

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION

SIMULATOR LESSON PLAN

07-190-91

02-REQ-009-TRA-2-31 Revision 0

TITLE: RECIRC PUMP DOWNSHIFT/APRM FAILURE/LOSS OF SWG-016/  
MSC LEAK IN TUNNEL

	SIGNATURE	DATE
PREPARED BY	<u>[Signature]</u>	<u>5/31/91</u>
VALIDATED BY	<u>[Signature]</u>	<u>5/31/91</u>
SUPERVISOR OPS. TRAINING	<u>[Signature]</u>	<u>5/31/91</u>
PLANT SUPERVISOR/ USER GROUP SUPERVISOR	<u>[Signature]</u>	<u>5/31/91</u>

**MASTER**  
 Summary of Pages  
 (Effective Date 5/31/91)  
 Number of Pages 16  
**CONTROLLED**  
 Date May 1991 Pages 1 - 16  
**DOCUMENT**

TRAINING DEPARTMENT RECORDS ADMINISTRATION ONLY:

VERIFICATION: \_\_\_\_\_

DATA ENTRY: \_\_\_\_\_

RECORDS: \_\_\_\_\_

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 PDR ADOCK 05000410  
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ATTACHMENT 5  
LESSON PLAN TEMPORARY/PUBLICATION/ADDENDUM CHANGE FORM

The attached change was made to:

Lesson plan title: Recirc Pump Downshift / APRM Failure / Loss of Sight - 16

Lesson plan number: 02-REQ-DOA TRA-2-51

Name of instructor initiating change: Eric D. Perry

Reason for the change: Correction of typos <sup>to Learning Objectives</sup> and to Add A Role Play.

Type of change:

1. Temporary change
2. Publication change
3. Addendum change

Disposition:

1. Incorporate this change during the next scheduled revision.
2. Begin revising the lesson plan immediately. Supervisor initiate the process.
3. To be used one time only.

Approvals:

Instructor: Eric D. Perry /Date 6/17/91

Supervisor Operations Training (or designee): Matthew K. [Signature] /Date 6/17/91

