage

The following radiation monitors alarms and readings are noted:

<u>Monitor</u>	<u>Reading</u>	<u>Alarm Status</u>
• RU-142A	9.1 E + 3 cpm	High
• RU-142B	1.19 E + 3 cpm	High
• RU-142C	7.08 E + 2 cpm	High
• RU-142D	4.35 E + 2 cpm	High
• RU-139	1.82 E + 0 mr/hr	Alert
• RU-140	1.5 E + 0 mr/hr	None

Which one of the following would explain these readings and alarms?

- A. Steam generator tube leak #1 S/G.
- B. Steam generator tube leak #2 S/G.
- C. Steam generator tube leak on both S/Gs.
- D. Iodine spike in the RCS due to the power transient.



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Question 034

Post SPTAs, the CRS diagnoses a SGTR in #2 S/G and entered 40EP-9EO04, Steam Generator Tube Rupture.

Based on the following conditions:

- RCS Thot is 567°F
- S/G 1 50% WR with 400 gpm AFW flow
- S/G 1 1180 psia
- S/G 2 20% NR with 100 gpm AFW flow
- S/G 2 1180 psia

Which one of the following describes the event mitigation priority?

- A. Cooldown to Thot \leq 550°F, then isolate S/G 2.
- B. Isolate S/G 2 now, then feed S/G 1 at \geq 500 gpm.
- C. Stop feeding S/G 2 now, then cooldown to Thot $<$ 550°F.
- D. Feed both S/Gs at \geq 250 gpm until both NR levels are $>$ 40%.

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Question 035

Given the following plant conditions:

- Unit 2 tripped due to a 500 gpm SGTR on #1 S/G
- 1A & 2A RCPs are running
- 'B' HPSI pump is under clearance for maintenance

The CRS has implemented 40EP-9EO04 SGTR. #1 S/G has been isolated. In preparation for depressurization of the RCS, the following parameters are noted:

- Loop 1 Thot 543°F
- Loop 1 Tcold 541°F
- S/G 1 Press 1050 psia
- Loop 2 Thot 543°F
- Loop 2 Tcold 538°F
- S/G 2 press 950 psia
- RCS pressure 1550 psia

Which one of the following is the minimum range of pressure the RCS can be depressurized to at this point in time?

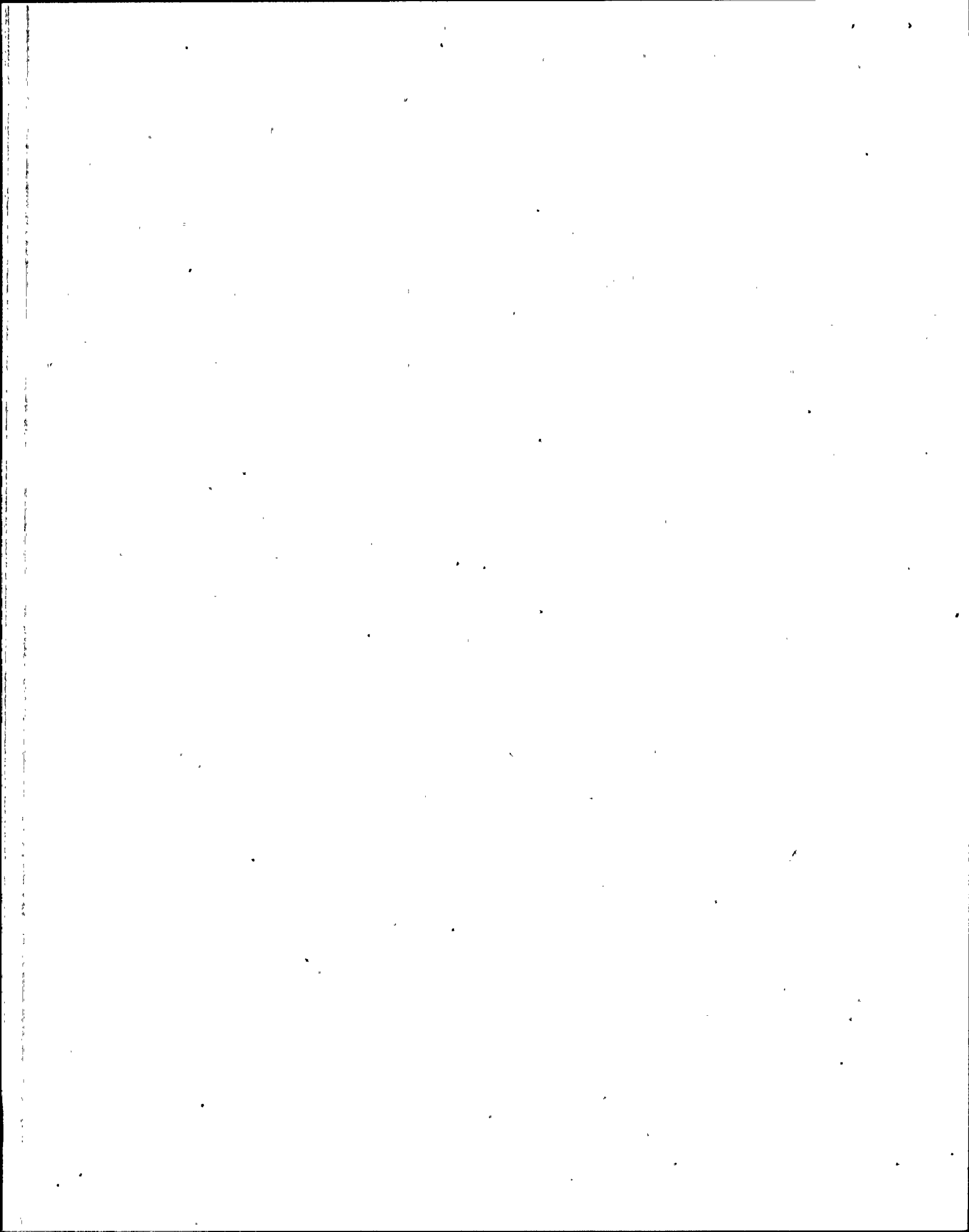
- A. 950-1050 psia
- B. 1050-1150 psia
- C. 1150-1250 psia
- D. 1250-1350 psia

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Question 036

Which one of the following describes the reason for stopping all Reactor Coolant Pumps (RCPs) during a Loss of All Feedwater event?

- A. Reduces the heat load to be removed by the S/Gs.
- B. Prevents primary system depressurization through the main spray valves.
- C. Enhances plant recovery by allowing slow changes in primary system parameters.
- D. Reduces the RCS mass loss to the S/Gs if tubes break upon initiation of feedwater.



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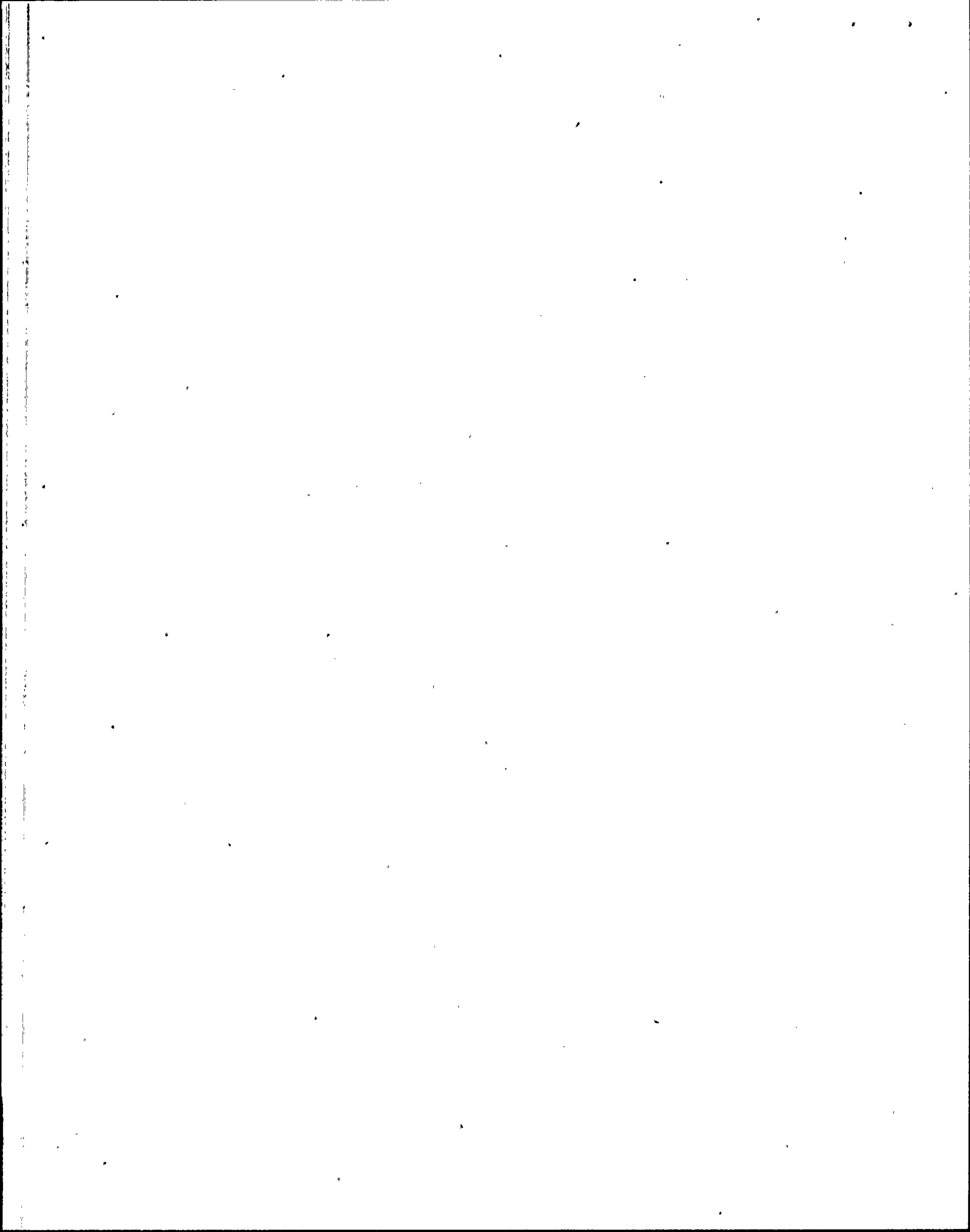
Question 037

Given the following plant conditions:

- Unit 1 is at 100% power
- Non-class 125 VDC bus NKN-M45 deenergized due to a bus fault
- The Reactor and Main Turbine have been tripped
- Main Generator output breakers were manually opened
- SPTA's are in progress with no further operator action

Which one of the following describes the status of major electrical system buses in this event?

- A. All class and non-class buses, 4 KV and above, are deenergized.
- B. All class and non-class buses, 4 KV and above, are energized from off-site power.
- C. 4 KV class buses are energized from off-site power, non-class buses 4 KV and above are deenergized.
- D. 4 KV class buses are energized from their respective DG's, non-class buses 4 KV and above are deenergized.



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Question 038

Given the following plant conditions:

- RU-7 Auxiliary Steam Condensate Receiver Tank radiation monitor is in HIGH alarm.

Which one of the following describes the effect of this alarm condition?

Auxiliary Steam condensate shifts to the _____.

- A. Main condenser
- B. Liquid Radwaste TDS tank
- C. Chemical Waste Drain Tank
- D. Chemical Waste Neutralizer Tank

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Question 039

Unit 3 is in a refueling outage with the following plant conditions:

- The Refueling Pool level is 116 feet
- The fuel transfer tube isolated with the isolation flange installed.
- The fuel transfer canal is drained with the gate installed.
- Spent Fuel Pool level is 137 Feet

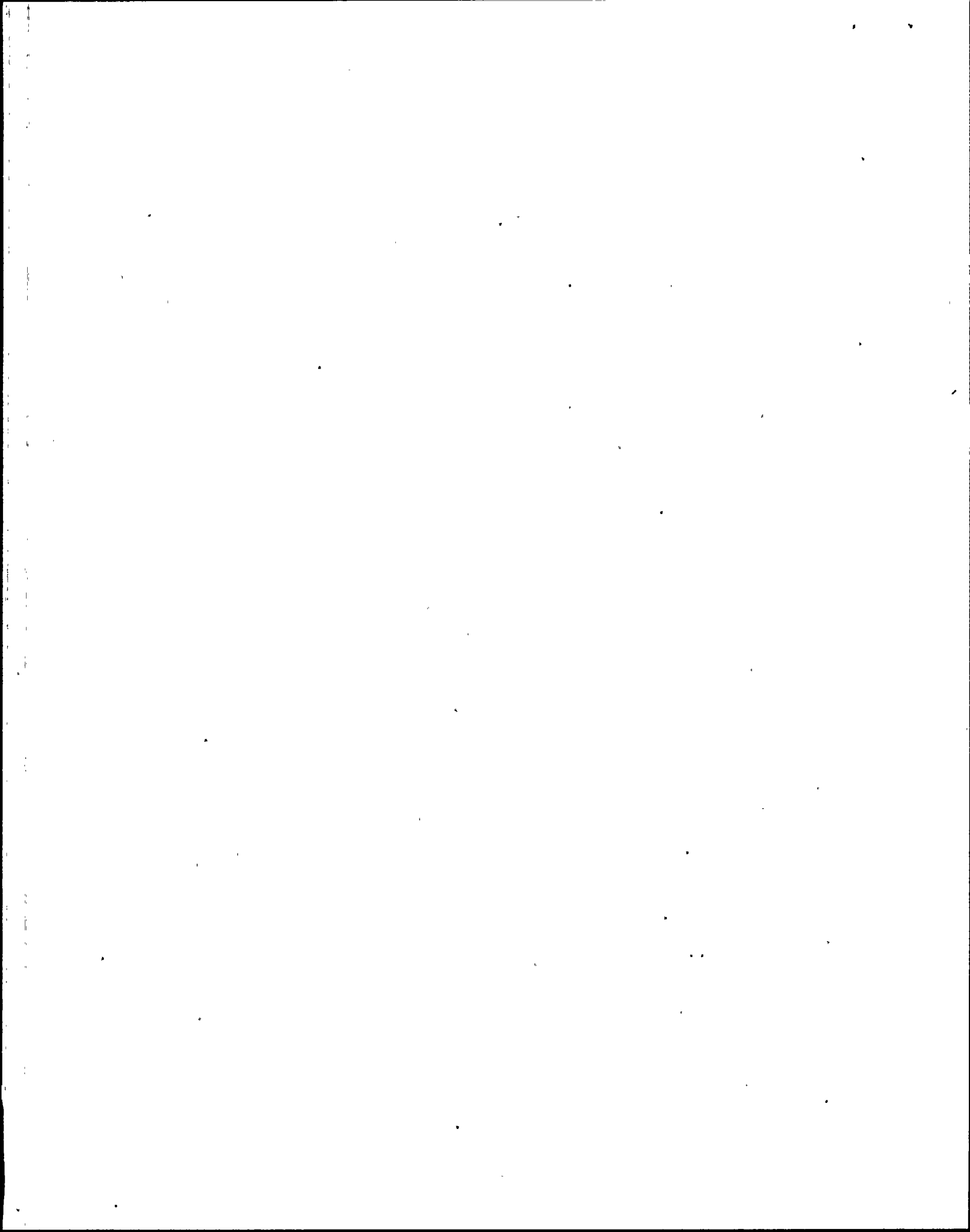
A tagout was issued which isolated instrument air to the Fuel building.

Subsequently the following alarms were received in the Control Room.

- Alarm Window 7B08A, FP GATE SEAL A/S PRESS HI/LO, is in alarm
- PMS PT ID IAPS216, FP GATE SEAL A/S PRESS HI/LO, is in alarm

Assuming no operator action, determine the impact on the unit.

- A. The spent fuel pool equalizes with the refueling pool.
- B. The refueling pool drains to the fuel transfer canal.
- C. The spent fuel pool drains to the fuel transfer canal.
- D. Back-up N₂ bottles automatically align to maintain gate seal.



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Question 040

Given the following conditions:

- Unit 3 tripped from 100% power
- S/G #2 safety valve sticks open and remains open
- AFA-P01 out of service
- Off-Site power is lost
- PBB-S04 has an electrical fault and cannot be energized
- SIAS, CIAS and MSIS have actuated
- The crew enters the Functional Recovery Procedure and is evaluating safety functions

Which one of the following correctly identifies all the jeopardized safety functions for this event?

- A. HR
- B. MVAC
- C. HR and CI
- D. MVAC and HR

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Question 041

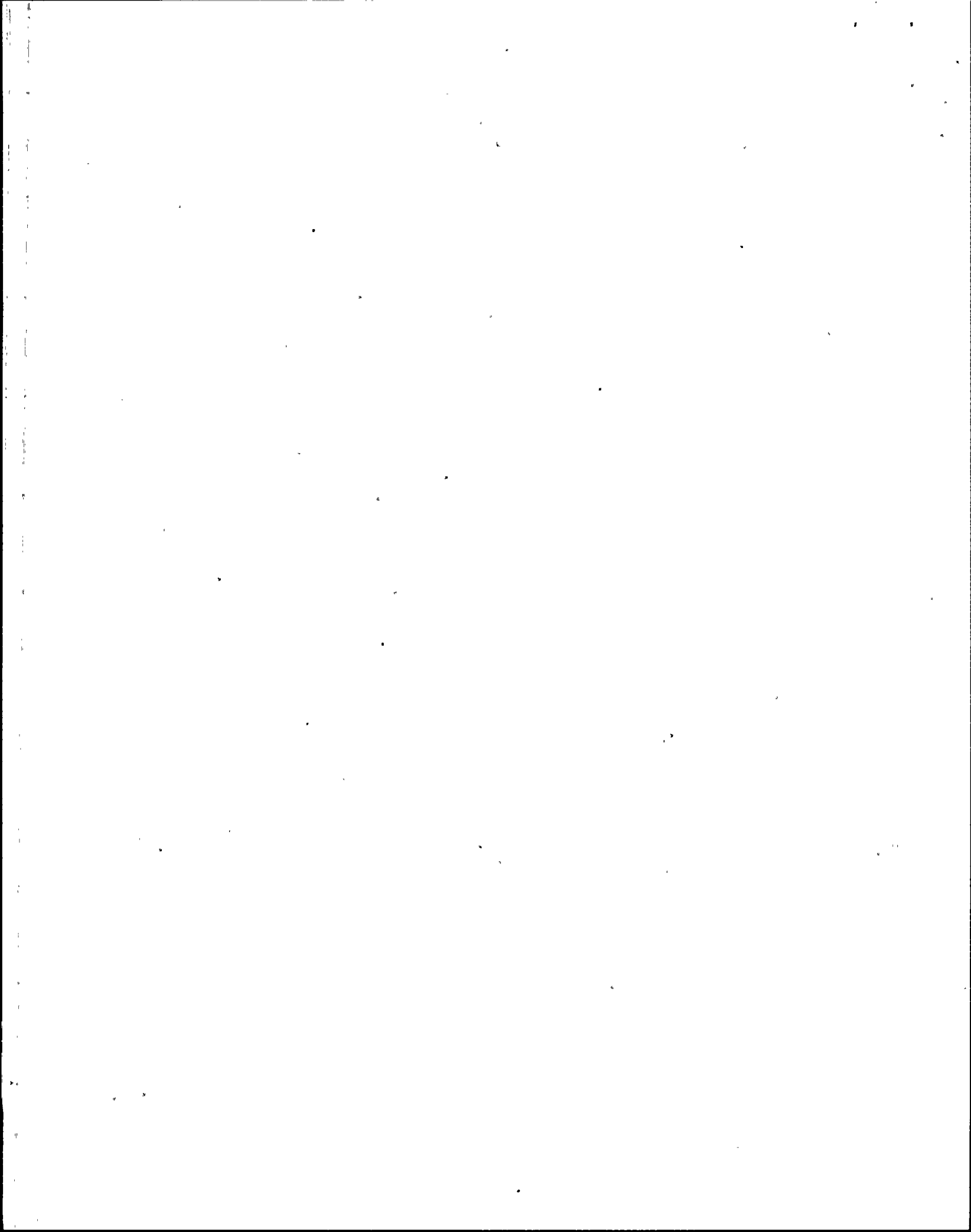
Given the following conditions:

- Pressurizer Level Control System master controller is in REMOTE-AUTO
- Level control channel selected to Channel Y
- Heater Low Level Cutout selected to BOTH
- Pressurizer pressure is 2250 psia

Reference leg of RCN-LT-110Y develops a leak.

With no operator action, which one of the following describes the response of the Pressurizer Level Control System?

- A. Standby charging pump starts, heaters energize, letdown flow decreases.
- B. Standby charging pump starts, heaters cutout, letdown flow decreases.
- C. Normally running charging pump stops, heaters energize, letdown flow increases.
- D. Normally running charging pump stops, heaters do not change state, letdown flow increases.