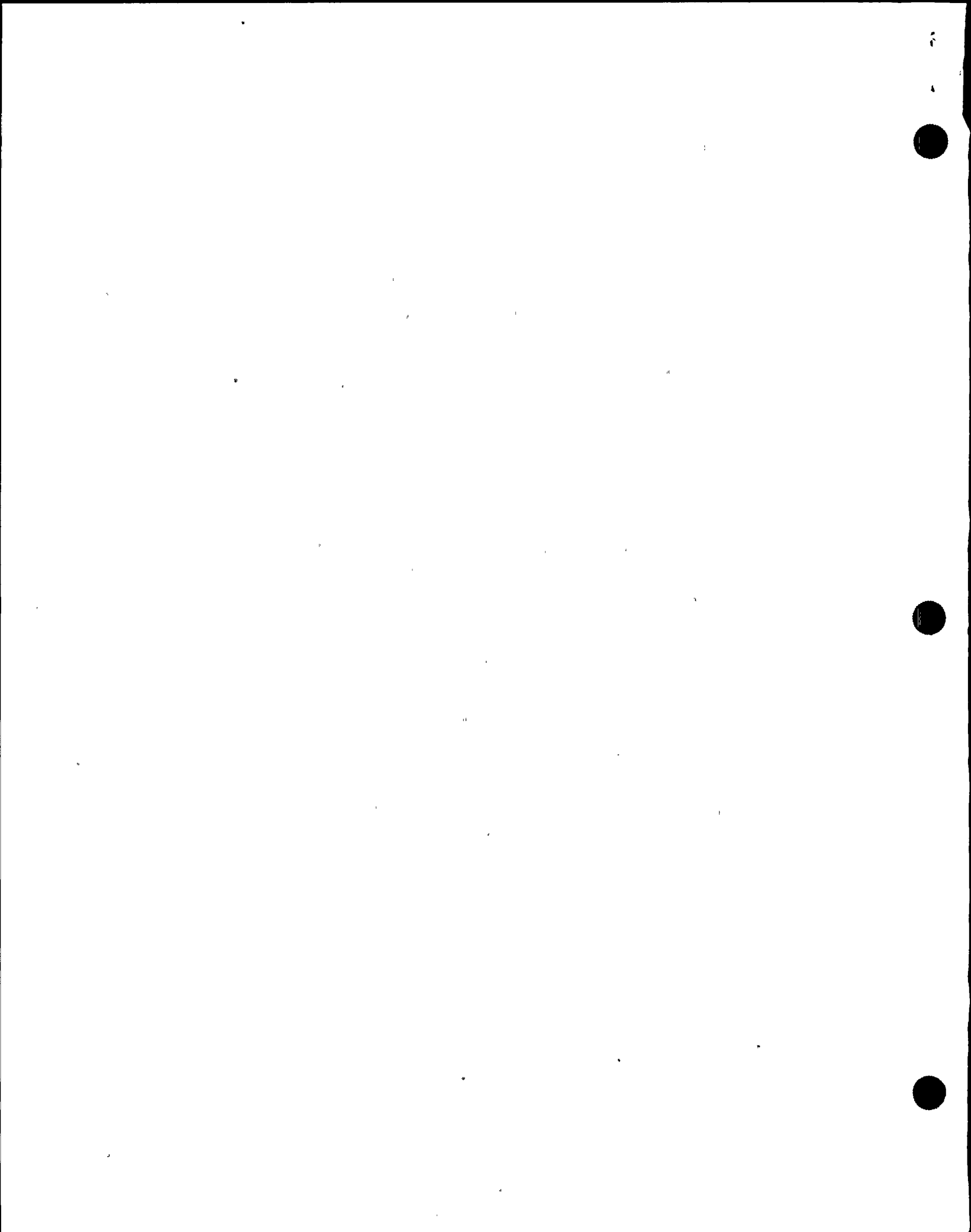


A. TRAINING DESCRIPTION

1. Title of Lesson Plan: Recirc Pump Downshift/APRM Failure/Loss of SWG-016/MSL Leak in Tunnel
2. Estimated Duration of Lesson: 50 minutes
3. Prerequisites:
  - a. Instructor:  
Qualified in accordance with NTP-16.
  - b. Trainees:  
Meet eligibility requirements per 10CFR55.
4. References:
  - a. Nine Mile Point Unit 2 Technical Specifications
    - 1) Table 3.3.1-1 RPS Channel Requirements
    - 2) Table 3.3.6-1 Rod Block Channel Requirements
  - b. N2-OP-101C, Plant Shutdown
  - c. N2-OP-29, Reactor Recirc System
  - d. N2-OP-92, Neutron Monitoring System
  - e. N2-OP-11, Service Water
  - f. N2-OP-71, AC Power Distribution
  - g. N2-EOP-RPV, Emergency Operating Procedures - RPV Control
  - h. N2-OP-60, Drywell Cooling
  - i. N2-OP-97, Reactor Protection System
  - j. INPO NPRDS (see Lessons Learned Section)
5. Manipulations Performed:
  - a. A05, Power changes >10% with rods or recirc flow
  - b. B15, Nuclear Instrumentation Failure
  - c. A11, Loss of Elec. Power/Degraded Sources
  - d. B14, Main Steam Line Break (in or out of cont.)

B. REQUIREMENTS

1. NTP-11 Licensed Operator Requalification Training



C. PRE-EXERCISE BRIEF

Conduct in accordance with NTI-4.3.1 using Attachment 1 as a guide.

D. SIMULATOR SET-UP

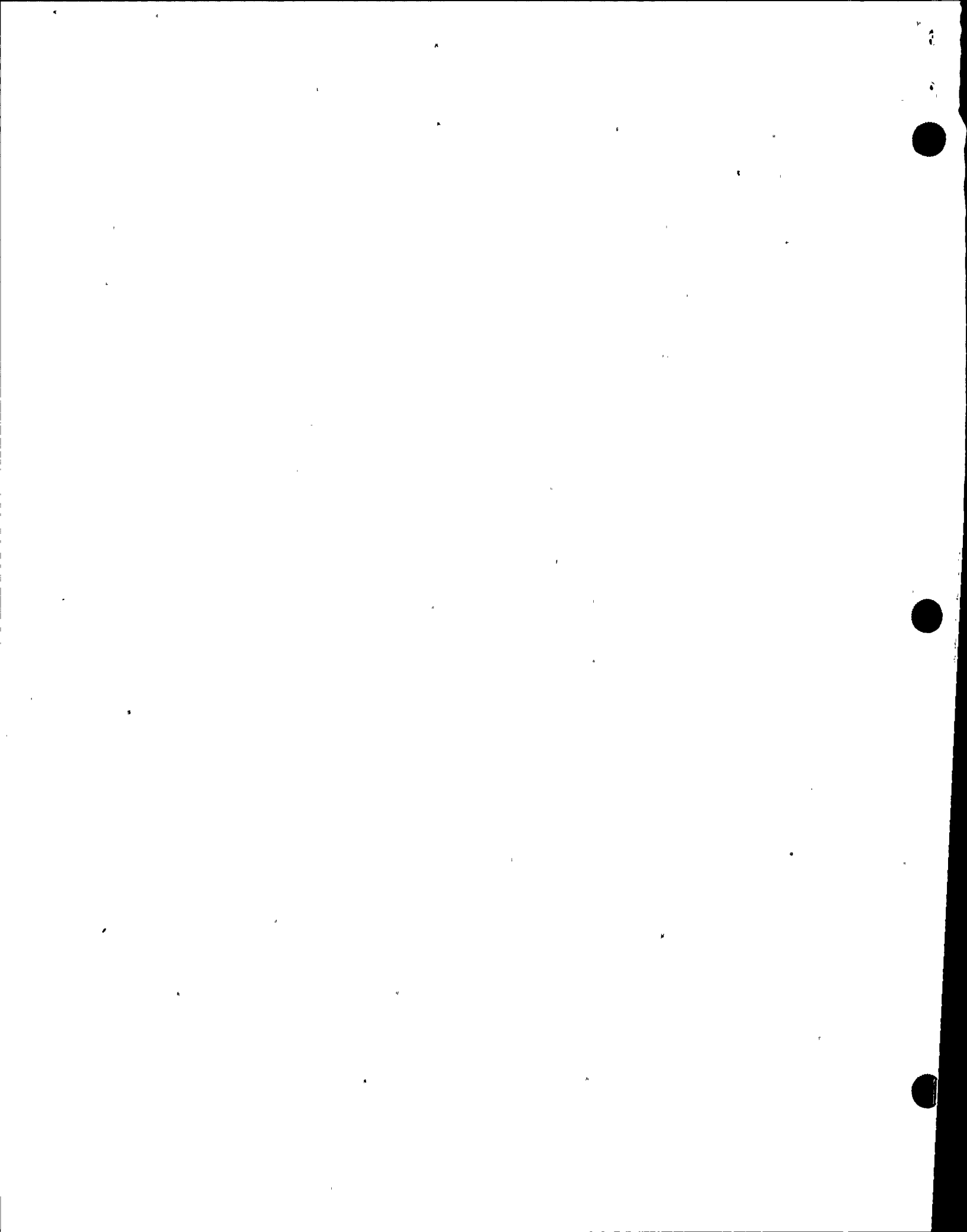
1. Initialize IC-15
2. Change the simulator conditions as follows:
  - a. Insert RWM Groups 71, 70, 69, and 68
  - b. Secure 4th Pt. Htr. Drain pumps per OP-8
  - c. Place STBY Cond./Cond. booster pumps in PTL per OP-3
  - d. Place Recirc flow control in loop - manual
  - e. Transfer house loads to off-site power
3. Enter the following presets:
  - a. Preset Malfunction:  
MF;1,MS13  
MSIV Isolation Failure
  - b. Preset I/O's:  
None
  - c. Preset Remotes:  
None

E. POSITION ASSIGNMENTS

Ensure proper rotation of trainees is performed to meet the requirements of the training session.

F. SCENARIO SUMMARY

The plant is operating at approximately 45% power at the time of turnover. Plant shutdown is in progress in preparation for the mid-cycle outage. The crew will downshift Recirc pumps. After satisfactory completion of the downshift, an APRM fails. Soon afterwards, 2NNS-SWG16 is lost. The final problem the crew encounters is a small steam leak in the steam tunnel. The scenario ends when the RPV parameters are stabilized and the event has been classified.