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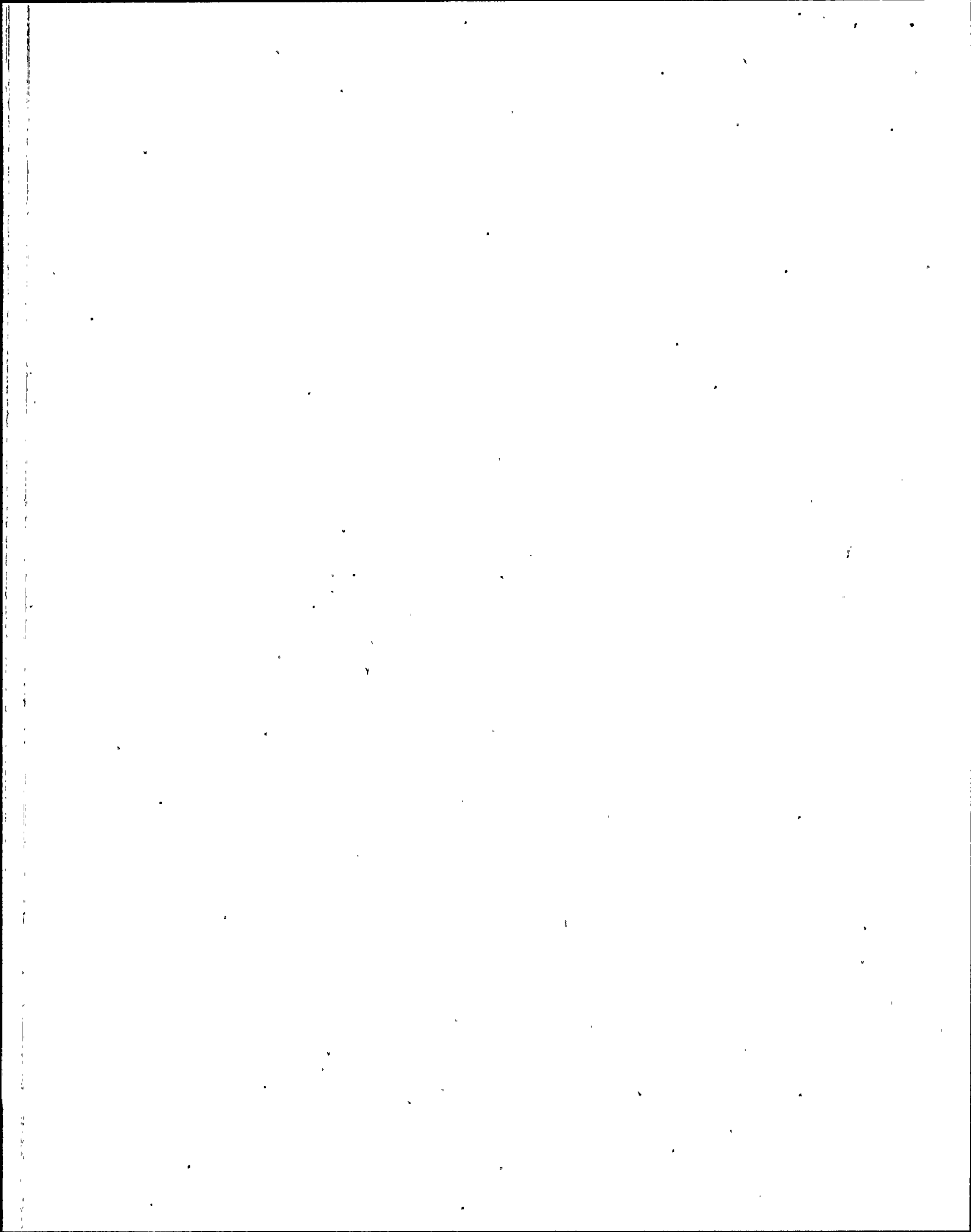
Question 042

Given the following plant conditions:

- Unit 1 tripped from 100% due to a LOOP
- SPTAs are in progress
- D/G 'B' energized PBB-S04
- D/G 'A' is running
- D/G 'A' voltage is < 3500 V
- D/G 'A' frequency is < 55 hz
- PBA-S03B, D/G 'A' output breaker, is open

Which one of the following actions must be taken to mitigate this event?

- A. Energize PBA-S03 from PBB-S04.
- B. Shutdown the D/G 'A' from the Control Room.
- C. Manually close D/G 'A' output breaker, PBA-S03B, from the Control Room.
- D. OVERRIDE D/G 'A', raise speed and voltage to within limits and verify output breaker automatically closes.



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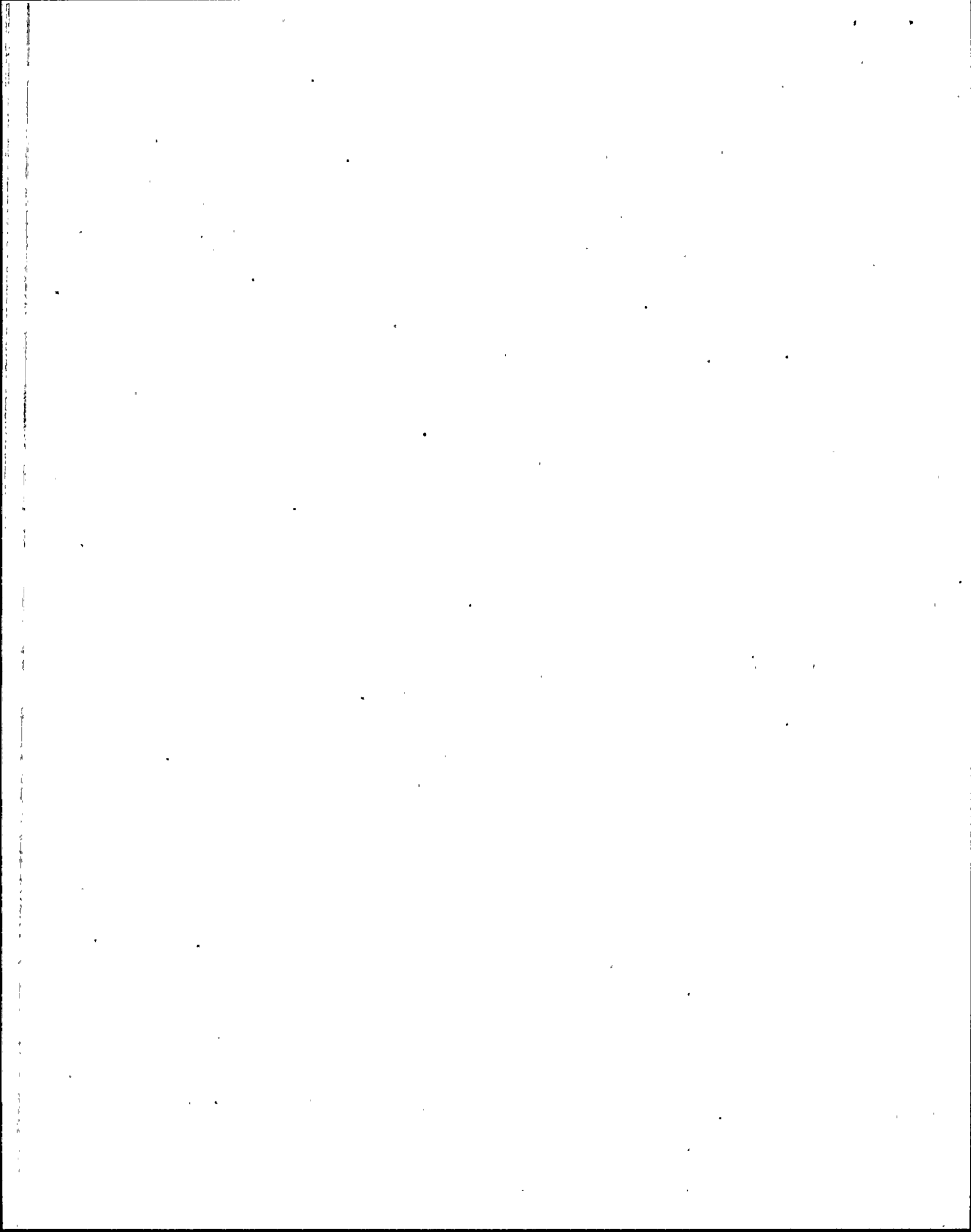
Question 043

Given the following conditions:

- Unit 3 is at 100% power
- EW 'A' has been cross connected to NC
- RU-2, EW 'A' Radiation monitor, is in HIGH alarm

Which one of the following components is the probable source of in-leakage to the Essential Cooling Water System?

- A. RCP Seal Cooler 1B
- B. Boric Acid Concentrator
- C. Letdown Heat Exchanger
- D. Fuel Pool Heat Exchanger 'A'



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Question 044

Given the following plant conditions:

- Plant is at rated power
- Loop 2 Tave selected at RRS
- Loop 2 Tcold fails HIGH

This failure results in a(n) _____.

- A. Auto motion inhibit (AMI)
- B. Control withdraw prohibit (CWP)
- C. Auto withdraw prohibit (AWP)
- D. Turbine load increase inhibit (TLI)

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Question 045

Unit 2 is at 100% power.

Which one of the following causes the COLSS DNBR power operating limit (POL) to INCREASE?

- A. A CEA is inserted from UEL to 130".
- B. Pressurizer pressure decreases from 2250 to 2235 psia.
- C. One Tc transmitter begins to read 5°F higher than actual.
- D. An RCP delta-P transmitter begins to read 5 psid lower than actual.

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Question 046

Which one of the following would cause RCS temperature and plant power to increase?

- A. Temperature decrease in the letdown system.
- B. EHC system failure causing CV#4 to partially close.
- C. SBCS valve partially opening due to system malfunction.
- D. Downcomer control valve partially closing due to system malfunction.

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Question 047

Which one of the following will cause the Letdown Isolation valves to close?

	<u>CHA-UV-515</u>	<u>CHA-UV-516</u>	<u>CHB-UV-523</u>
A.	SIAS	NC Low Flow	LD High Temp
B.	LD High Temp	SIAS	CIAS
C.	NC Low Flow	CIAS	SIAS
D.	CIAS	LD High Temp	Low NC flow

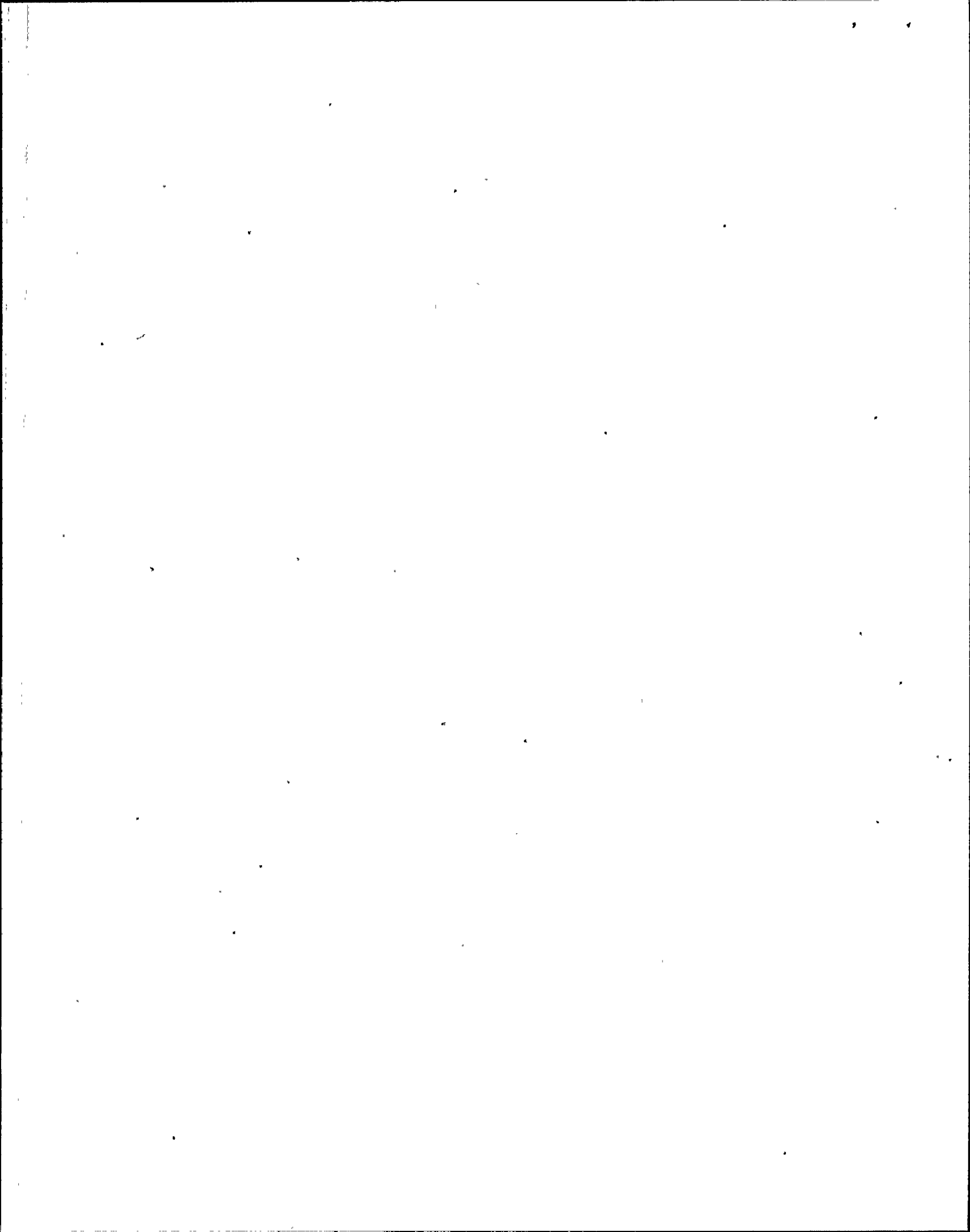
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Question 048

A blown fuse indicator for SIAS on the 'B' Aux Relay Cabinet is illuminated on leg 2-4.

Which one of the following indications/actuators would be observed from the Control Room?

- A. Train B SIAS; Train B equipment repositions/actuators.
- B. Half leg SIAS alarm; No equipment repositions/actuators.
- C. Half leg SIAS actuation; Some equipment repositions/actuators.
- D. Train A and Train B SIAS; Both trains of equipment repositions/actuate.



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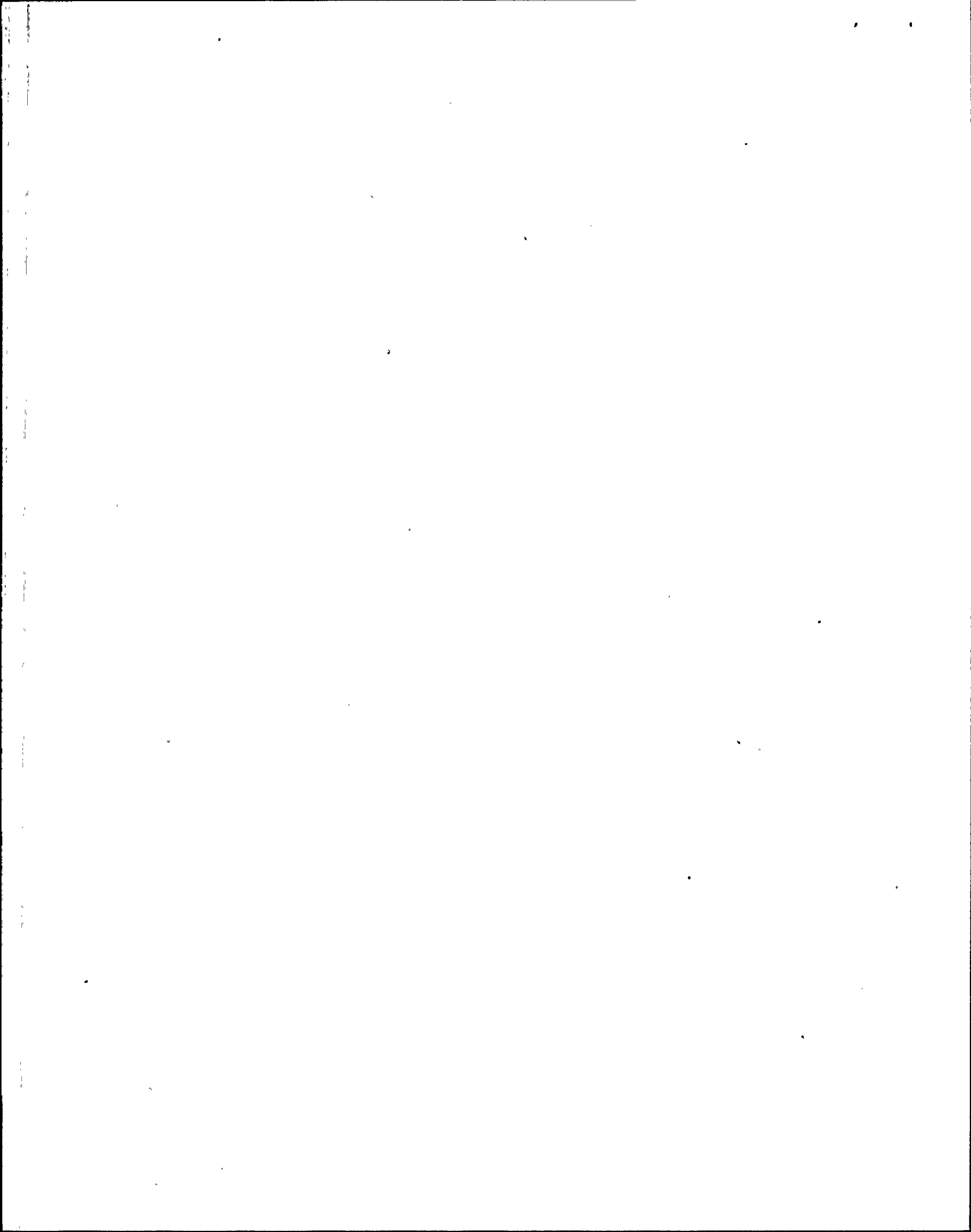
Question 049

Given the following plant conditions:

- Unit 3 has sustained a LOCA.
- The reactor has tripped
- SIAS, CIAS, and MSIS have actuated
- LPSI pump 'B' breaker tripped on 86 lockout.

Which of the following is the expected indication on the Safety Equipment Status System (SESS) for LPSI pump 'B'?

	<u>INOPERABLE STATUS (SEIS)</u>	<u>ACTUATED STATUS (SEAS)</u>
A.	ILLUMINATED	ILLUMINATED
B.	EXTINGUISHED	EXTINGUISHED
C.	ILLUMINATED	EXTINGUISHED
D.	EXTINGUISHED	ILLUMINATED



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Question 050

Control Element Assemblies (CEAs) have two means of position indication, Reed Switch Position Transmitters (RSPT) and Pulse Counters.

Which one of the following describes where RSPT and Pulse Counter output signals are sent?

- | | <u>RSPT</u> | <u>Pulse Counter</u> |
|----|---|---|
| A. | CPC
Dropped Rod Contact
UEL, LEL Lights | COLSS
PDIL Alarms
Deviation Alarms |
| B. | CPC
PDIL Alarms
Deviation Alarms | COLSS
Dropped Rod Contact
UEL, LEL Lights |
| C. | COLSS
Dropped Rod Contact
UEL, LEL Lights | CPC
PDIL Alarms
Deviation Alarms |
| D. | COLSS
PDIL Alarms
Deviation Alarms | CPC
Dropped Rod Contact
UEL, LEL Lights |

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Question 051

Given the following plant conditions:

- Unit 1 is at 100% power
- Channel 'D' upper detector excore safety monitor fails HIGH

Which one of the following describes the expected response of Channel 'D' Reactor Protection System to this failure? No other failures are present.

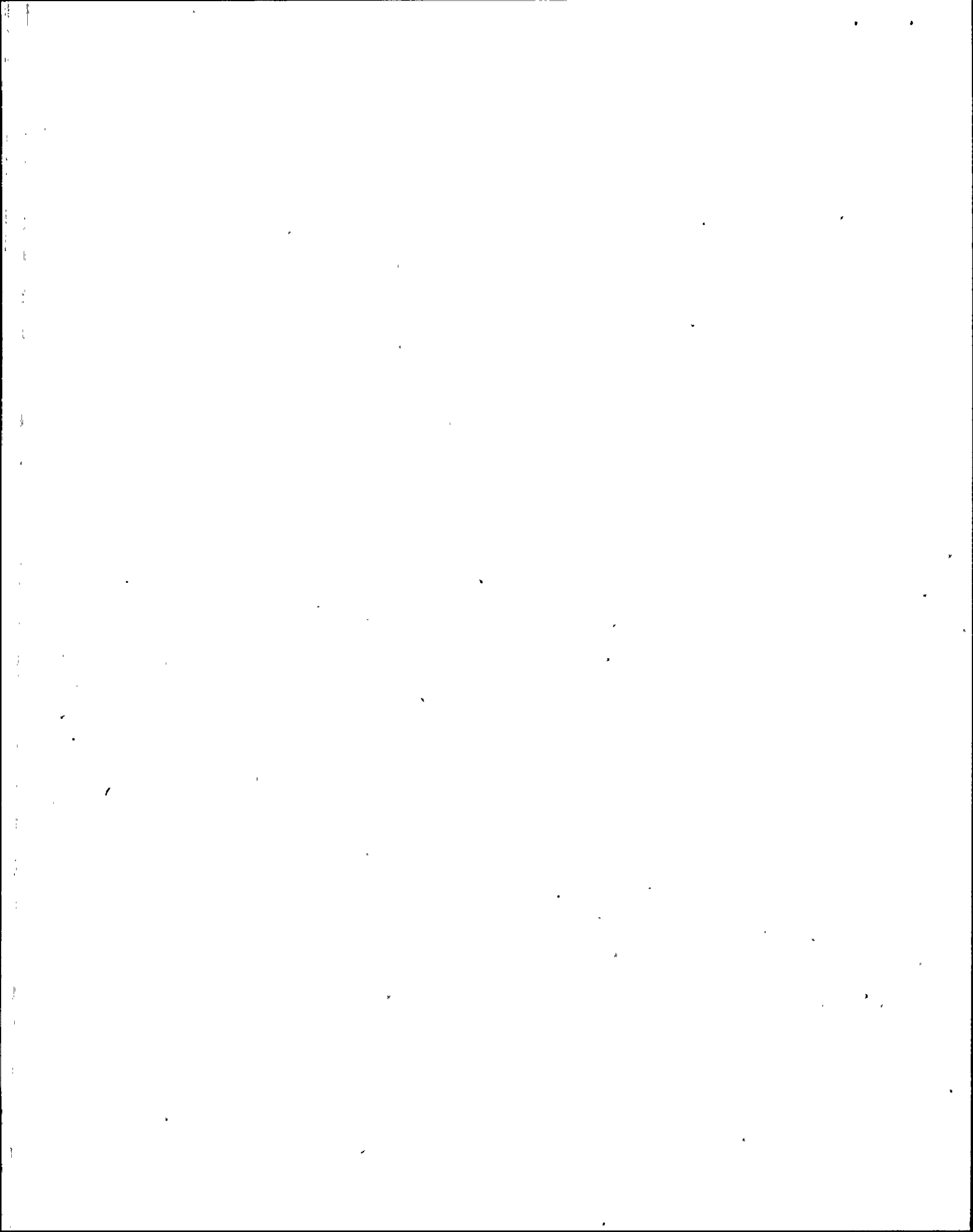
- A. High Local Power Density AND Low DNBR trips WITHOUT pre-trips
- B. Variable Overpower, High Local Power Density and Low DNBR pre-trips ONLY
- C. Variable Overpower pre-trip, and trip, and High Local Power Density and Low DNBR trips WITHOUT pre-trips
- D. Variable Overpower, High Local Power Density and Low DNBR trips AND pre-trips

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Question 052

Values of RCS or CET Superheat in excess of 50 [62] degrees during a LOCA _____

- A. indicate core uncover.
- B. make RVLMS inoperable.
- C. enhances natural circulation.
- D. indicate a loss of steam generators as a secondary heat sink.