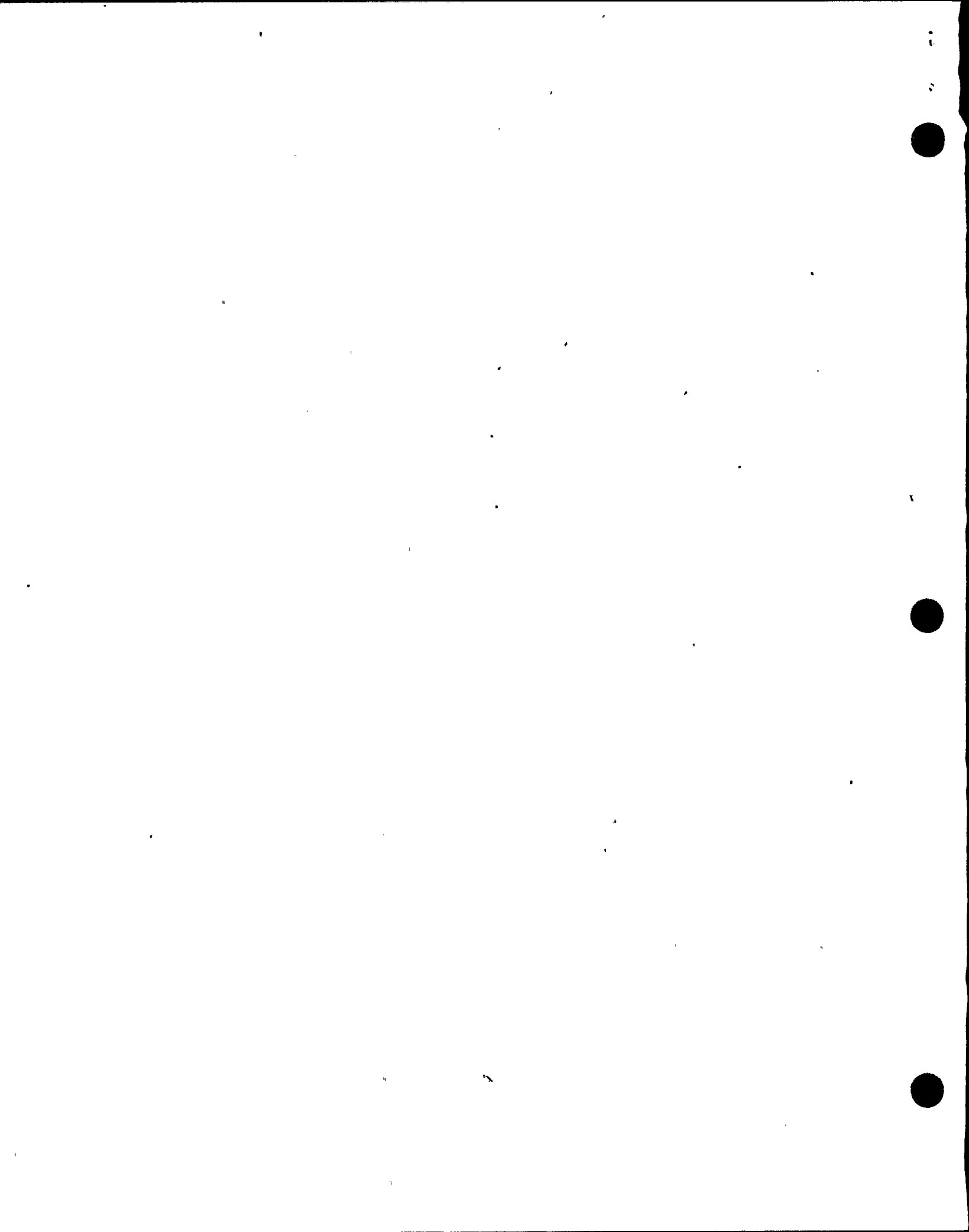
G. LEARNING OBJECTIVES

1. Generic Objectives:

- GO-1.0 Demonstrate effective communications in accordance with the Operations Department Instruction on verbal communications.
- GO-2.0 Demonstrate for those exercises that require use of the Emergency Plan, an understanding of the roles and responsibilities of the SSS, ASSS/STA and CSO/NAOE in accordance with Operations Department Instructions.
- GO-3.0 SRO's shall demonstrate an understanding of command and control, EOP place keeping techniques and effective use of Control Room personnel during emergency conditions.
- GO-4.0 Operators shall demonstrate "Self Verification" work practices in accordance with Operations Department Instructions.

2. Scenario Objectives:

- LO-1.0 Given a reactor plant at approximately 45% power, the operating crew will transfer both Recirc pumps to slow speed IAW OP-29 and OP-101C.  
Tasks:  
SRO: Direct Reactor power changes (>10%) using recirc flow or control rods (3419140103).  
RO: Monitor operation of the Recirc pumps. (2020060101)
- LO-2.0 Given a reactor plant at approximately 40% power and an APRM fails upscale, the operating crew will recognize that channel A has failed and reset the 1/2 scram.  
Tasks:  
RO: Perform the actions required for an APRM/LPRM Failure (2009040501).



LO-3.0 Given a loss of SWG-016, the operating crew will transfer Div. I and III to the alternate supply without power interruption to the emergency buses.

Tasks:

SRO: Authorize and direct de-energizing/energizing of electrical busses (3410460303).

RO: Perform actions for an emergency electrical system failure (2000040501).

LO-4.0 Given a reactor plant performing a shutdown, a leak develops in the steam tunnel. The operating crew will shut the MSIVs within one minute after verifying the isolation is required.

Tasks:

SRO: Direct the actions required for a Main Steam Line break (outside the Drywell) (3449310503).

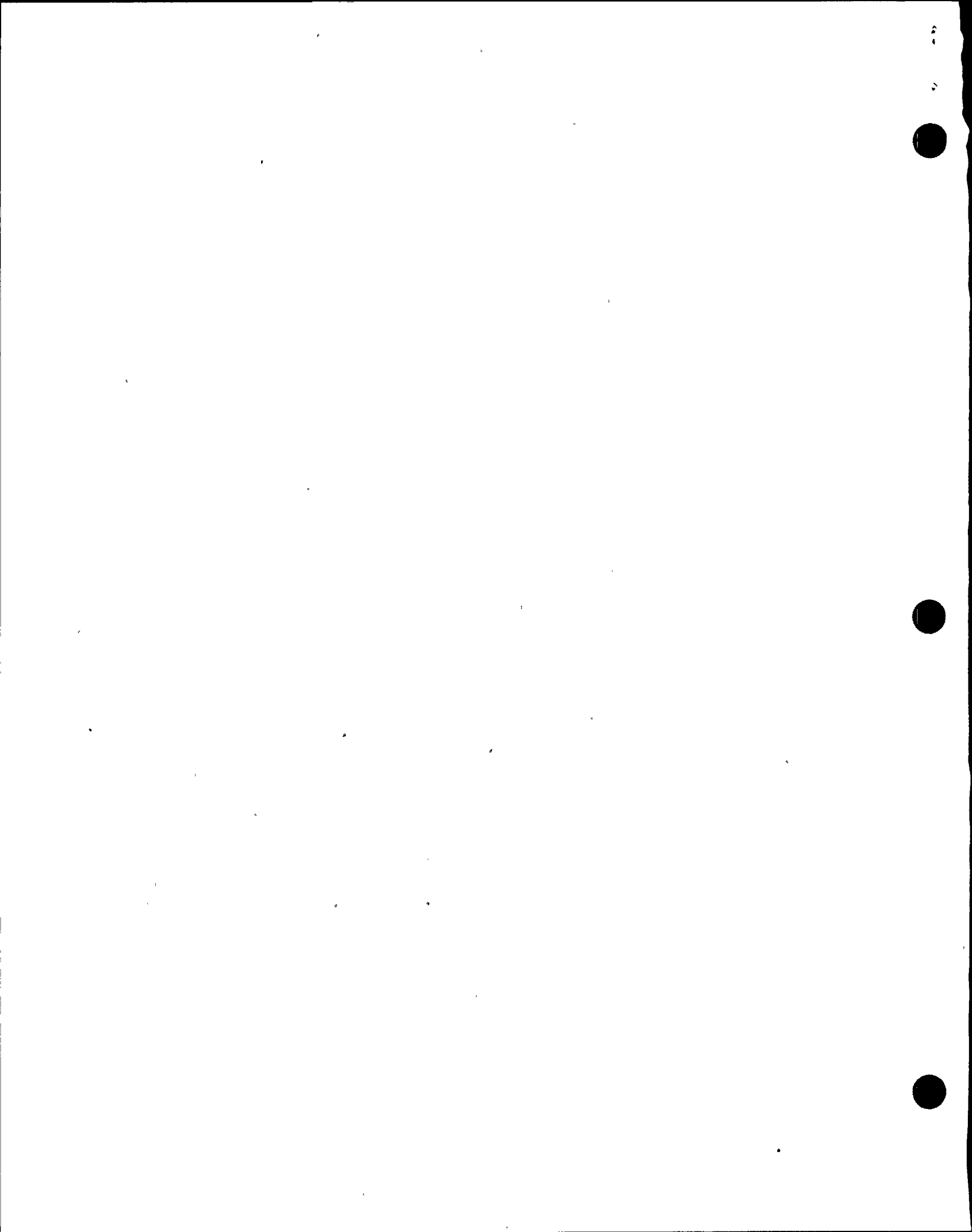
RO: Perform actions for a main steam isolation valve failure (2000030501).

RO: Scram the Reactor manually and take immediate actions (2010130101).

LO-5.0 Given a reactor plant following a main steam leak, the SSS will classify the event as an alert and initiate the required notification within 15 minutes.

Tasks:

SRO: Classify emergency events requiring emergency plan implementation (3440190303).



## H. LESSONS LEARNED

The following examples are from the NPRDS Sytem (Nuclear Plant Reliability Data System).