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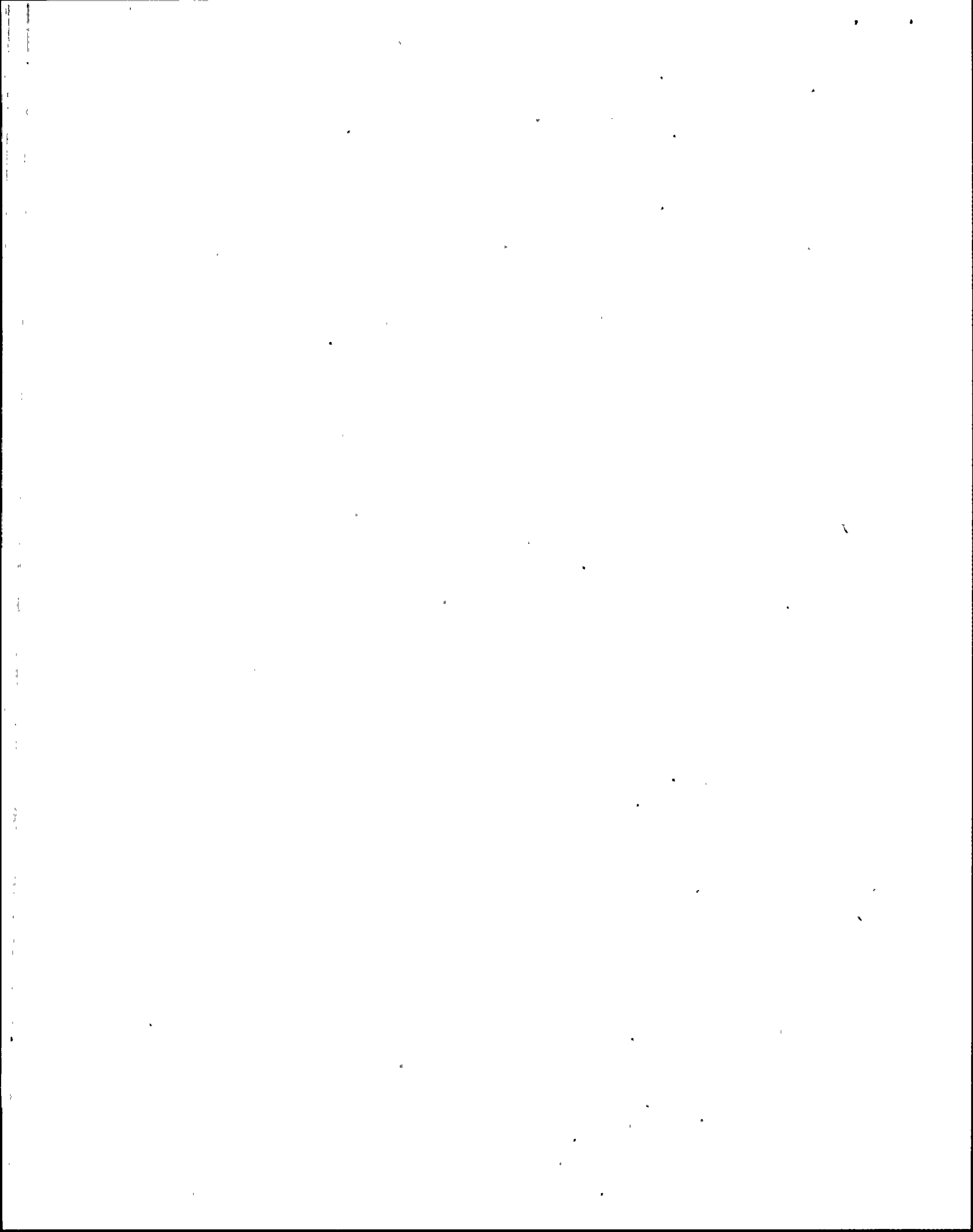
Question 053

Given the following condition:

- Unit 3 is at 100% power
- An ESD occurs on #2 S/G
- SIAS, CIAS, and MSIS have actuated

Which one of the following is correct concerning the status of the Containment Normal ACU's?

- A. They continue to run.
- B. They are load shed and will sequence back on after 40 seconds.
- C. They are load shed and must be manually started by an operator.
- D. They shift to take suction on elevations 100' and below in containment.



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Question 054

Given the following conditions:

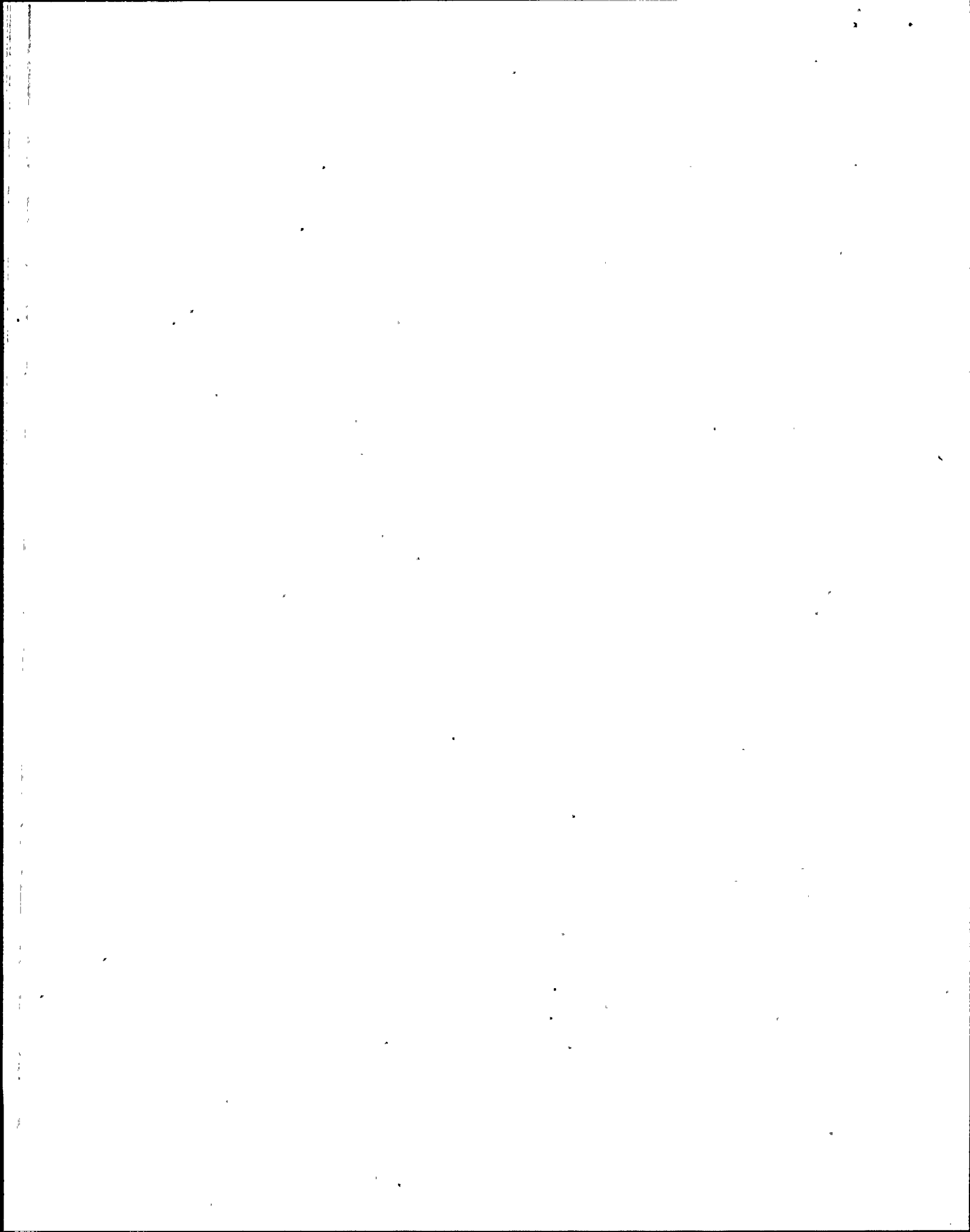
- At 0200 Unit 3 tripped due to a large LOCA
- All protective systems operated as designed

At 0300 the Primary Operator notes all RWT level channel indications are decreasing and indicate as follows:

- 'A' 7.0%
- 'B' 7.0%
- 'C' 6.5%
- 'D' 8.0%

Which one of the following describes the expected status of the Containment Spray system?

	<u>Pumps</u>	<u>RECIRC Valves</u>	<u>Pump Suction Aligned to</u>
A.	ON	OPEN	RWT
B.	OFF	OPEN	Containment Sump
C.	ON	CLOSED	Containment Sump
D.	OFF	CLOSED	RWT



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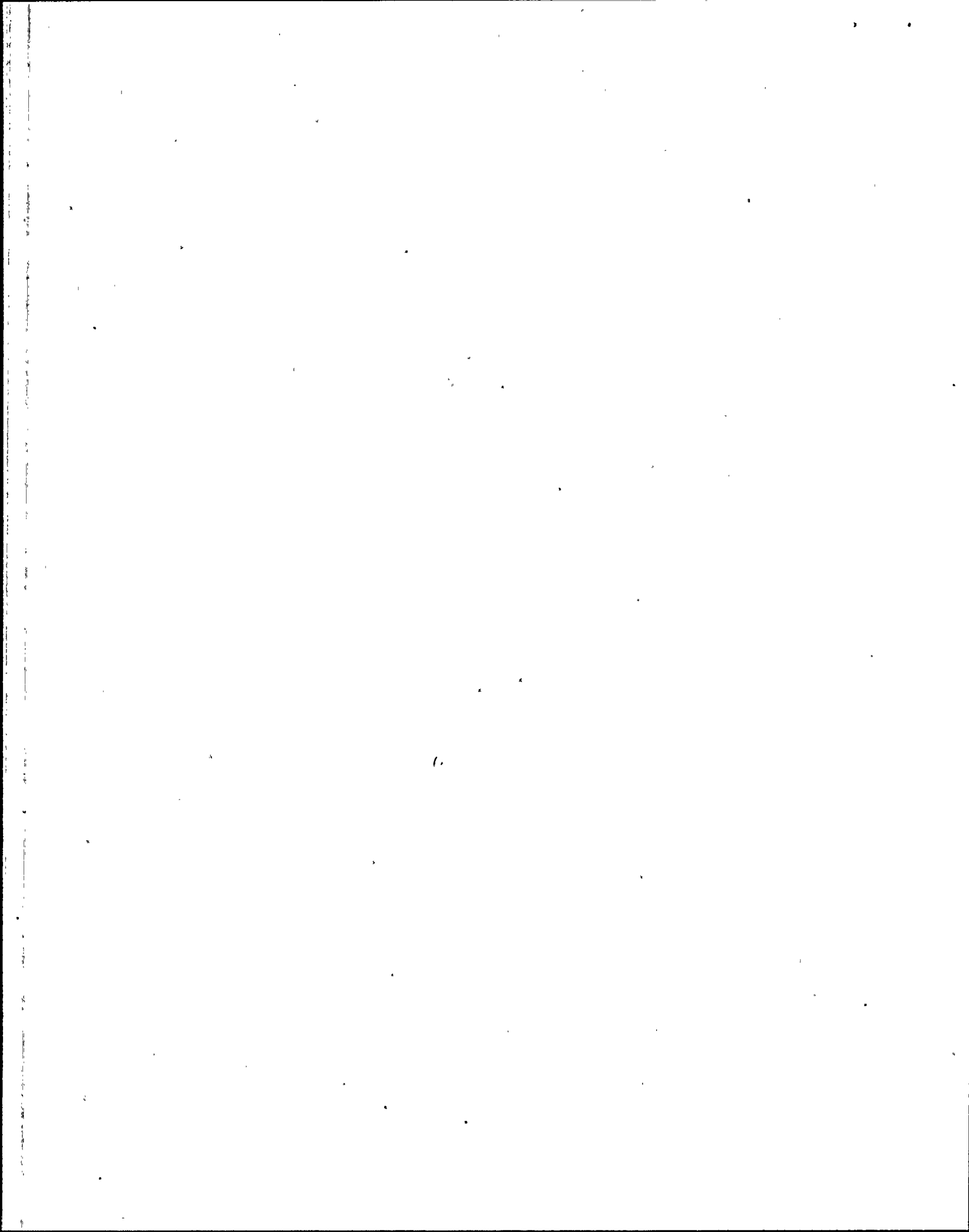
Question 055

Given the following plant conditions:

- Unit 2 is 98% power.
- Steam Generator #2 is aligned for High Rate blowdown.
- Condensate Demineralizers are in service.
- Condensate discharge pressure transmitter CDN-PT-276, located at the outlet of the LP feedwater heaters, fails HIGH (600 psig)

With no Operator action, which one of the following describes the next expected result of this failure?

- A. All three Condensate Pumps will trip on high discharge pressure.
- B. MFWP 'A' will trip on low suction pressure and a RPCB will occur.
- C. MFWP 'B' will trip on low suction pressure and a RPCB will occur.
- D. The Condensate Demineralizer Bypass Valve will automatically OPEN.



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Question 056

Given the following plant conditions for Unit 2:

- FWCS #1 Master Controller is in MANUAL
- Reactor trips from 100% power

FWCS #1 will operate in RTO until _____

- A. Tcold < 564°F.
- B. #1 S/G Level > 52% NR.
- C. #1 S/G Level > 88% NR.
- D. FWCS #1 is placed in AUTO.

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Question 057

Given the following plant conditions:

- Unit 3 is in Mode 3, 565°F, 2250 psia
- Preparations are in progress for a Reactor Startup
- AFN-P01 is in service, feeding both Steam Generators
- S/G 1 and 2 are at 35% NR
- An inadvertent SIAS on both Trains 'A' and 'B' occurred due to a system malfunction

Which one of the following describes the immediate response of the auxiliary feedwater system to this event?

- | | <u>Pump Status</u> | <u>Feed Status</u> |
|----|--------------------|--------------------|
| A. | AFN running | Supplying feed |
| B. | AFN running | Not feeding |
| C. | AFB running | Supplying feed |
| D. | AFB running | Not feeding |

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Question 058

Given the following conditions:

- Reactor has tripped
- SIAS, CIAS, MSIS, AFAS-1, and AFAS-2 have actuated
- S/G #2 > S/G #1 Pressure Channel Trip and Pre-Trips on all four Channels

Which one of the following describes the status of the Auxiliary Feed Regulating and Isolation Valves?

- A. Both S/G #1 and S/G #2 valves open.
- B. Both S/G #1 and S/G #2 valves closed.
- C. S/G #1 valves open S/G #2 valves closed.
- D. S/G #2 valves open S/G #1 valves closed.

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Question 059

Given the following plant conditions

- Unit 3 is at rated power
- 40ST-9DG02 Section 8.7, Load Test, is in progress
- D/G 'B' is carrying 2.7 MW
- A loss of PKB-M42 occurs

Which one of the following describes the impact this has on the 'B' D/G and PBB-S04?

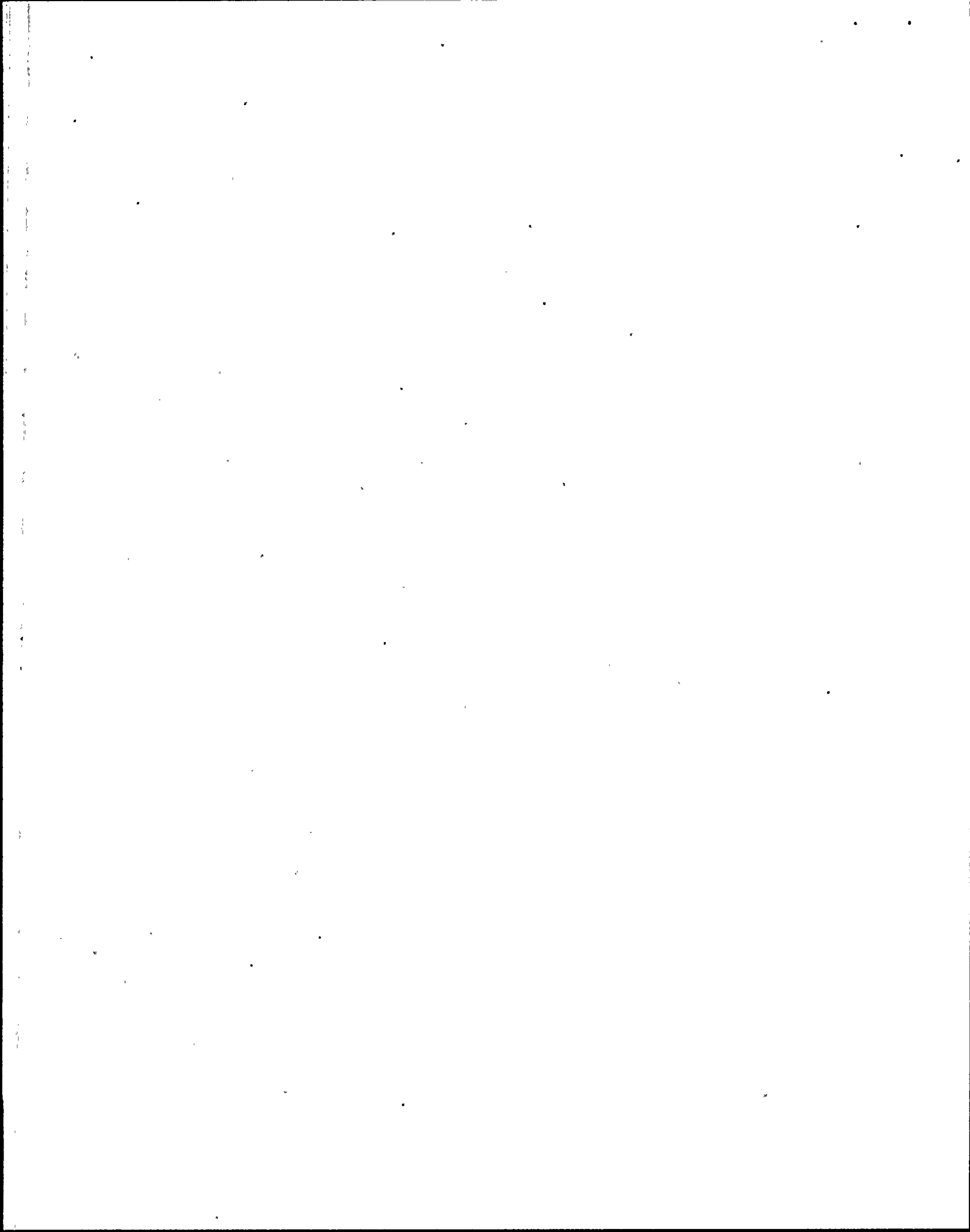
- A. 'B' D/G trips, PBB S04 de-energizes.
- B. 'B' D/G trips, PBB S04 remains energized.
- C. 'B' D/G continues to run, PBB S04 de-energizes.
- D. 'B' D/G continues to run, PBB S04 remains energized.

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Question 060

Which one of the following can be DIRECTLY pumped to the liquid radwaste system? (Assume NO system modifications)

- A. Chemical Drain Tank
- B. Concentrate Monitor Tank
- C. Cooling Water Holdup Tank
- D. Low Activity Spent Resin Tank



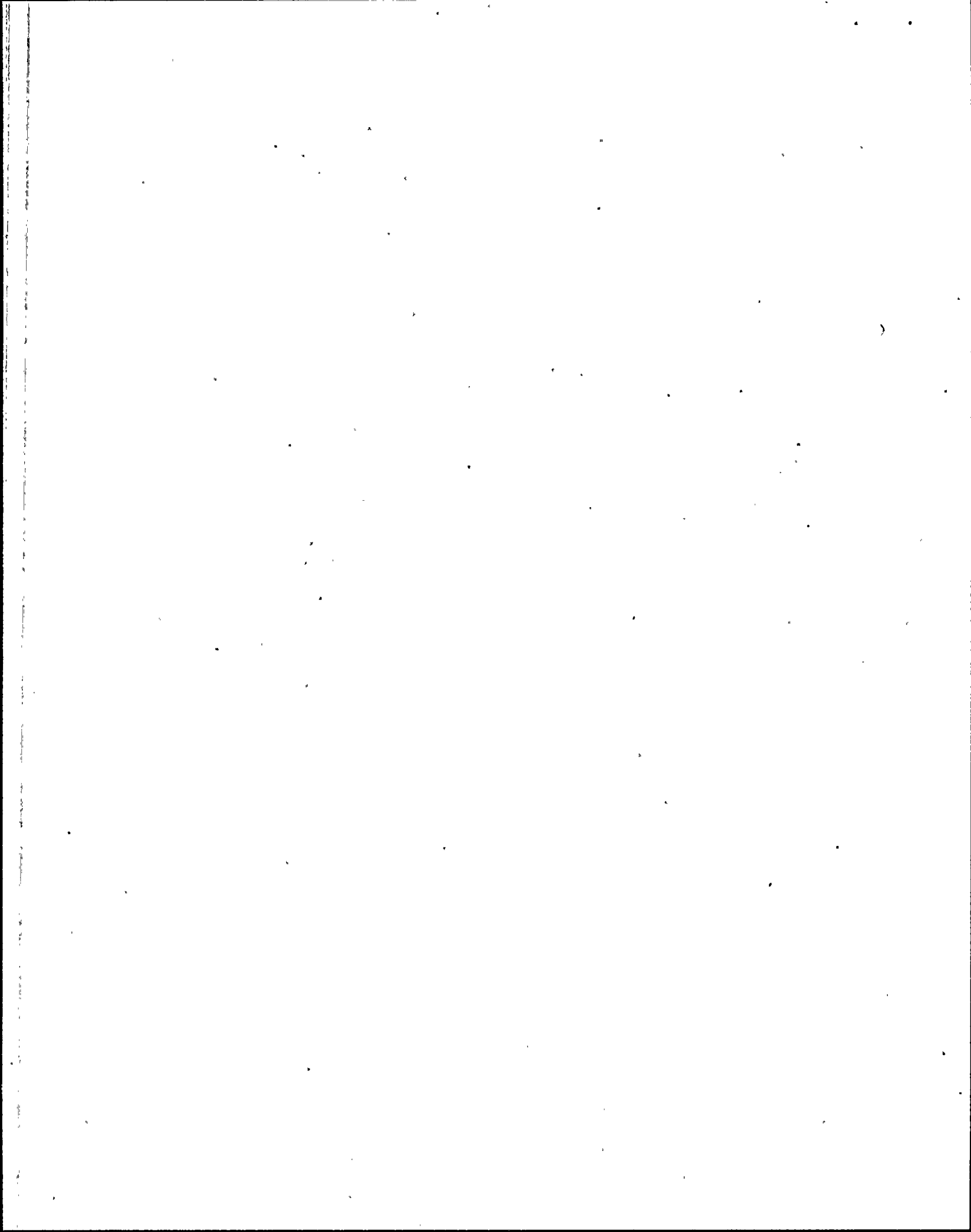
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Question 061

A planned release of Waste Gas Decay Tank 'B' is in progress.