1. Virginia Power - North Anna 1:  
Discovery Date 08/07/88

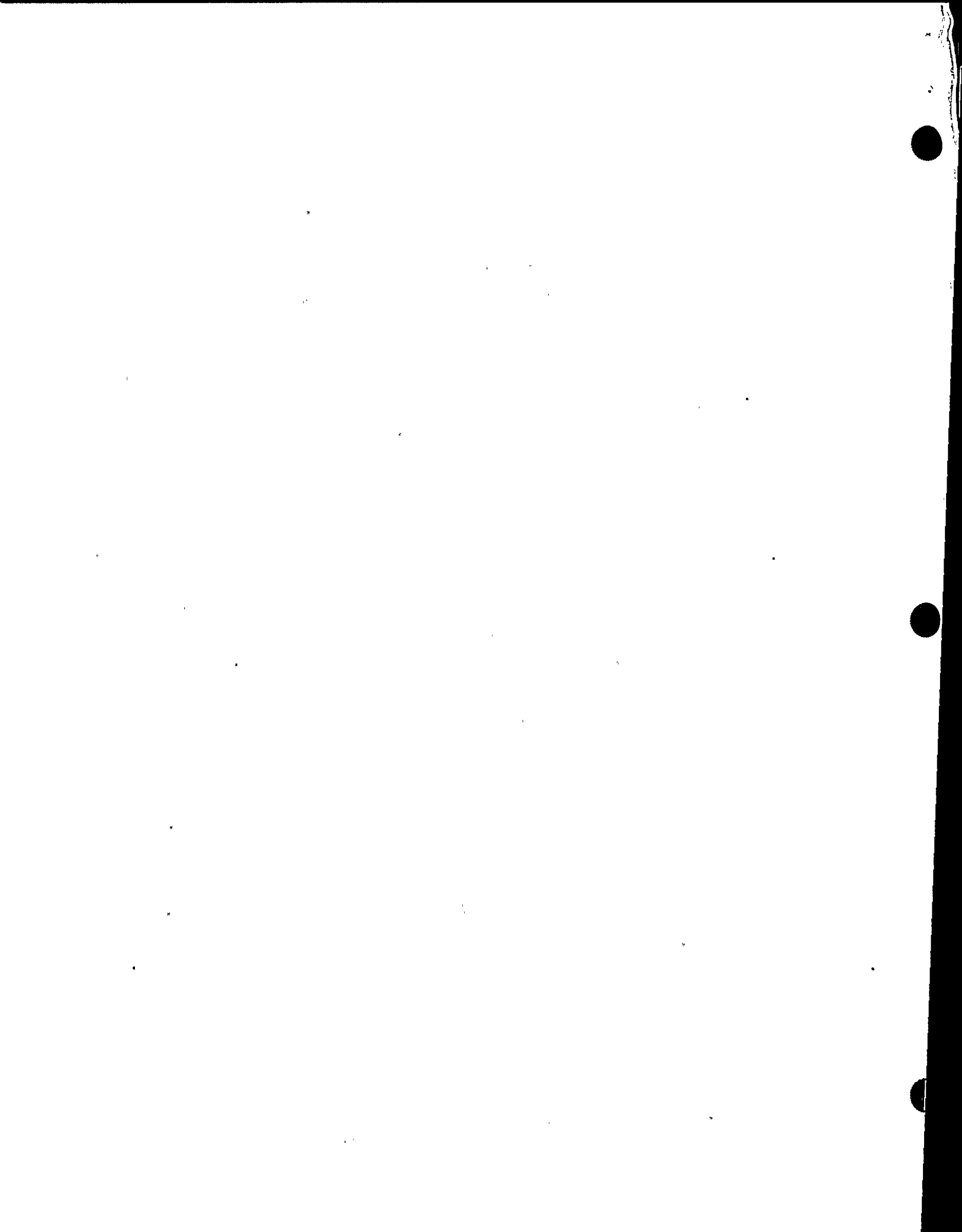
With unit at 100% power, operator placed shunt reactor (electrical device) in service and the automatic tap changer did not function. This resulted in a low output voltage which caused the output breaker to open. System was effected as function was lost. Unit was effected as bus was deenergized which lead to a unit trip. Tap changer motor tripped on thermal overload, the cause of overcurrent was because the dynamic breaking mechanism remained engaged which led to a degraded voltage on the emergency bus.

2. Duquesne Light Company - Beaver Valley 1  
Discovery Date 03/08/87

Operators discovered that the system station service transformer (TR-1A) 'A' load tap changer started moving to increase voltage with no low voltage condition present. Unit was on line at 100% power at the time of failure discovery. Balance voltage knob was slipping on the shaft. Printed circuit (PC) board lands were burned. Voltage regulating relay 90-1 may have been out of calibration also.

3. Duquesne Light Company - Beaver Valley 1  
Discovery date 10/12/85

During a routine observation, the a system station service transformer TR-1A auto tap changer was noticed to drive the A bus voltage low when in the automatic mode. The plant was running. A detective operational amplifier chip in the first stage of the sequential voltage regulating relay.



I. TURNOVER INFORMATION

1. Give the following information for initial conditions:

Core Life: BOL

Plant Conditions: Shutdown in progress from 45% power for mid cycle outage.