Which one of the following describes the automatic action due to a high alarm on RU-12?

- A. Stops all waste gas compressors.
- B. Initiates control room essential filtration actuation.
- C. Closes GRN-UV-34A/B, waste gas discharge valves.
- D. Aligns the post filter blower in the THROUGH FILTER Mode.



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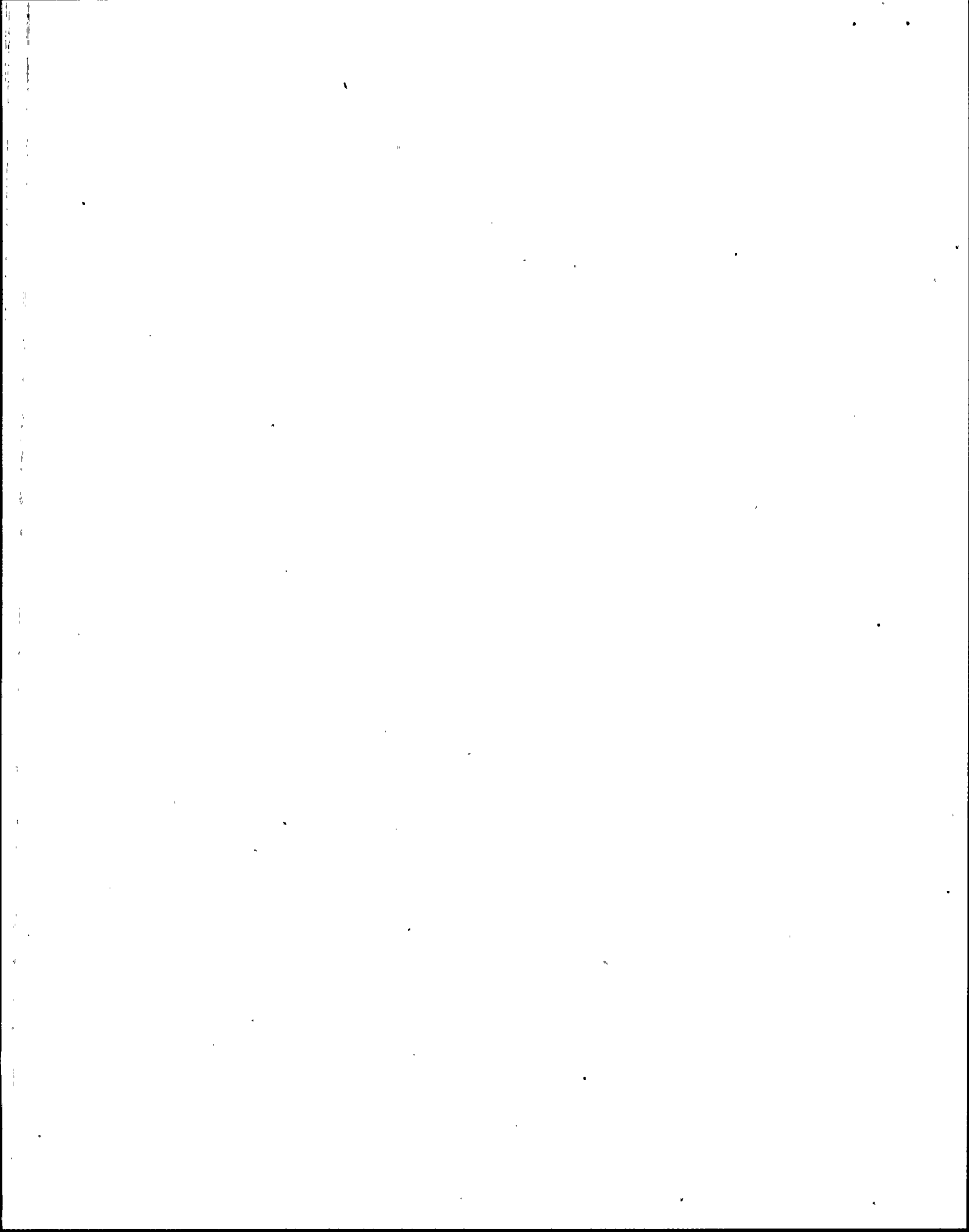
Question 062

Given the following conditions:

- Unit 3 is at 100% power
- 3 J SQA RU 31 (Fuel Pool Area Monitor) fails HIGH

Which of the following describes the expected plant response?

- A. No actions should occur due to this signal failure.
- B. Train A FBEVAS actuates ONLY.
- C. Train A of FBEVAS and CREFAS actuate ONLY.
- D. Both Trains of FBEVAS and both Trains of CREFAS actuate.



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Question 063

The following conditions exist on Unit 3:

- MODE 5
- BOTH LTOPs in service
- Shutdown Cooling maintaining a slight (5°F/hr) heatup rate
- One RCP in operation
- Pressurizer level is 30% as indicated on RNC-LI-103
- S/G temperatures are 15°F higher than RCS Tcold (Within allowable limits)

Which one of the following describes the initial response of the unit when the second RCP is started?

	<u>Pressurizer Level</u>	<u>S/G Pressure</u>
A.	INCREASE	INCREASE
B.	INCREASE	DECREASE
C.	DECREASE	INCREASE
D.	DECREASE	DECREASE

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Question 064

Given the following plant conditions:

- Unit 1 trip due to a LOCA
- RCS pressure 300 psia and slowly LOWERING
- #1 S/G Level 42% WR INCREASING
- #1 S/G Pressure 600 psia LOWERING
- #2 S/G Level 40% WR INCREASING
- #2 S/G Pressure 610 psia LOWERING
- Containment pressure 9.5 psig LOWERING
- RWT level 25% LOWERING

Which one of the following identifies the ESFAS actuations that should have occurred?

- A. CSAS, RAS.
- B. AFAS, MSIS
- C. CSAS, MSIS
- D. AFAS, RAS

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Question 065

Given the following plant conditions:

- Unit 1 is operating at 100% power
- All control systems are operating in AUTOMATIC
- RRS inputs selected to AVERAGE
- Pressurizer pressure control selected to PT 100X
- Pressurizer Low Level heater cutout selected to BOTH
- Spray Valve Selector switch, RCN-HS-100-10, is selected to 100F

PT 100X indication fails OFF SCALE HIGH.

Assuming NO operator action, what is the response of the unit?

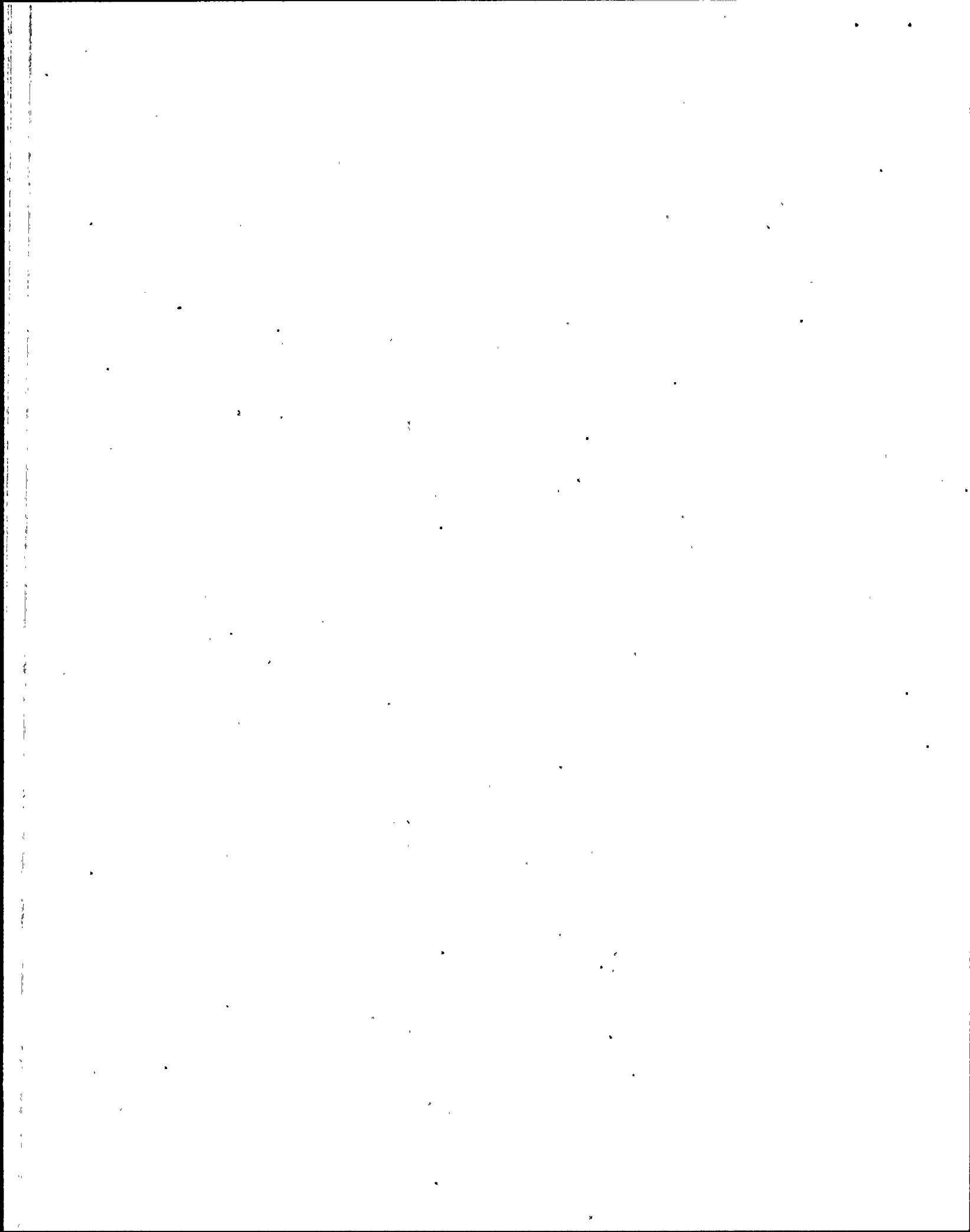
- A. Spray valve 100F closes, heaters deenergize, reactor trip on Low Pressurizer Pressure.
- B. Both Spray valves close, heaters energize, reactor trips on High Pressurizer Pressure.
- C. Spray valve 100F opens, heaters deenergize, reactor trips on Low Pressurizer Pressure or Low DNBR.
- D. Both Spray valves open, heaters deenergize, Steam Bypass Control valves modulate full open, reactor trips on Low DNBR.

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Question 066

Which one of the following would provide an indication of voiding in the RCS?

- A. Unheated Junction Thermocouple temperatures rising.
- B. Pressurizer spray causes pressurizer level to rise.
- C. Pressurizer heaters cause pressurizer level to rise.
- D. Unexplained letdown flow less than charging flow.



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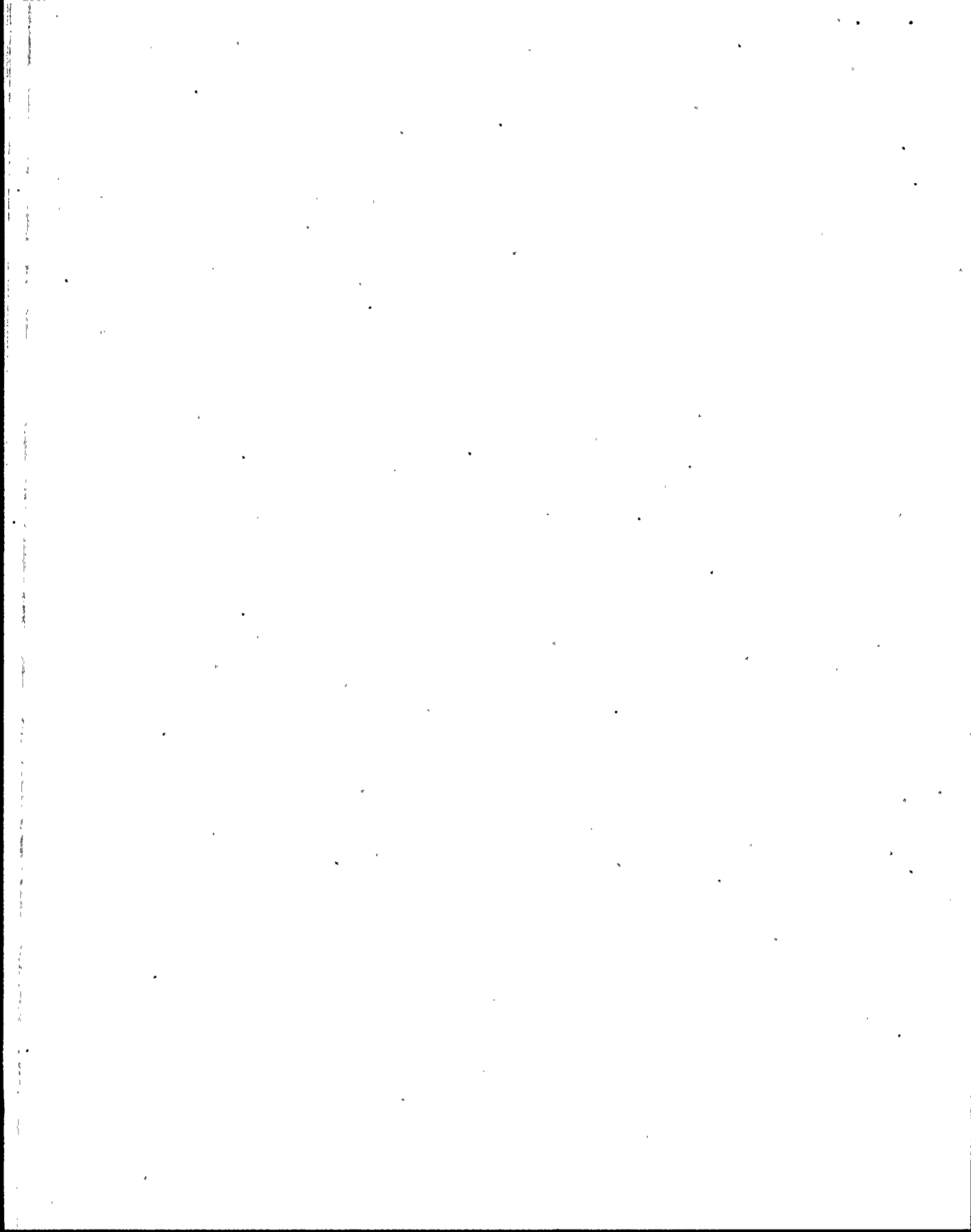
Question 067

Given the following plant conditions:

- Unit 2 is at 100% power
- All Control Systems are operating in AUTOMATIC
- Channels A through D WR pressurizer pressure indicates 1820 psig and TRENDING DOWN
- LOW PRESSURIZER PRESSURE pre-trips and trips actuated on PPS channels A through D
- SIAS and CIAS have actuated
- RPS Initiation relays in the 1-3 leg are ENERGIZED
- RPS Initiation relays in the 2-4 leg are DEENERGIZED
- Phase current light extinguished for the 2-4 leg

Which one of the following describes the PPS/ESFAS response?

- A. RTSG breakers B and D inadvertently opened.
- B. The leg 1-3 RPS initiation relays failed to deenergize.
- C. The leg 2-4 RPS initiation relays deenergized inadvertently.
- D. The SIAS/CIAS is inadvertent due to the logic matrix failure.



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Question 068

Given the following PPS cabinet conditions:

- Channel 'D' Hi Containment Pressure is in bypass and tripped
- Channel 'B' Hi Containment Pressure is tripped due to a power supply failure

Based on these condition, what would the effect be if the Channel 'A' High Containment Pressure bypass pushbutton is depressed?

- A. All RTSG breakers open.
- B. RTSG breakers B and D open, RTSG breakers A & C stay closed.
- C. Channel 'A' High Containment Pressure will not go into bypass because Channel 'C' is in bypass.
- D. Channel 'A' and 'D' will be in bypass and Channel 'B' Hi Containment Pressure will be in a tripped condition.

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Question 069

Given the following conditions:

- Unit 2 is at 100% power
- NNN-D12 de-energizes due to a bus failure

Which one of the following is correct as a result of this failure?

- A. Letdown control valves fail closed immediately.
- B. Downcomer and economizer control valves fail as – is.
- C. Pressurizer main spray valves are NOT available in auto or manual.
- D. Steam Bypass Control System “Quick Open” fails, valves available for modulation.

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Question 070

Given the following conditions:

- Unit 2 has experienced major core damage as a result of a LOCA
- 2 hours have elapsed since the onset of the accident

Which one of the following is the MAJOR contributor of hydrogen generation in containment?

- A. Radiolysis
- B. Zirc/Steam reaction
- C. Steel/Steam reaction
- D. Dissolved hydrogen in the RCS

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Question 071

Given the following conditions:

- Unit 1 is at 100% power
- Power Access Purge is in progress

Which one of the following conditions will automatically close the Containment Power Access Purge Mode Isolation Valves CP-UV-4A, 5A, 4B and 5B?

- A. SIAS
- B. CPIAS
- C. Containment pressure less than 14" H₂O gage
- D. Containment pressure is less than 1" H₂O gage

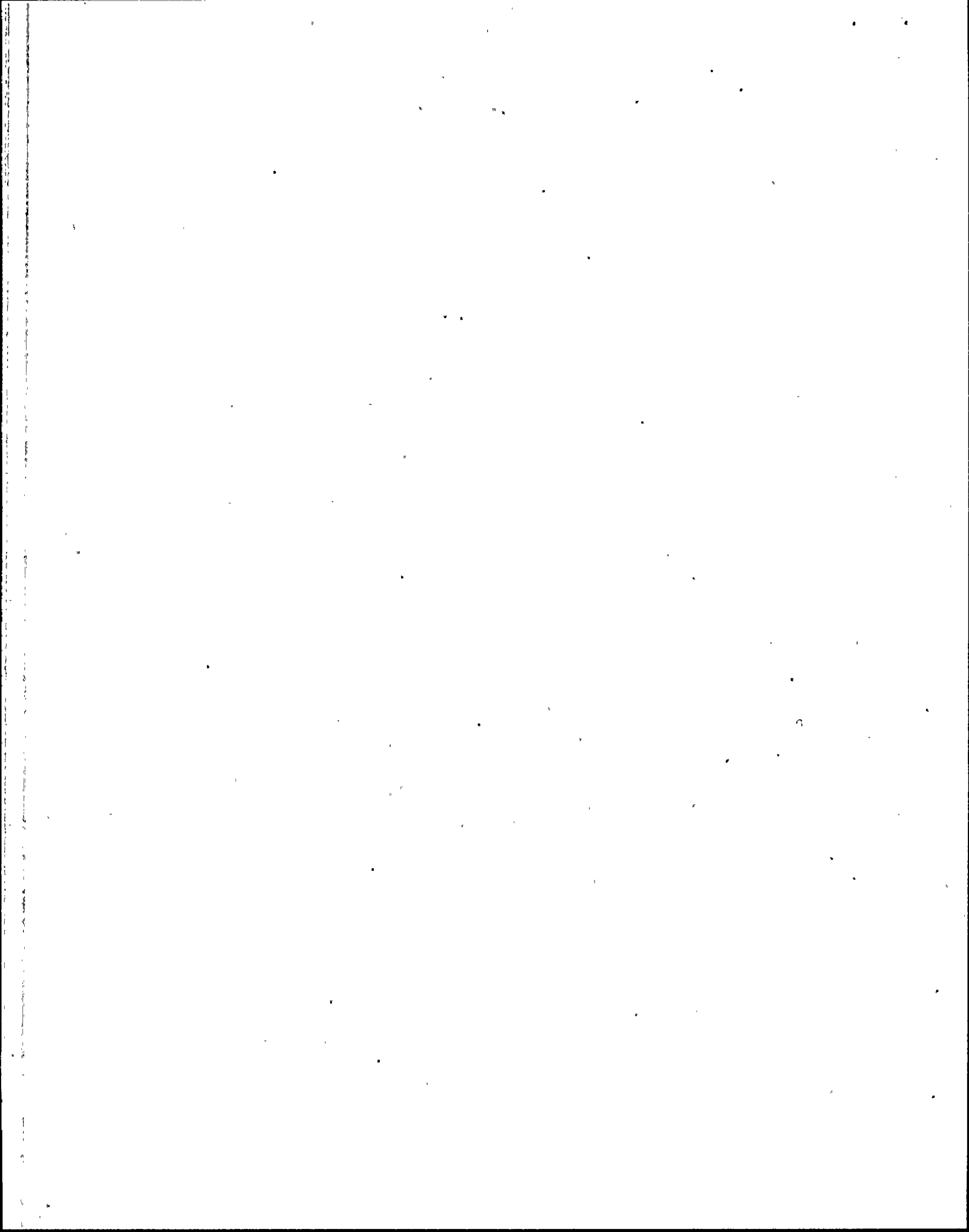
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Question 072

Technical Specification 3.7.14, Fuel Storage Pool Water Level, L.C.O. states "The Fuel storage pool water level shall be ≥ 23 feet over the top of the irradiated fuel assemblies seated in the storage racks."

Which one of the following is the reason for this minimum level?

- A. Provide sufficient NPSH for the fuel pool cooling pumps.
- B. Ensures adequate inventory in the spent fuel pool to prevent boiling during the Loss of Offsite Power.
- C. Maintains adequate level to ensure offsite dose is held to within limits during the design basis accident.
- D. Prevents sluicing water from the RWT during a design basis LOCA when the Spent Fuel Pool is aligned as a charging pump suction source.



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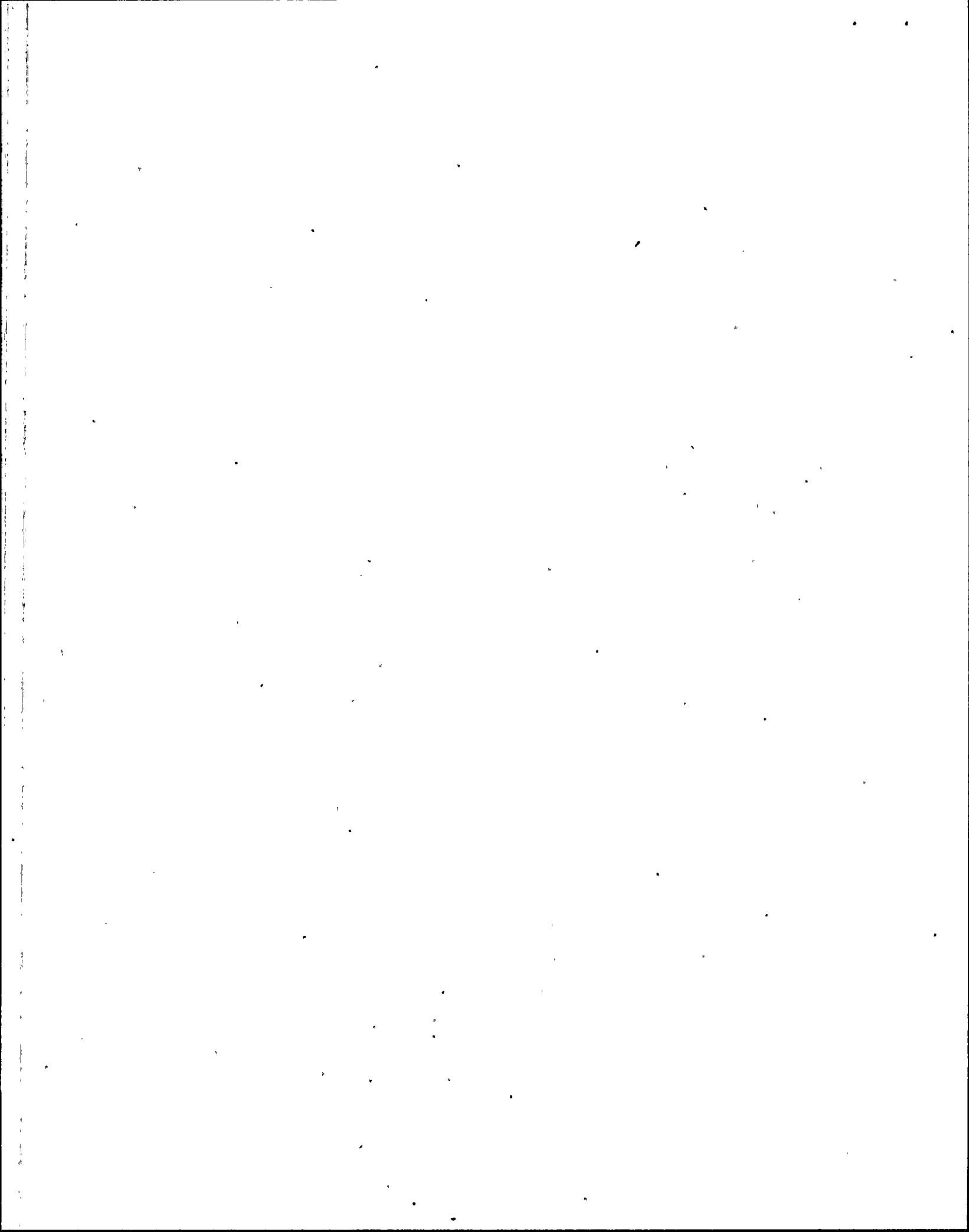
Question 073

Core Offload is in progress on Unit 3. You are assigned as the Refueling SRO.

The Refueling Machine operator reports that raising of assembly A6 has STOPPED and a HOIST OVERLOAD light is illuminated on the refueling machine.

Which of the following actions should be directed?

- A. Select "Extend" on the Fuel Spreader.
- B. Manually move the bridge while hoisting up.
- C. Engage manual control to bypass the overload.
- D. Lower the assembly to clear the overload condition.



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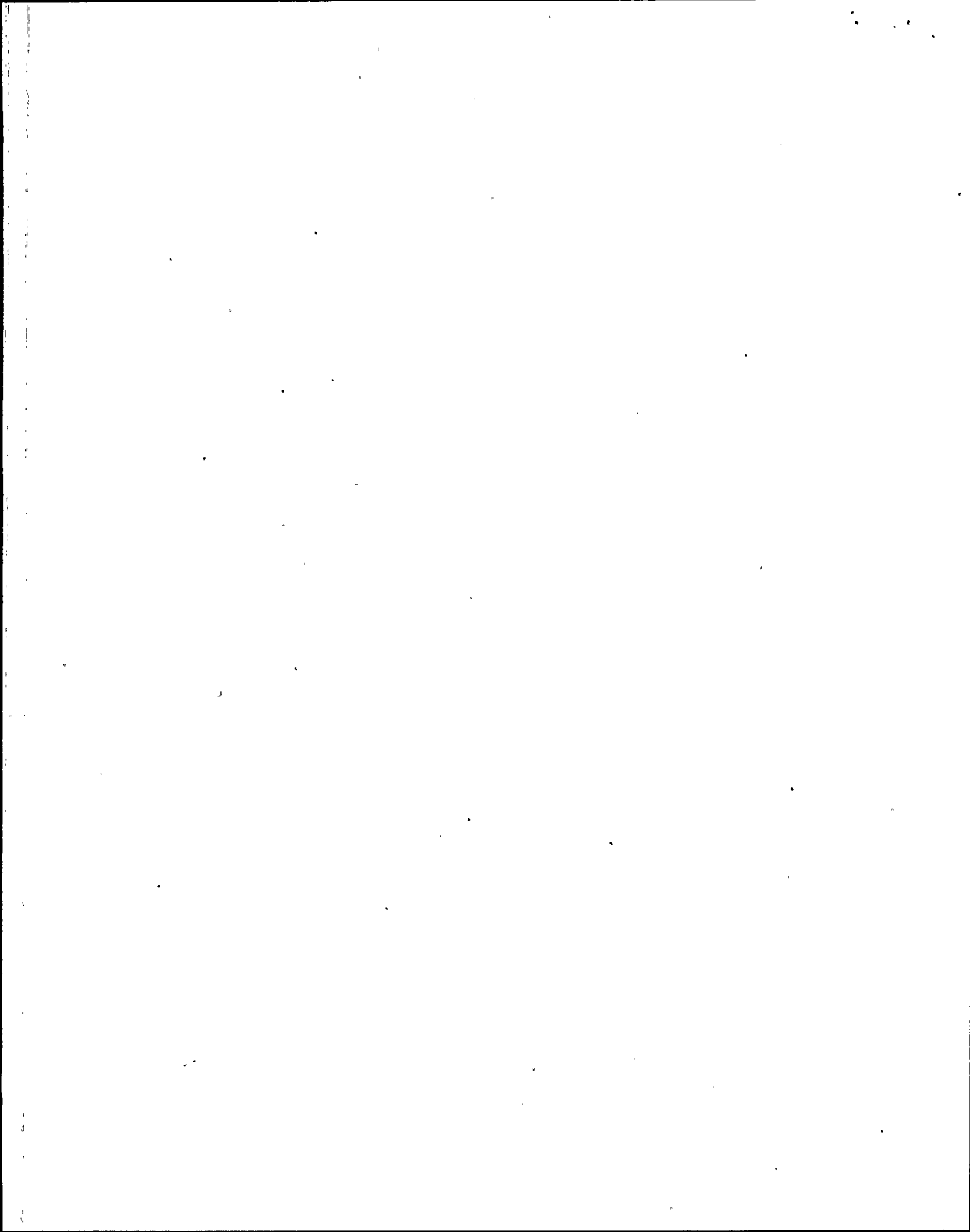
Question 074

Given the following plant conditions:

- Unit 3 is at 100% power
- The S/G level selection for both FWCS is in the "Higher Level" position
- Control channel level transmitter LT-1111 for FWCS #1 fails to 100%

Which ONE of the following describes the plant response without operator action?

- A. A subsequent Reactor Trip on low #1 S/G level.
- B. A subsequent Reactor Trip on high #1 S/G level.
- C. No impact, since selected to the "Higher Level" position.
- D. Level initially decreases in #1 S/G, but stabilizes above the Reactor Trip Setpoint.



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Question 075

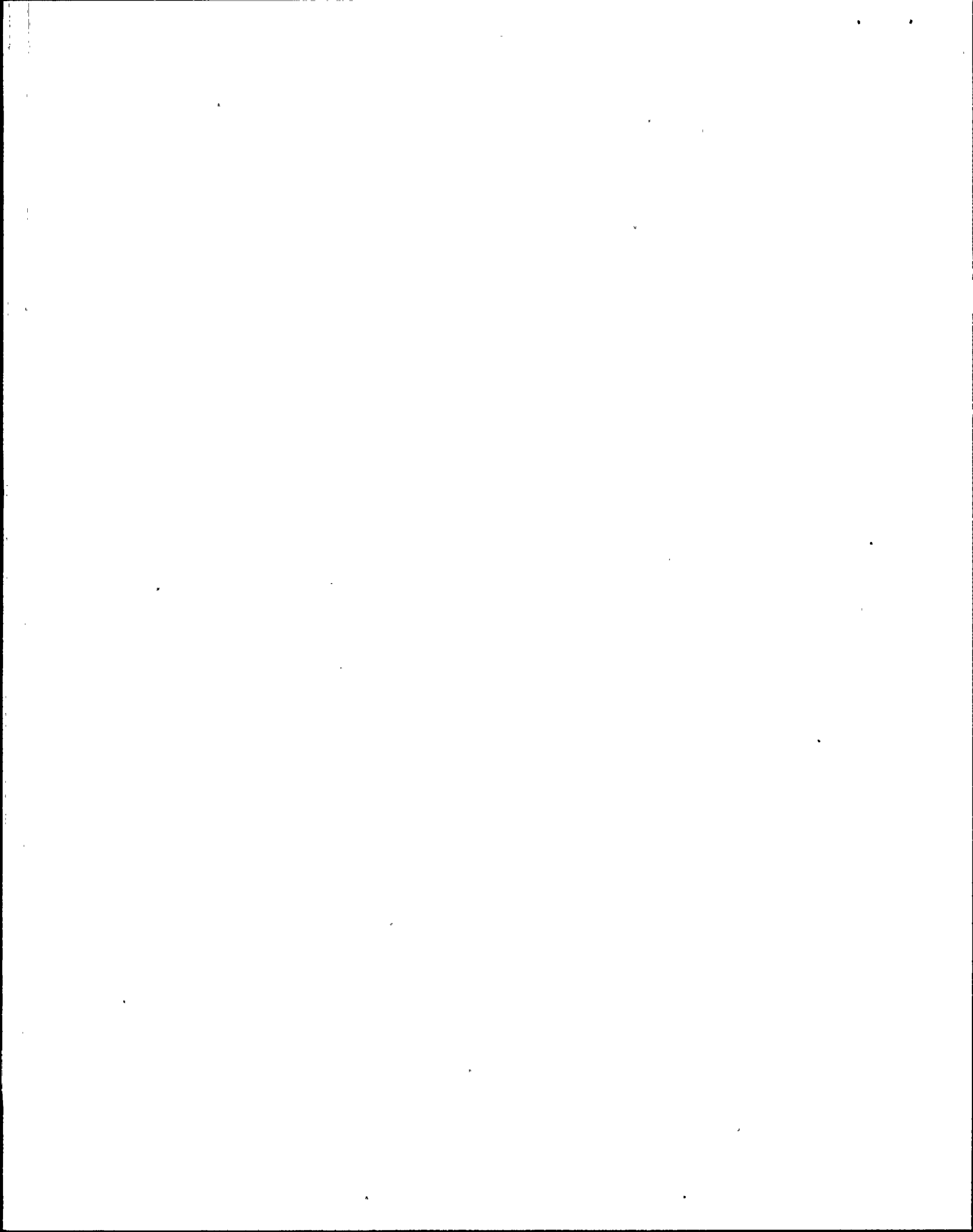
Given the following conditions:

- Unit 1 is at 30% power
- Power ascension is in progress

A valid high-high level condition exists in Moisture Separator Reheater (MSR) 'C' MTN E01C.

Which one of the following will occur due to this condition?

- A. Main Turbine will trip.
- B. No effect, Main Turbine Load is less than 65%.
- C. MSR 'C' Steam High Load Valve, MTN-UV-328C, opens.
- D. 1st Stage Reheater Drain Tank 'A' & 'C' Bypass valve, EDN-FV-611B, closes.



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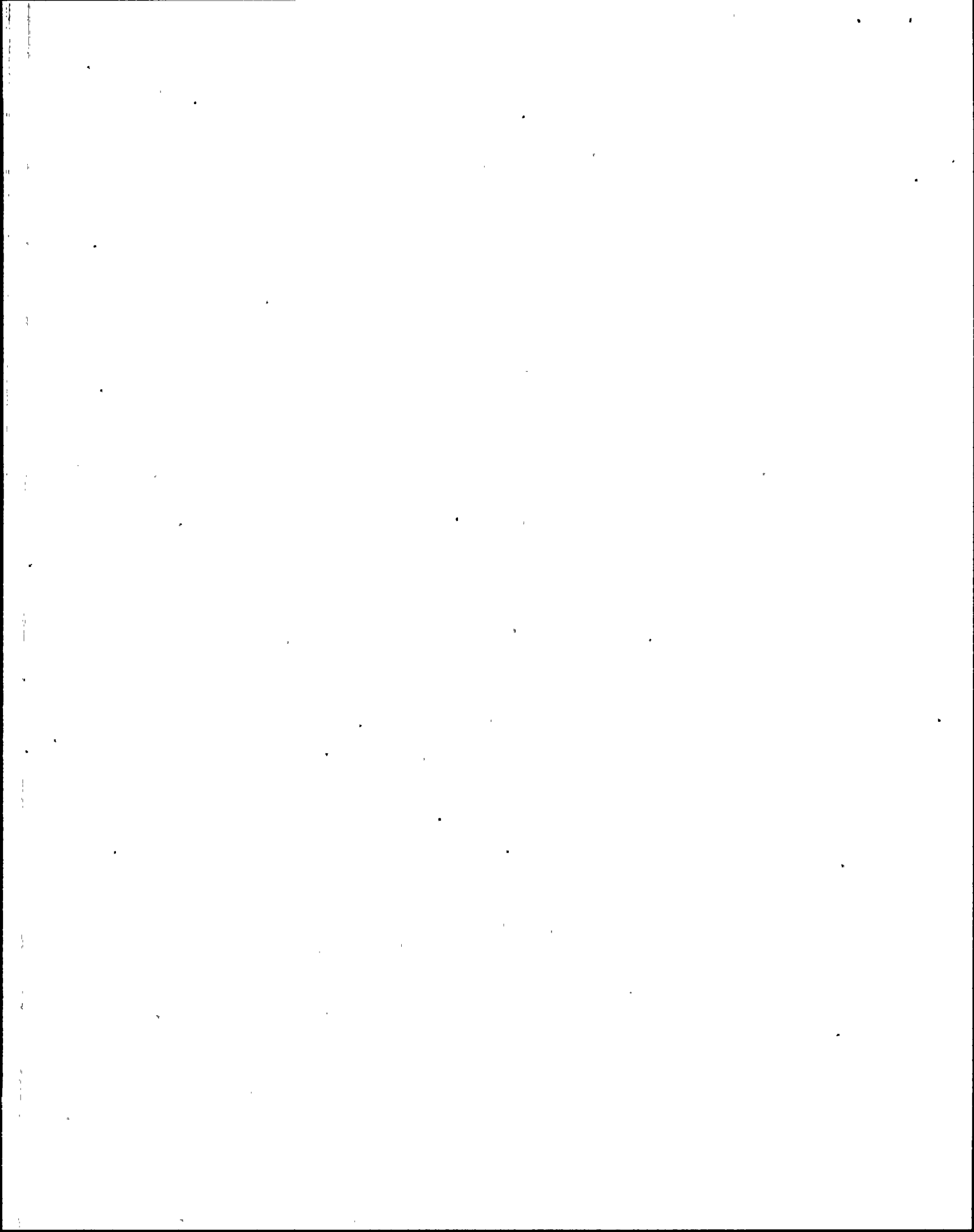
Question 076

Given the following conditions:

- Unit 1 is at 100% power
- 4160 V bus NBN-S01 feeder breaker, NBN-S01A, tripped and is locked out due to a breaker malfunction

Which one of the following loads is lost as a result of de-energizing NBN-S01

- A. WCN-E01A, Normal Chiller 'A'.
- B. CDN-P01B, Condensate Pump 'B'.
- C. AFN-P01, Non-Essential Aux Feed Pump.
- D. Non-Class Load centers NGN-L03, L17 and L11.



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Question 077

Given the following conditions:

- Unit 3 is at 12% power following a Refueling Outage
- Main generator synchronization is in progress
- Breaker 552-985 (Main Generator output Breaker) is closed

While raising Main Turbine load using the LOAD INCREASE pushbutton, the following were noted:

- Main generator load stopped increasing at 20 MW
- Load Limit Limiting Light is ON

Which one of the following responses is required?

- A. Trip the Main Turbine.
- B. Manually open Breaker 552-985.
- C. Place the Main Turbine in STANDBY, raise load to 65 MW.
- D. Raise Main Turbine load using the LOAD Limit Potentiometer to 65 MW.

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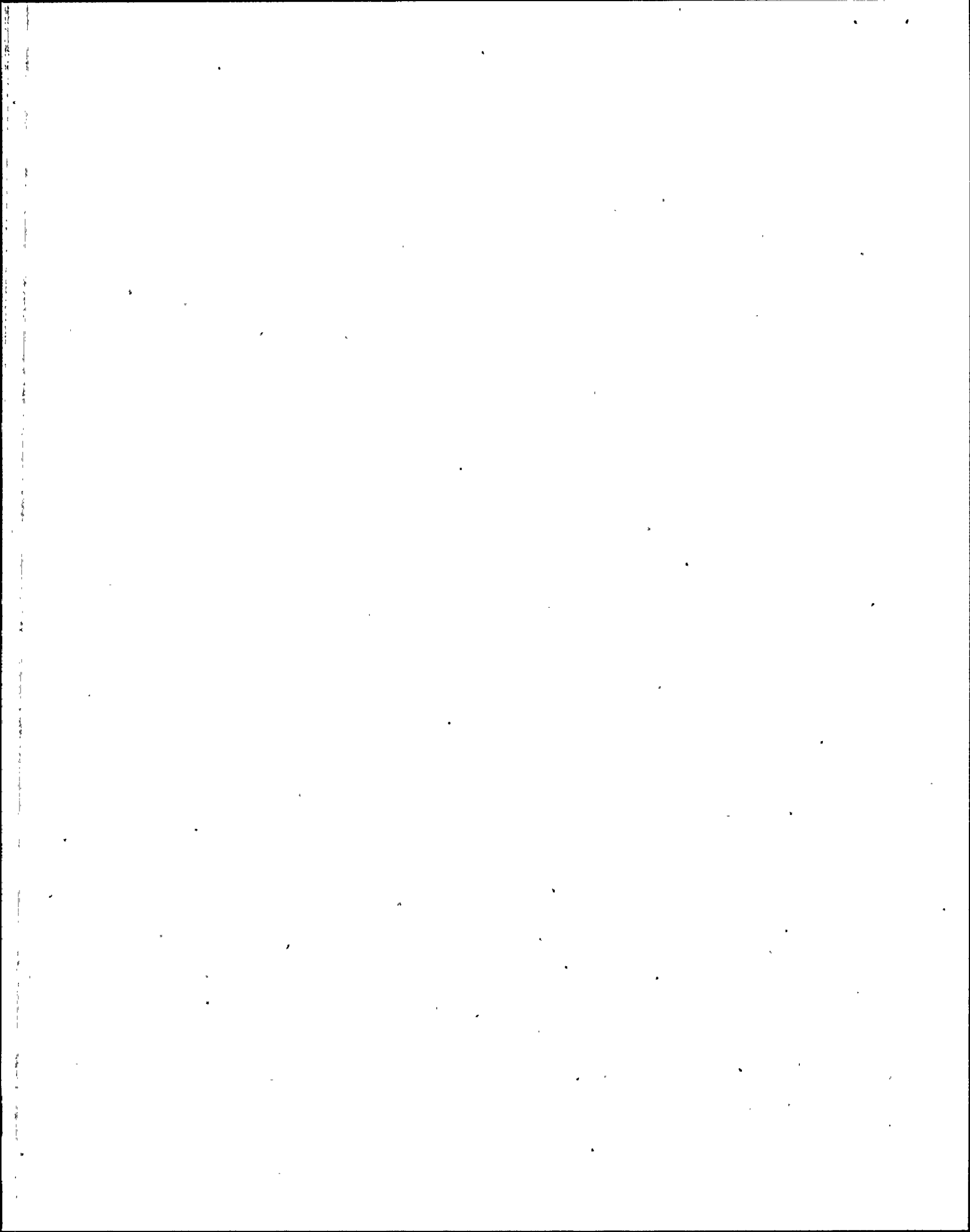
Question 078

Given the following plant conditions:

- Unit 1 is Mode 5
- PBA-S03 de-energized
- 'A' DG automatically started and energized PBA-S03

Which one of the following describes the DG trips that are active in this mode of DG operation?