2. Tech. Spec. limitations in effect:

None

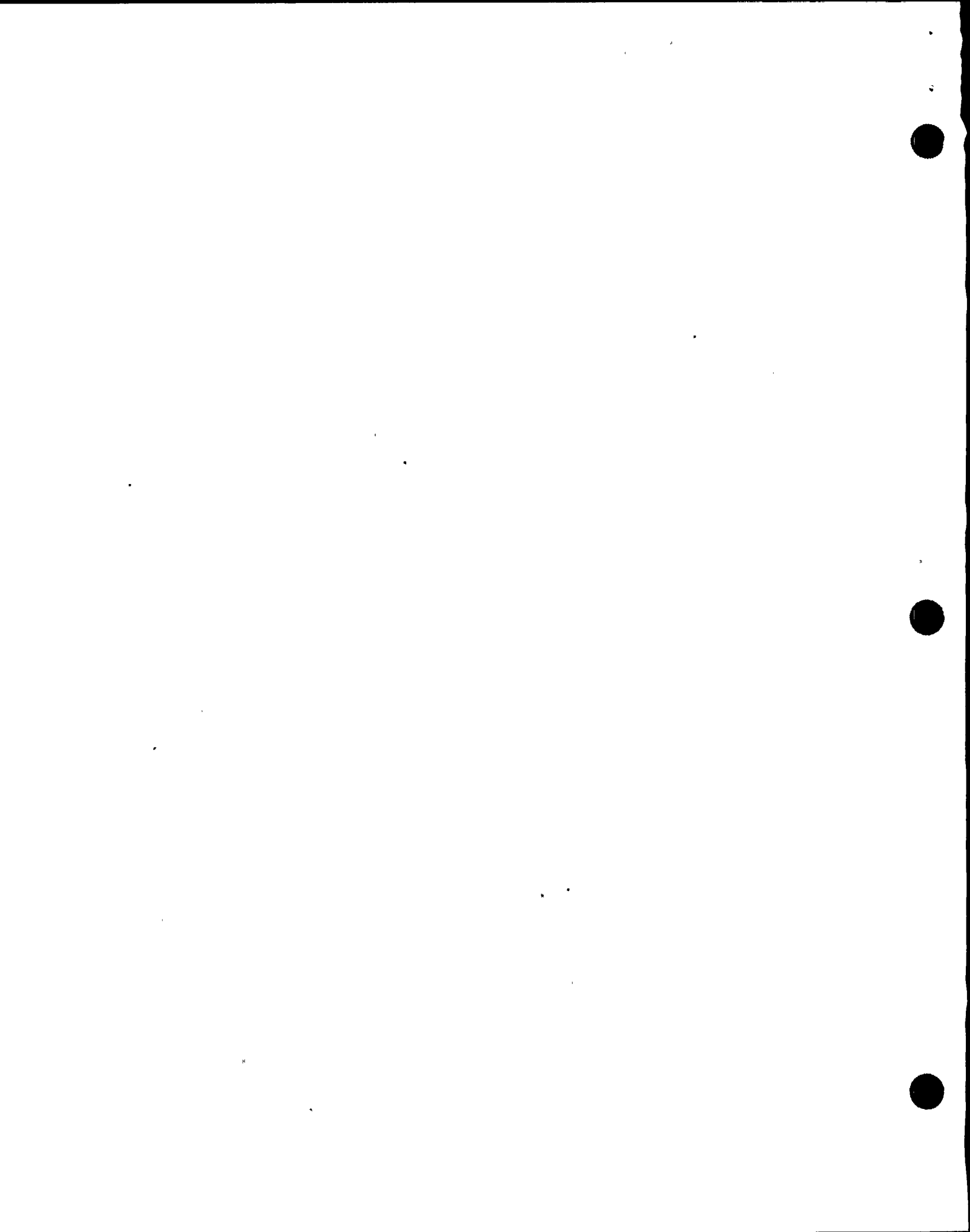
3. Significant problems/abnormalities:

House power have been transferred to off-site (performed earlier by previous SSS direction).

4. Evolutions/maintenance for the on-coming shift:

- a. Continue with the plant shutdown per OP-101C. (Completed through Step G-1.4)

- b. Chemistry, load dispatcher and Reactor Engineering have been notified of the shutdown.





J. SCENAR

INSTRUCTOR INFORMATION/  
INSTRUCTOR ACTIVITIES

EXPECTED STUDENT RESPONSE

SAT/UNSAT/NA

COMMENTS

1. Shift Turnover

Crew performs panel walk-downs and receives turnover information from the SSS.

Sat/Unsat/NA

2. 10% Power Change

SSS directs CSO/E to continue shutdown per OP-101C.

Sat/Unsat/NA

Role Play: As operator dispatched, wait three minutes and inform CSO/E that the lockout relays are reset.

CSO/E dispatches operator to verify lockout relays reset at LFMG control panel.