1. Generator Differential
 2. High Vibration
 3. Engine Overspeed
 4. Low Engine Lube Oil Pressure
 5. Under frequency
- A. 1, 2, 4
- B. 2, 3, 5
- C. 3, 4, 5
- D. 1, 3, 4



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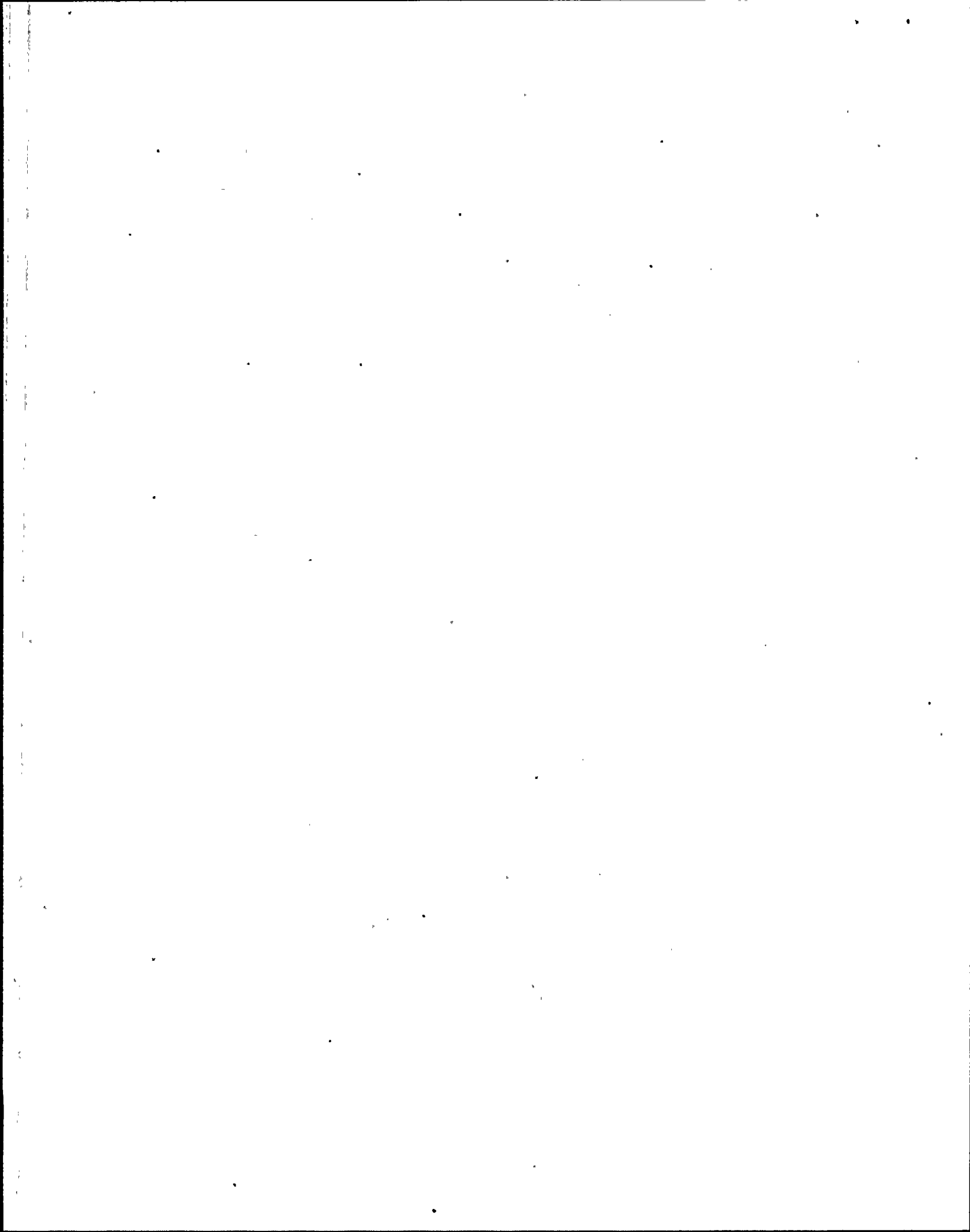
Question 079

Given the following plant conditions:

- Unit 3 is in Reduced Inventory
- The Containment hatch is scheduled to be opened
- Permission to open the hatch has been obtained from the Operations Department Leader

Which one of the following calculated times to boil would be the **MINIMUM** required to allow Containment hatch opening?

- A. 10 minutes
- B. 20 minutes
- C. 30 minutes
- D. 40 minutes



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Question 080

Given the following plant conditions:

- 100% power
- Pressurizer safety valve, PSV-200 has seat leakage
- Reactor drain tank level is rising
- Reactor drain tank pressure is 9.8 psig and increasing slowly

Which one of the following automatic actions will occur assuming no operator actions are taken?

- A. The RDT Vent to Containment, CHN-HV-923, will open resulting in increasing containment pressure.
- B. The RDT Vent to Waste Gas Header valve, CHN-UV-540, will open and the RDT Outlet Containment Isolation valve, CHA-UV-560, will close.
- C. The RDT Vent to Waste Gas Header valve, CHN-UV-540, and the RDT Outlet Containment Isolation valve, CHA-UV-560, will close.
- D. The RDT Vent to Waste Gas Header valve, CHN-UV-540, will open and the RDT rupture disk will rupture resulting in increasing containment pressure.

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Question 081

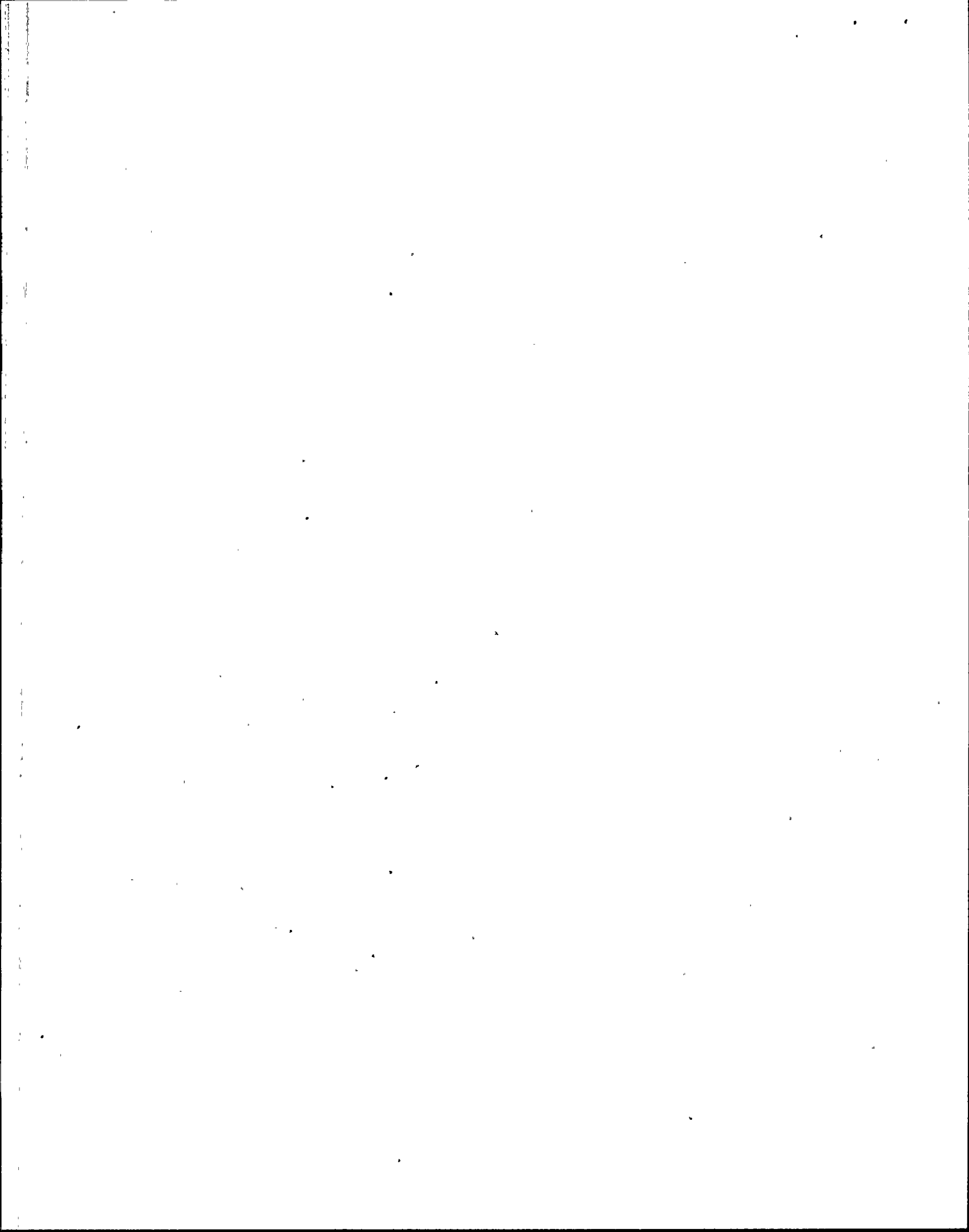
Reactor Startup per 40OP-9ZZ02 is in progress on Unit 3.

- MTC is -1 pcm/ $^{\circ}$ F.
- SBCS is in LOCAL-AUTO
- SGN-PV-1001 is approximately 8% open

The Primary RO withdraws CEAs to establish a Startup Rate of .5 DPM.

With no additional operator action, which one of the following describes the effects of reaching the Point of Adding Heat on the Steam Bypass Control System (SBCS)?

- A. SBCS modulates further open and controls steam flow at a higher value.
- B. SBCS modulates further open, then returns to a value corresponding to initial position.
- C. SBCS modulates further closed, and controls steam flow at a lower value.
- D. SBCS modulates further closed, then returns to a value corresponding to initial position.



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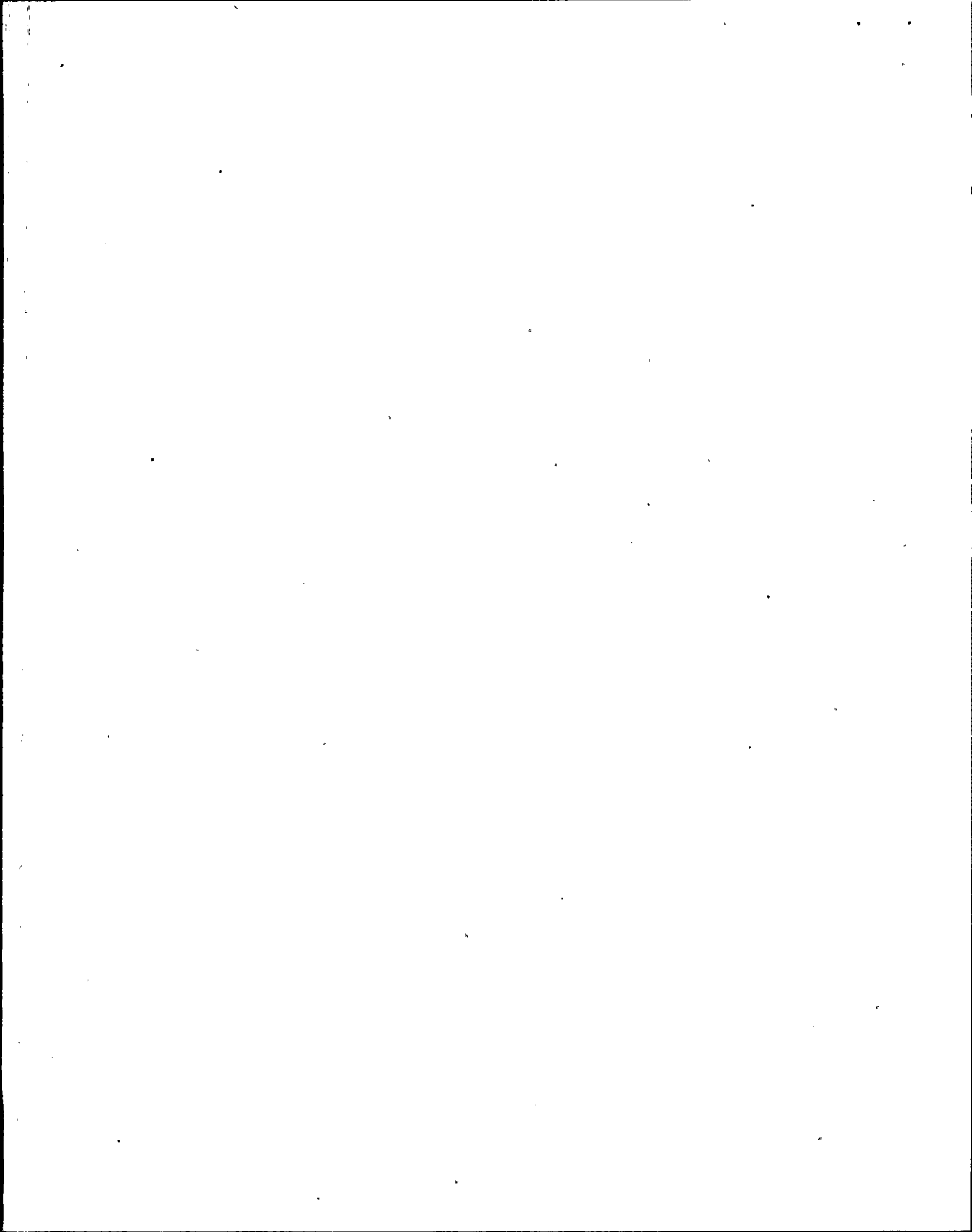
Question 082

Given the following conditions:

- Unit 1 is at 100% power
- The CRS had directed a manual reactor trip due to a plant transient
- The PO depresses all 4 reactor trip push-buttons on B05

Which one of the following initiates the subsequent main turbine trip signal?

- A. CEDMCS UV coils
- B. RPS Trip Initiation Relays
- C. RRS Low Power Bistables
- D. SBCS Quick Open Bistables

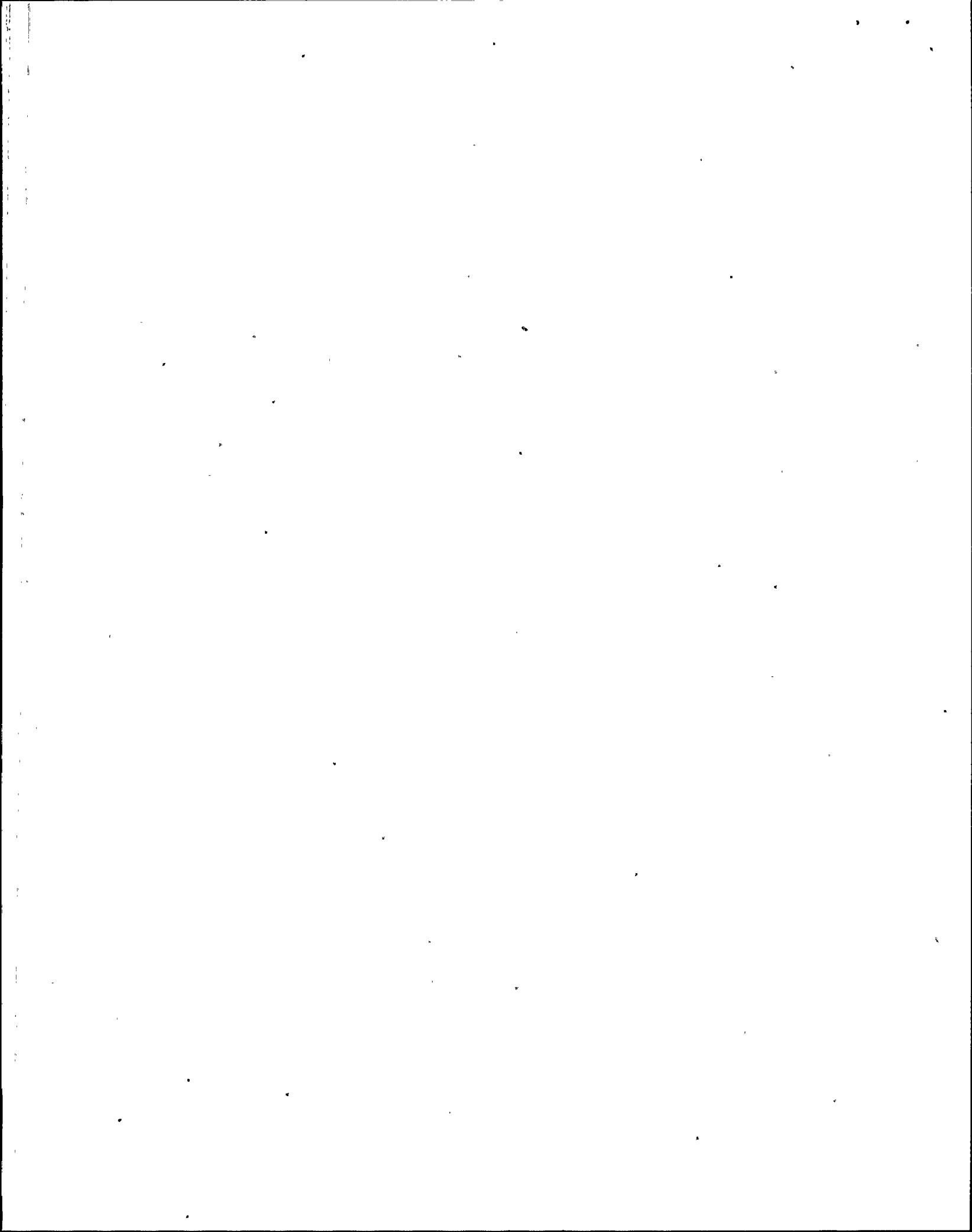


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Question 083

Which one of the following actuation's start the 'A' Essential Spray Pond Pump?

- A. RAS
- B. CIAS
- C. MSIS
- D. AFAS-1

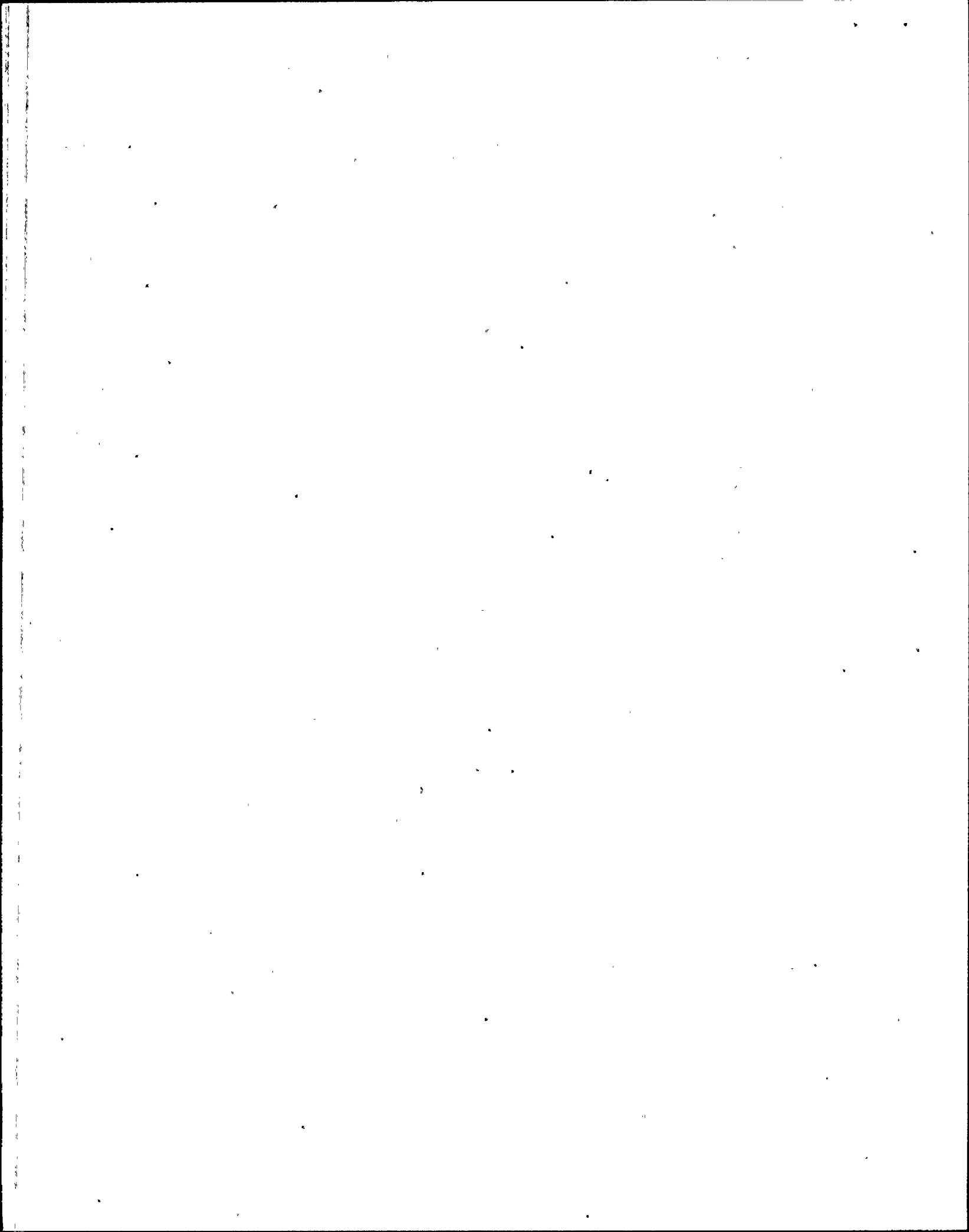


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Question 084

Who normally prepares the turnover comments sheet, Appendix C, of 40DP-9OP33, Shift Turnover?

- A. Shift Tech
- B. Shift Manager
- C. Third Reactor Operator
- D. Control Room Supervisor



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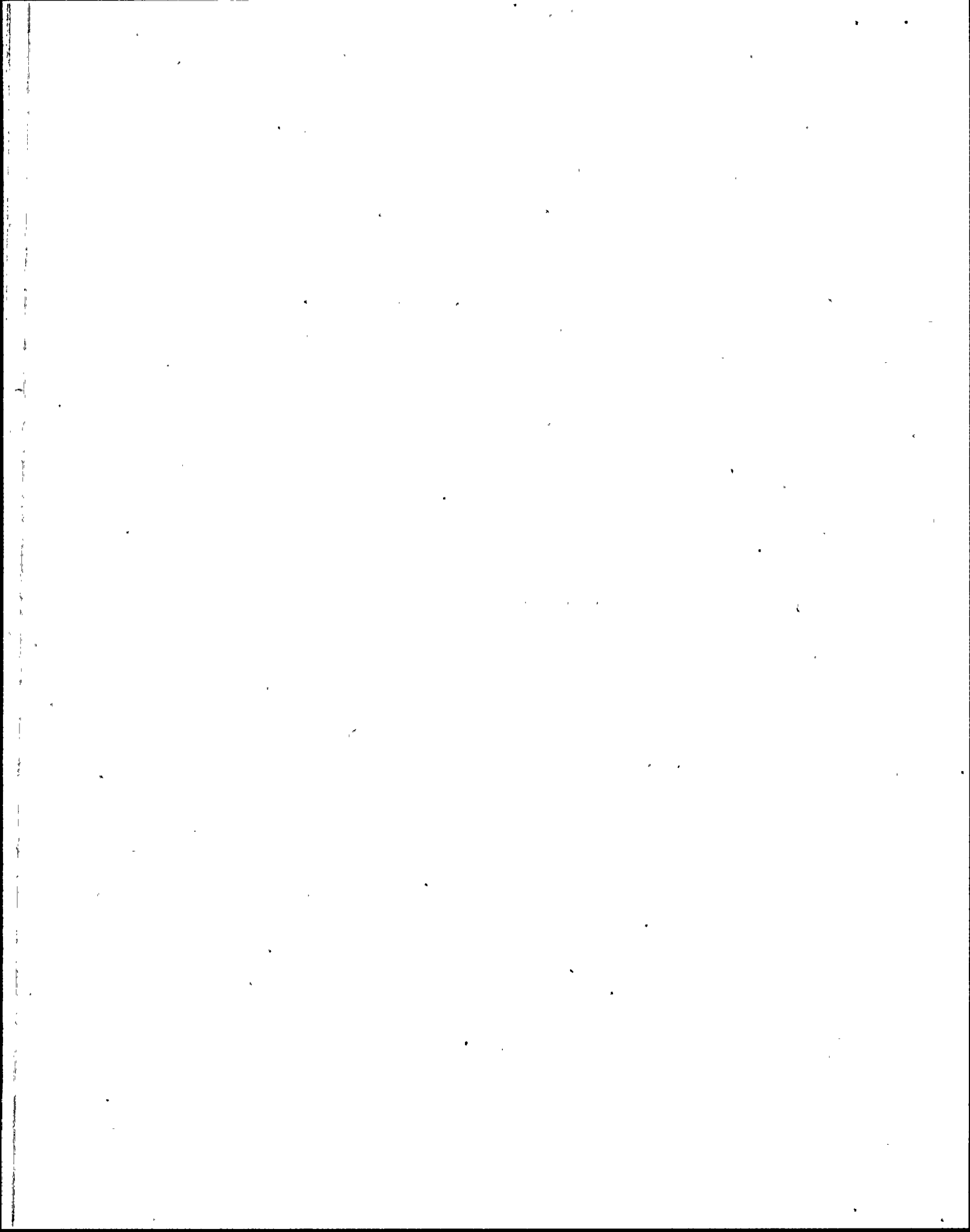
Question 085

Unit 1 is in MODE 1.

- The Third Reactor Operator becomes ill and must leave the site.
- Units 2 and 3 are fully staffed for the shift.

Which one of the following, if any, ACTION is required per 40DP-9OP02, Conduct of Shift?

- A. No ACTION required; minimum shift manning is still met.
- B. Immediately take ACTION to get a relief within 2 hours.
- C. Within 2 hours, take ACTION to obtain relief within 4 hours.
- D. CRS must assume the duties of the operator until a replacement arrives.



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Question 086

In regards to PVNGS Management Expectations concerning the implementation of 10 CFR 50.54X, which one of the following statements is correct? ,

- A. 10 CFR 50.54X cannot be invoked without prior NRC approval.
- B. 10 CFR 50.54X cannot be invoked unless the Functional Recovery Procedure has been implemented.
- C. 10 CFR 50.54X can be invoked to delay performing LCO condition required actions if continued unit operation is desired.
- D. 10 CFR 50.54X can be invoked if an action deviating from the EOPs needs to be taken in an emergency situation that is reasonable and serves to protect public health and safety.

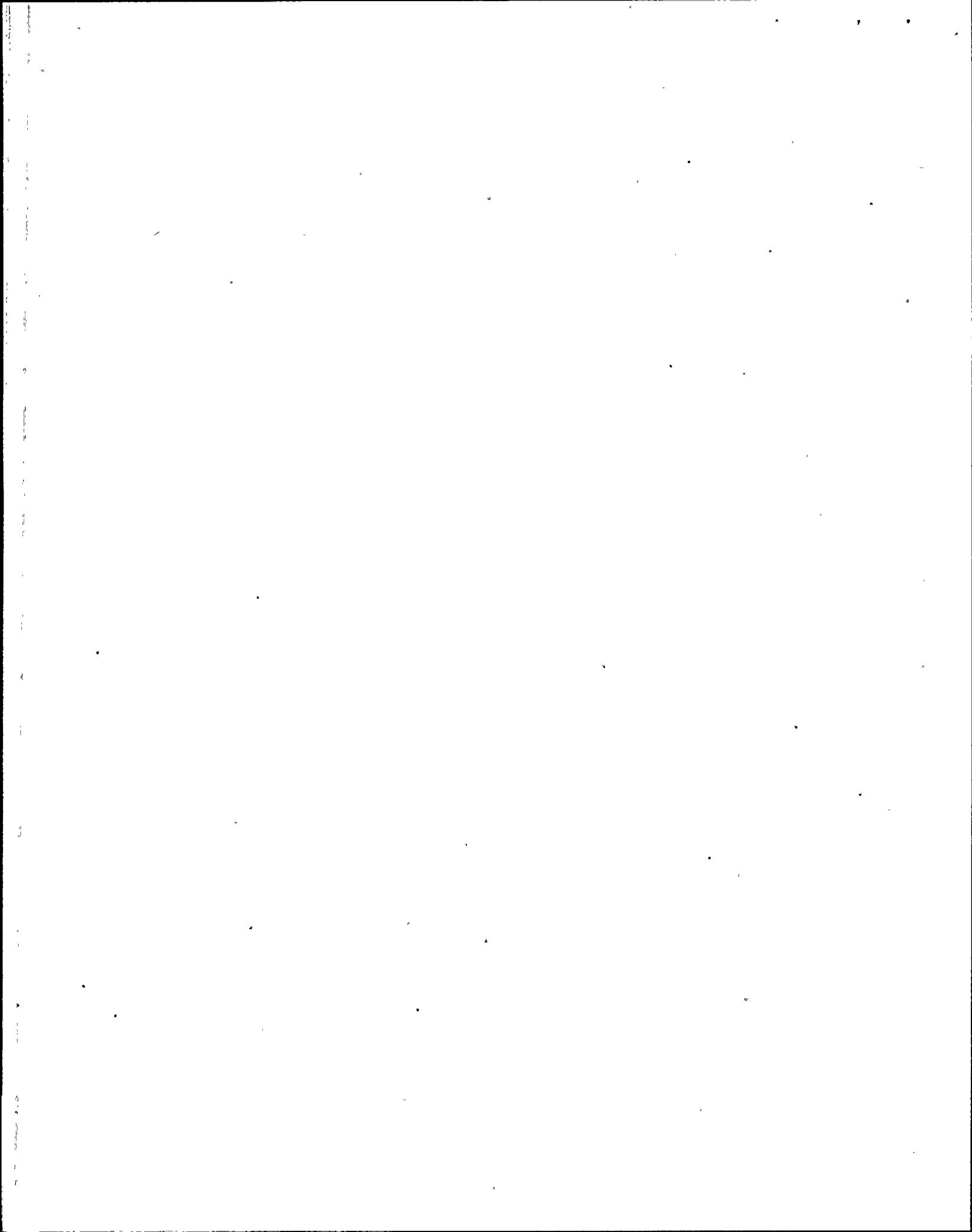
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Question 087

The unit is in Mode 1. A component under clearance is being returned to service. Due to operational needs, the normal system alignment will not be implemented.

How will system status for the component be maintained?

- A. A variance must be generated on the affected procedure.
- B. A new clearance must be generated, documenting the abnormal alignment.
- C. The component position must be documented on the Shift Turnover Comments Sheet.
- D. An Operations Night Order must be generated addressing the affected component position and contingency actions to be taken.



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Question 088

Which of the following procedure actions may be accomplished using a Temporary Approved Procedure Action (TAPA)?

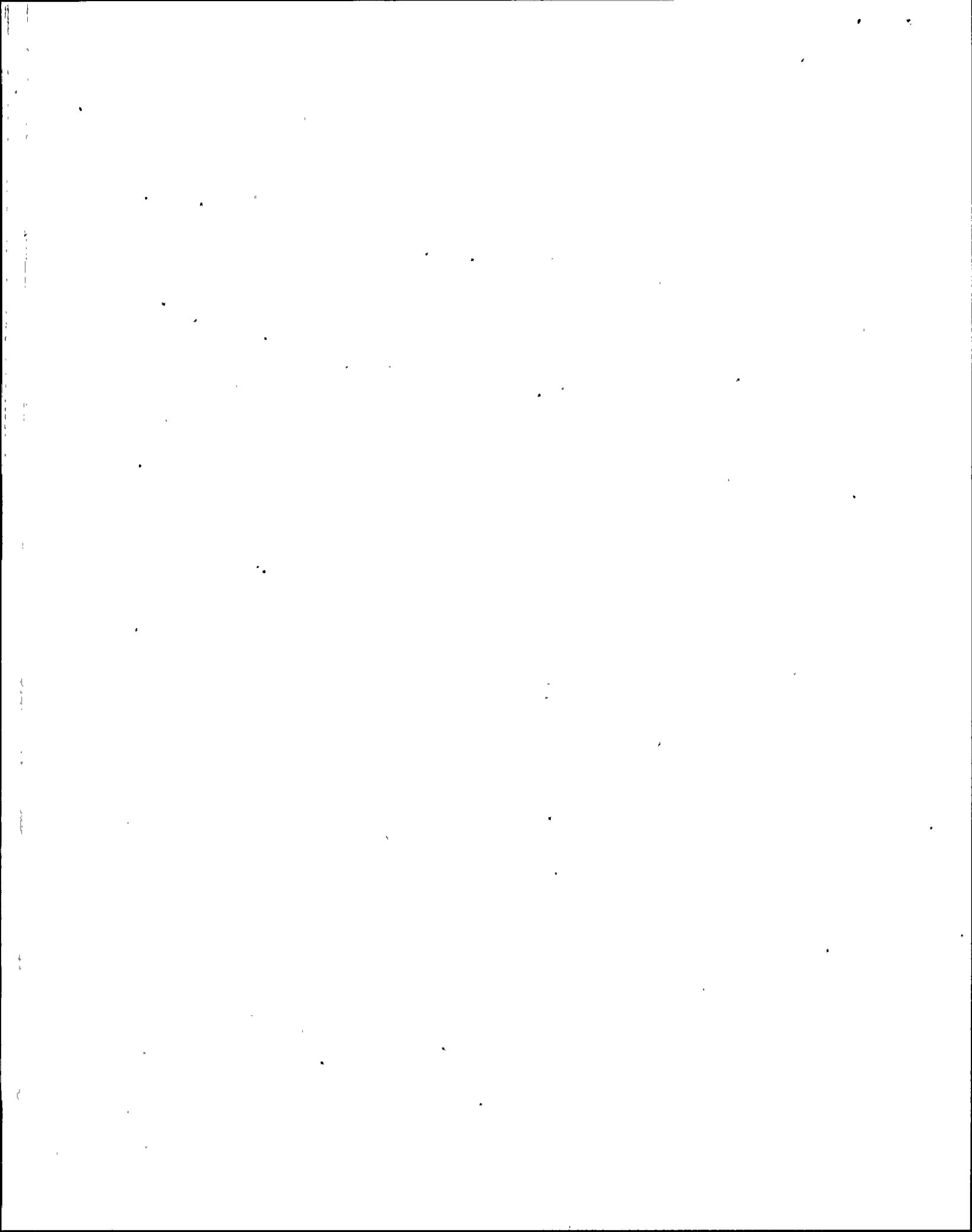
- A. Changing the Acceptance Criteria of a surveillance test.
- B. Minor, non-impact changes to implementing procedures.
- C. Provide documentation of component pre-conditioning prior to performing a surveillance test.
- D. Changing system alignments under circumstances requiring a 10CFR50.59 Safety Evaluation.

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Question 089

A Temporary Modification would be required for which one of the following installations?

- A. Temporary power to NHN-M04.
- B. Domestic service flush line on NCN-P01A while it is tagged out.
- C. Discharge pressure gauge on LPSI 'A' while performing 73ST-9SI11 (LPSI Pump Miniflow Inservice Test).
- D. Technician periodically attaches a Voltmeter on the control power for PGA-L35 and continuously monitors it while installed.



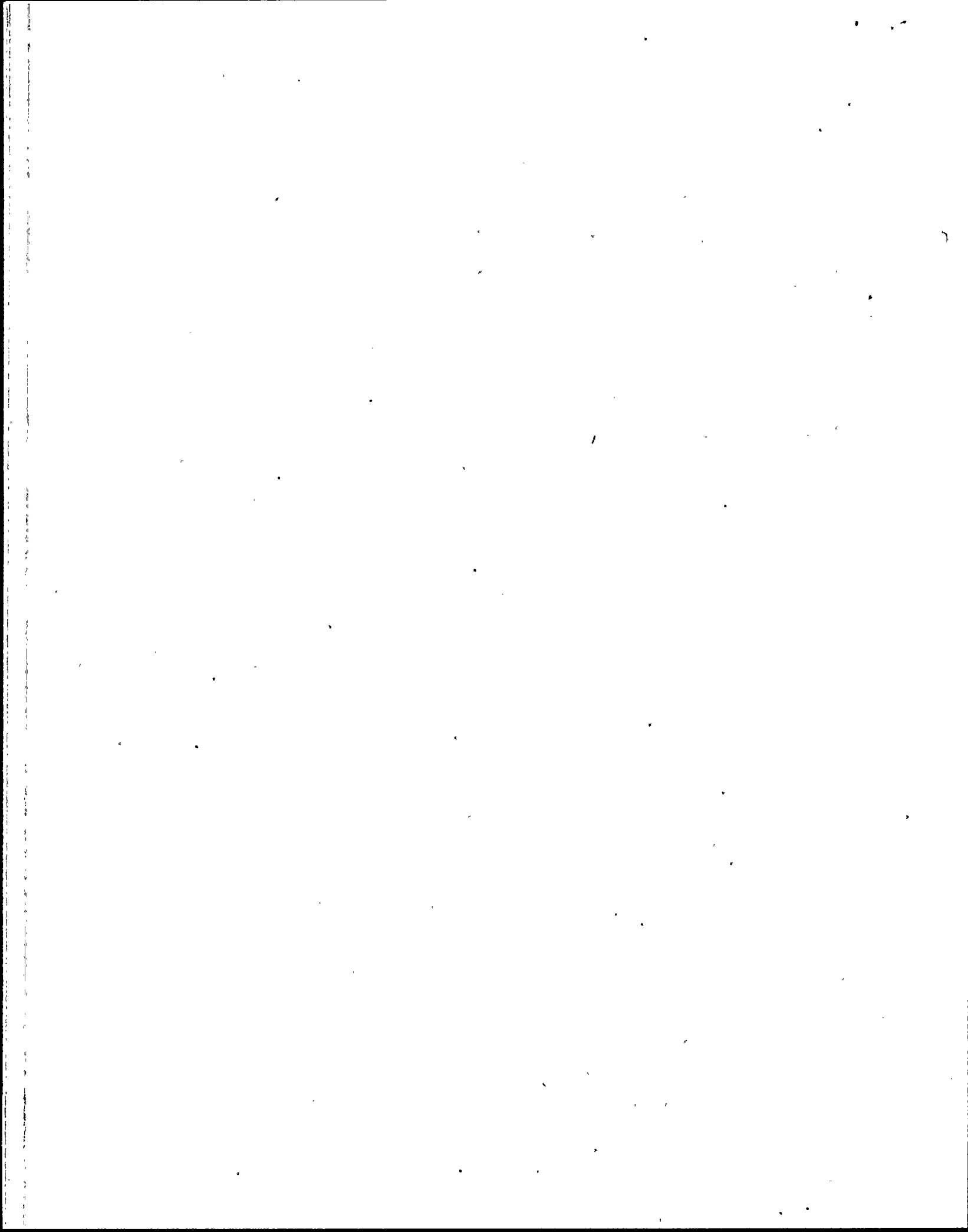
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Question 090

Which one of the following statements concerning yellow caution tags is correct?

Yellow Caution Tags _____

- A. can only have a single acceptor.
- B. do not require a technical review.
- C. are placed on temporary grounding devices.
- D. provide protection on energy isolation devices.

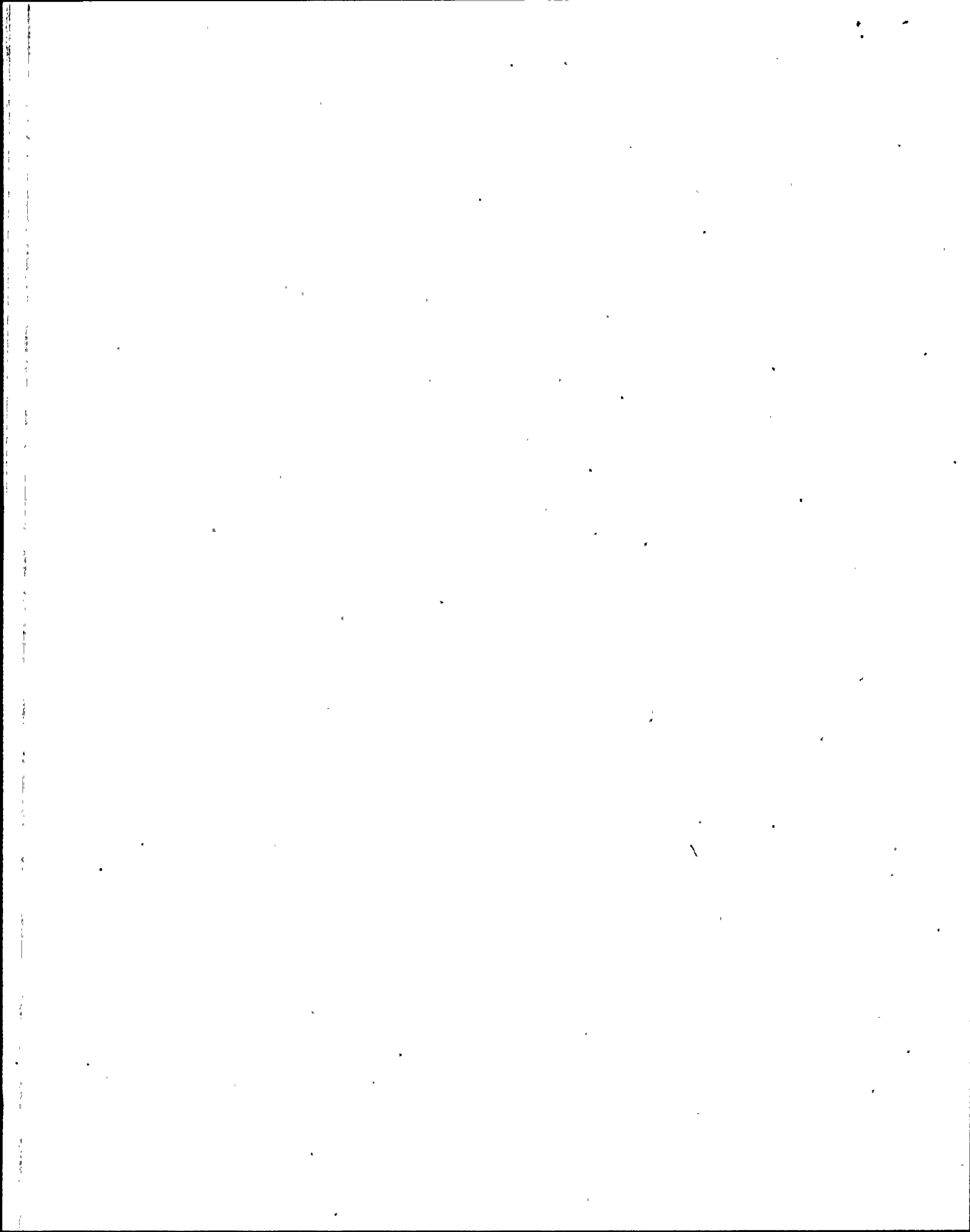


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Question 091

While maintaining the Refueling Water Tank minimum Tech Spec level of _____ gallons ensures at least _____ minutes of full Safety Injection flow from _____ Train(s) of Safety Injection.

	<u>Volume</u>	<u>Time</u>	<u>Train(s)</u>
A.	300,000 gal	10	1
B.	600,000 gal	10	2
C.	300,000 gal	20	1
D.	600,000 gal	20	2



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Question 092

The Refueling Machine operator suggests altering the sequence of Core Offload to save time and dose.

Who, at a minimum, must authorize this action?

- A. Outage Coordinator and Reactor Engineer
- B. Shift Manager and Shift Technical Advisor
- C. Reactor Engineer, Refueling SRO, and Shift Manager
- D. Reactor Engineer, Refueling SRO, and Outage Coordinator

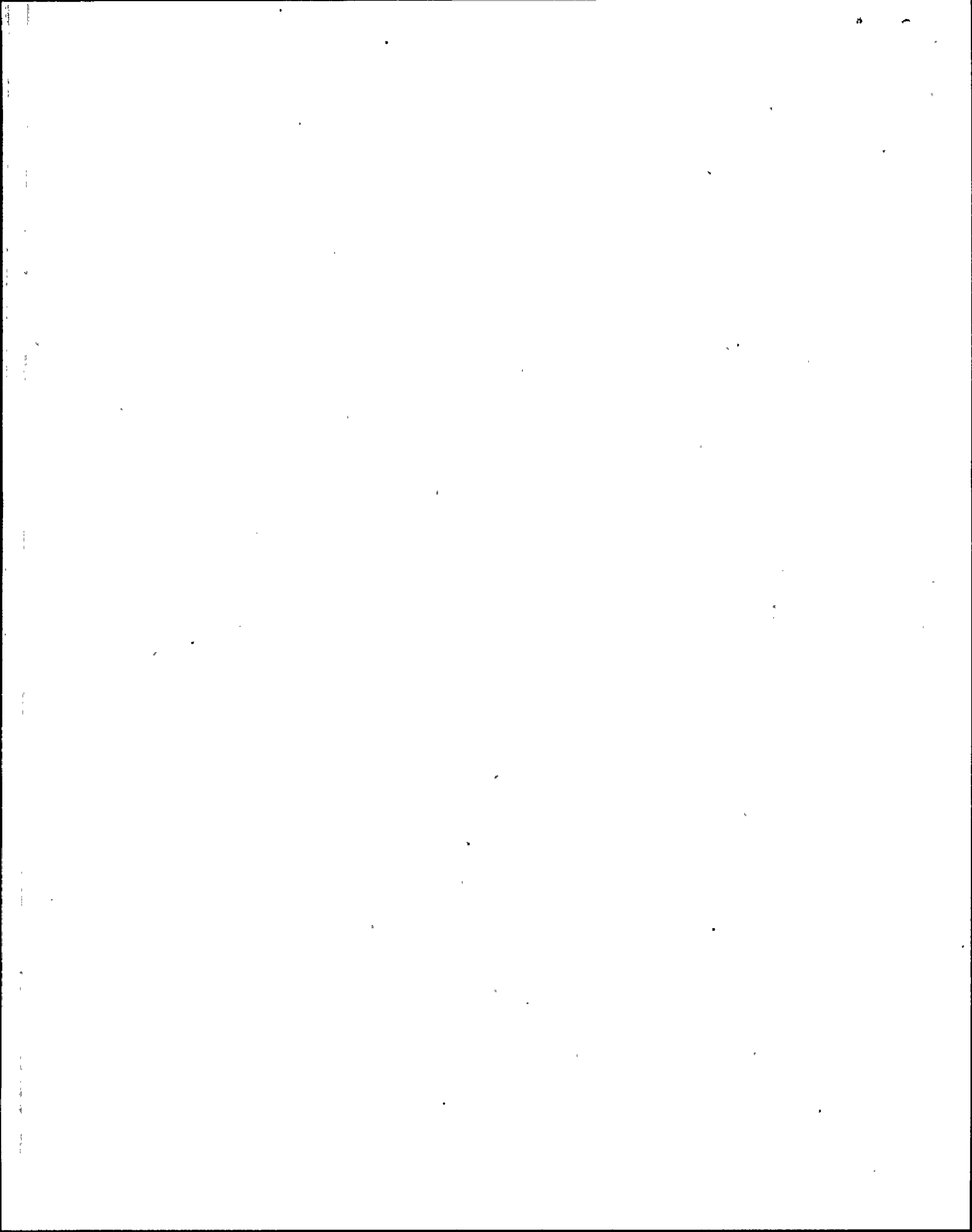
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Question 093

An operator is required to complete a valve lineup in an area where the radiation level is 50 mrem/hour. The operator's current TEDE is 1130 mrem.

Which one of the following is the **MAXIMUM** time allowed in this area without exceeding the operator's PVNGS administration limit?

- A. 7 hours.
- B. 17 hours.
- C. 37 hours.
- D. 77 hours.



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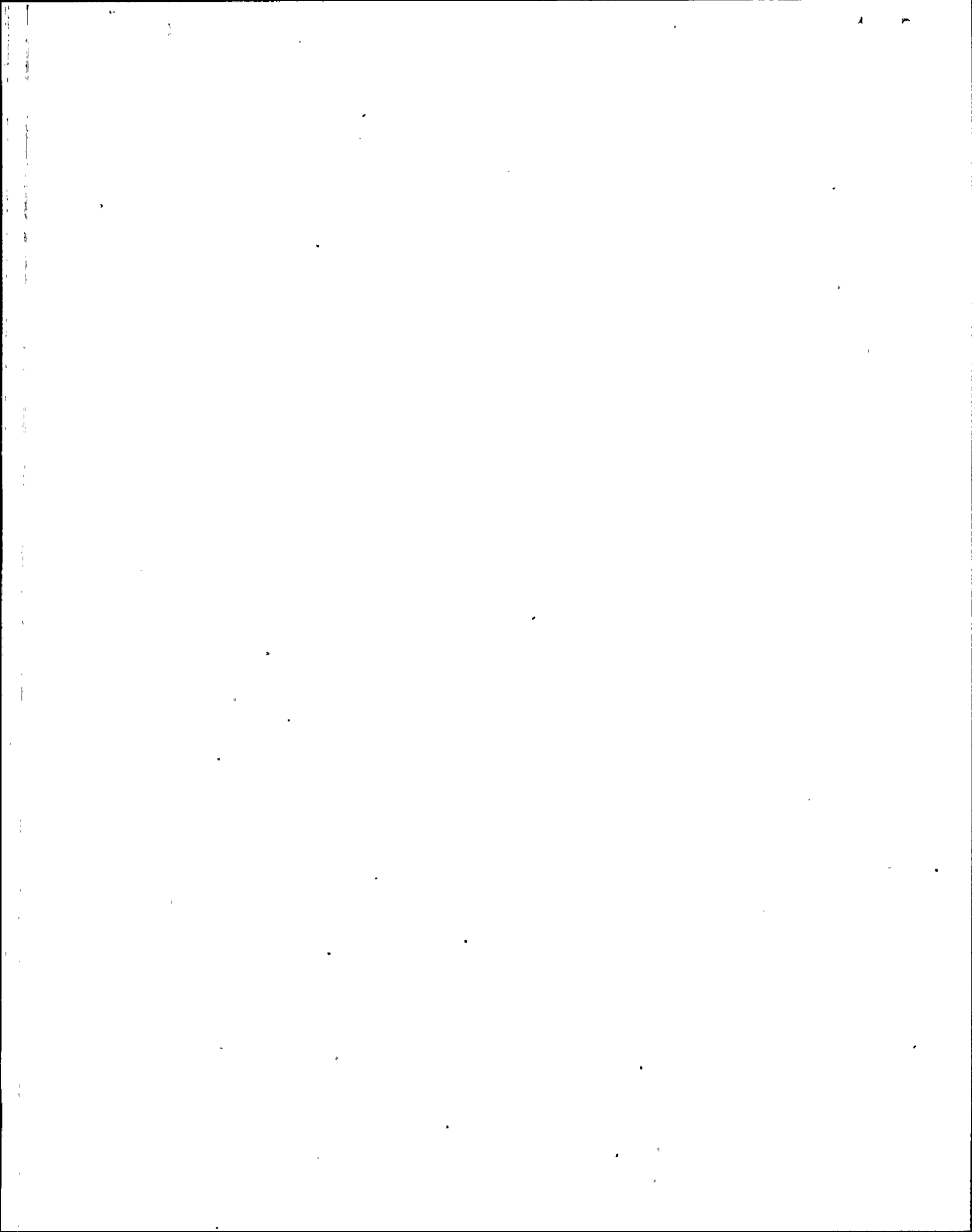
Question 094

An operator is performing a clearance tagging audit by verifying tags are hung on the proper components.

One of the tags is located inside a Locked High Radiation Area (LHRA).

Which one of the following is the acceptable response to this situation?

- A. Verify the tag installed by utilizing an alternate method.
- B. Obtain a key from the control room and enter the LHRA to verify the tag.
- C. Contact RP to send an RP technician to assist in entering the LHRA to verify the tag.
- D. Tagging Coordinator determines that verification of the tag is not required due to ALARA concern.



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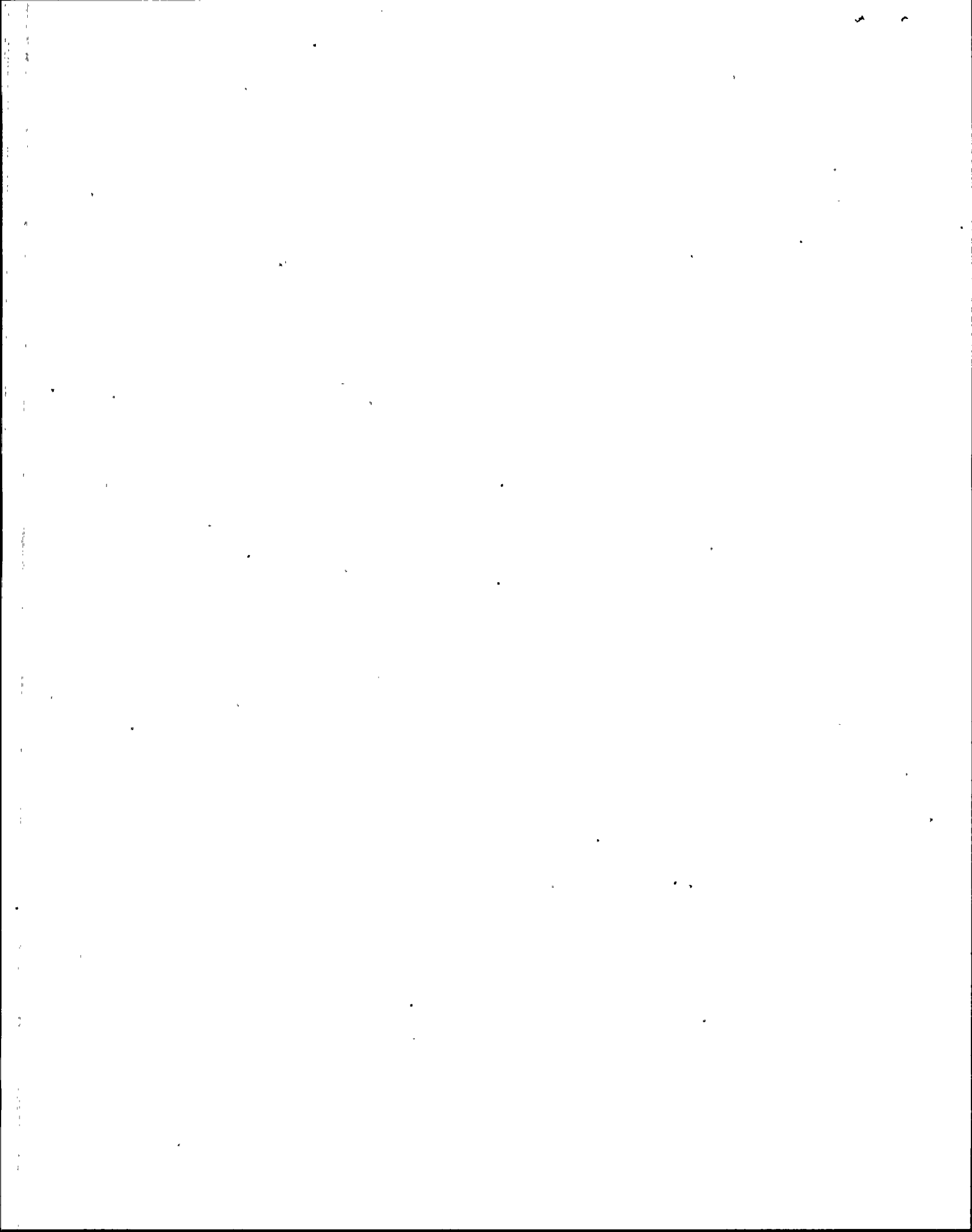
Question 095

Given the following plant conditions:

- 100% power
- Containment vent is in progress
- The Radioactive effluent release permit associated with the venting expires in 30 minutes
- The estimated containment pressure at that time will be .5 psig

Which one of the following actions should the operators take?

- A. Stop the venting within 30 minutes.
- B. Obtain a Containment Air Grab Sample.
- C. Perform a CHANNEL CHECK of RU-37 and RU-38.
- D. Continue the vent until containment pressure reaches atmospheric.



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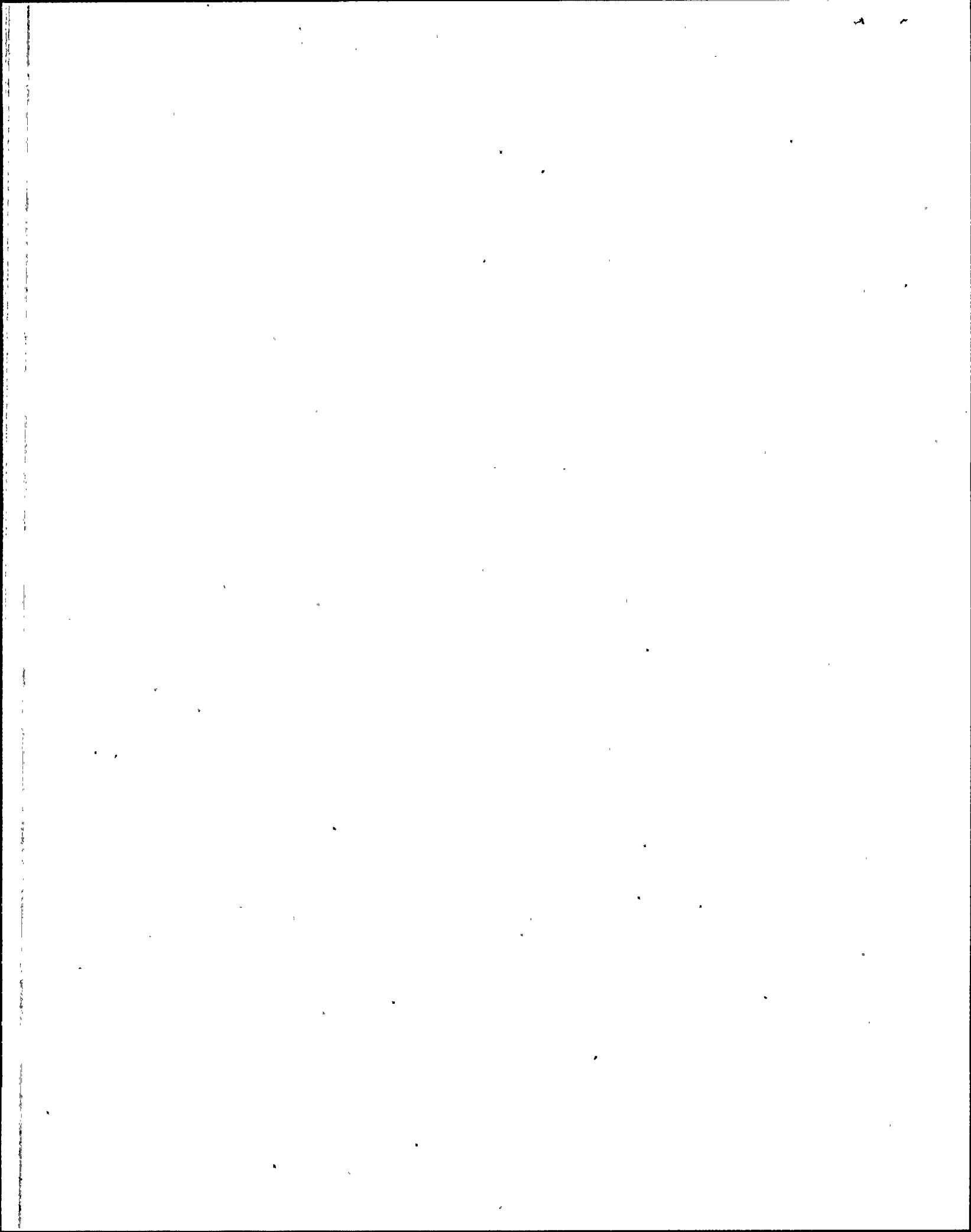
Question 096

Given the following plant conditions:

- Unit 1 tripped due to a Loss of Offsite Power
- 40EP-9EO01, Standard Post Trip Actions have been completed
- PO reports RCS Pressure and Pressurizer Level are decreasing rapidly
- SO reports Containment Pressure increasing and RU-16 in High Alarm

Which one of the following is the appropriate action for the CRS to take under these conditions?

- A. Complete a second pass of 40EP-9EO01, Standard Post Trip Actions.
- B. Enter 40EP-9EO03 Loss of Coolant Accident (LOCA).
- C. Enter 40EP-9EO09, Functional Recovery for jeopardized safety functions only.
- D. Enter 40EP-9EO03, LOCA and 40EP-9EO07, Loss of Offsite Power/Loss of Forced Circulation.



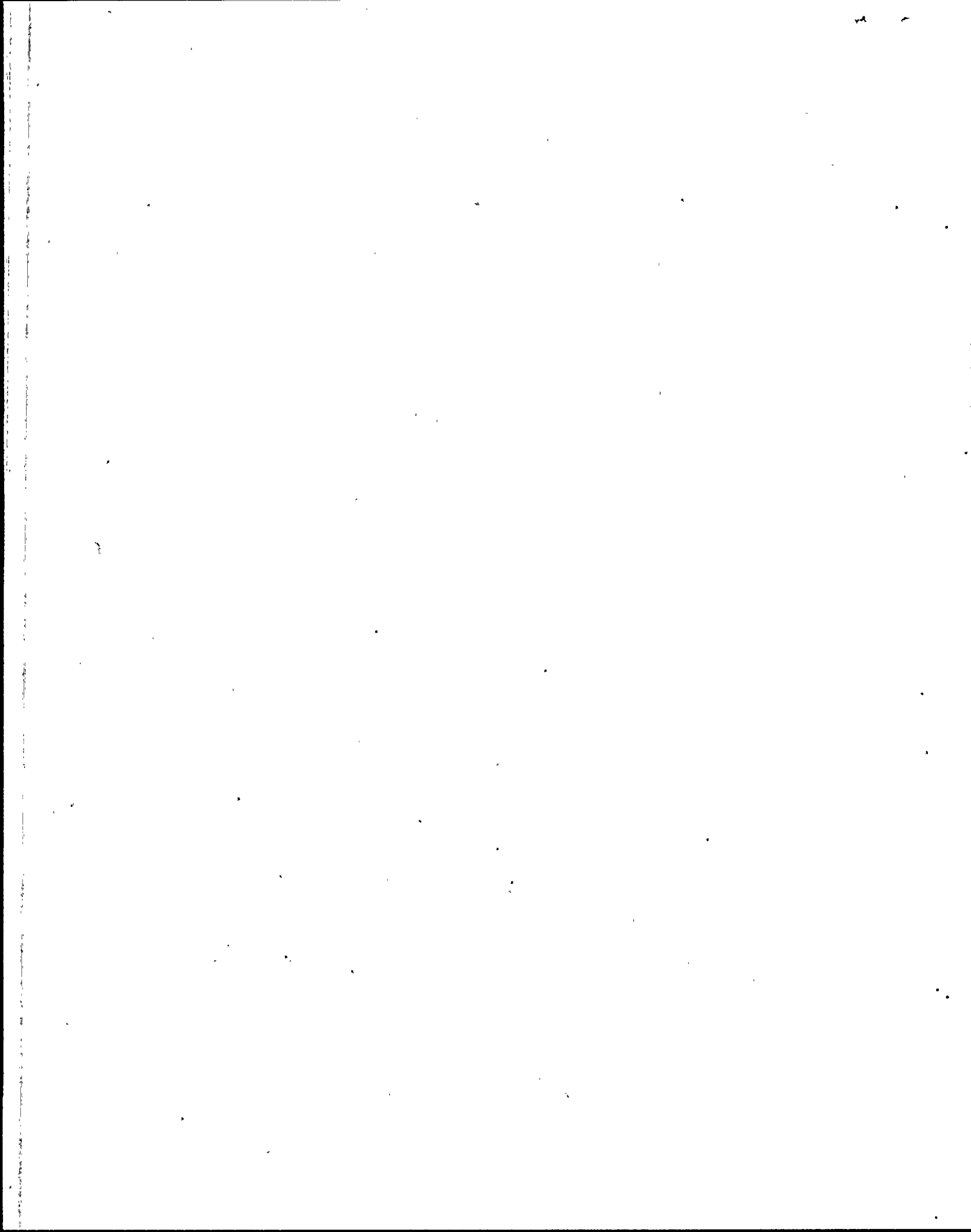
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Question 097

When are Technical Specifications addressed during Emergency Operating Procedure implementation?

Technical Specifications are addressed _____

- A. prior to exiting the Emergency Operating Procedures.
- B. immediately by the Shift Technical Advisor in parallel with the Safety Function Status Check.
- C. selectively at the discretion of the Unit Department Leader.
- D. within 24 hours following the completion of the post-trip Operability Determination.

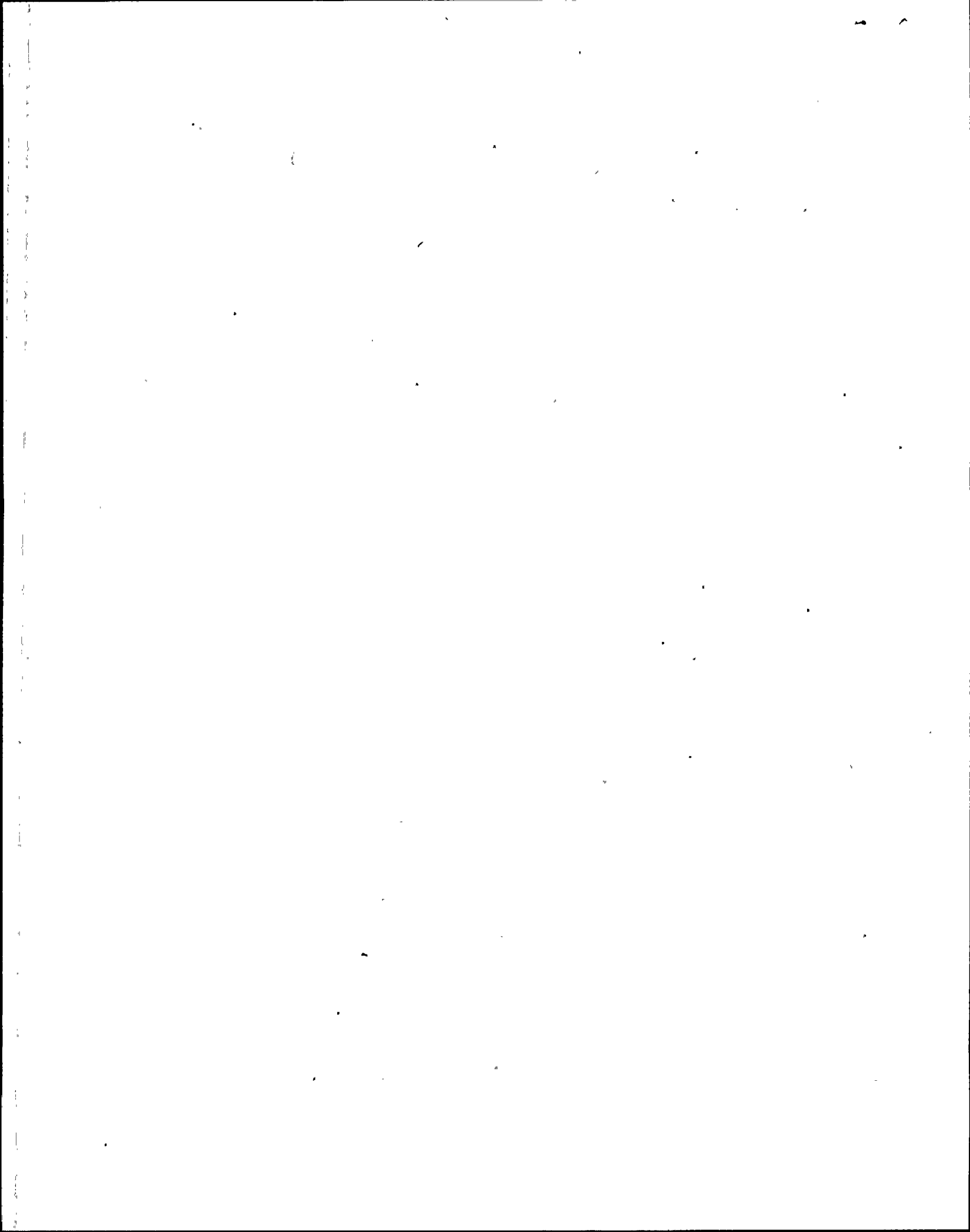


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Question 098

Which one of the following is the CRS required to do in response to a fire in the Fuel Building concurrent with a reactor trip per 40DP-9ZZ19, Operational Considerations Due to A Plant Fire?

- A. Deenergize all Appendix R equipment in the Fuel Building.
- B. Implement the Functional Recovery Procedure due to multiple events.
- C. Implement LOOP/Loss of Forced Circ due to fire analysis.
- D. Evaluate Appendix R actions in parallel with Emergency Operating procedures.



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Question 099

Which one of the following is a DELEGABLE responsibility of the Emergency Coordinator during a Site Area Emergency?

- A. Emergency team deployment.
- B. Protective Action Recommendations (PARs).
- C. Offsite notifications to the state, county and NRC.
- D. Determination of evacuation of non-emergency personnel.

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Question 100

Given the following plant conditions:

- An event classified as an ALERT exists in Unit 3
- Satellite Technical Support Center (STSC) is being activated

When must the STSC Communicator make notifications to offsite agencies?

- A. Within 15 minutes of being directed.
- B. Within 15 minutes of event declaration.
- C. Within 30 minutes of being directed.
- D. Within 30 minutes of event declaration.