Sat/Unsat/NA

Note: Transfer to the LFMGs could lead to single loop operation if the 5 BKR's are not positioned at the same time.

CSO/E places both 5 breaker CS's to TRANSFER-MG.

Sat/Unsat/NA

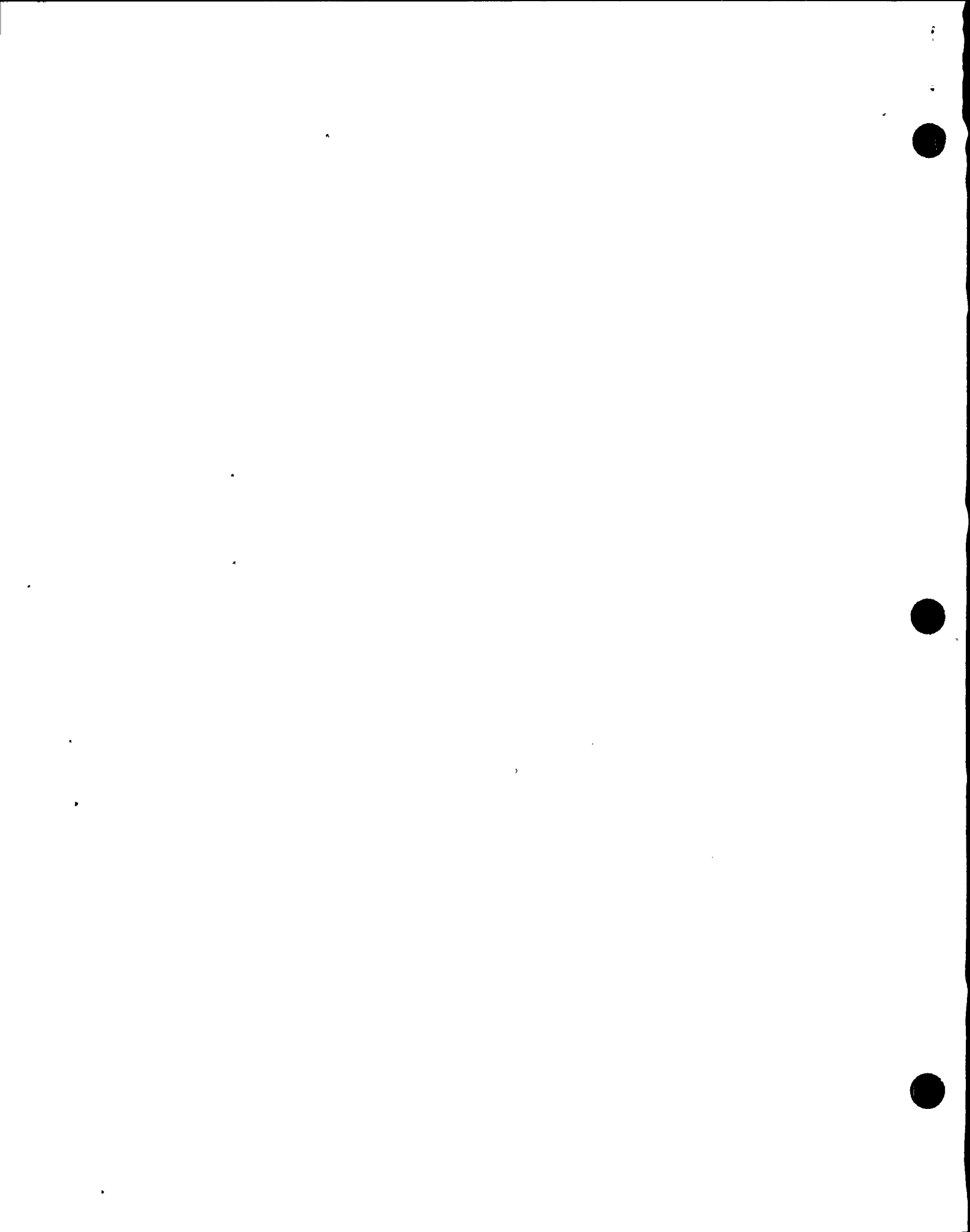
CSO/E place the FCVs to 85% open.

Sat/Unsat/NA

LO-1.0

3. APRM Failure

Three minutes after the Recirc pumps have been shifted to slow speed insert the following malfunction:



INSTRUCTOR INFORMATION/  
INSTRUCTOR ACTIVITIES

EXPECTED STUDENT RESPONSE

SAT/UNSAT/NA

COMMENTS

MF;2,NM11A  
APRM A fails full scale  
Operators report 1/2 scram.

Operator refers to ann.  
procedures in OP-92.

Sat/Unsat/NA

Operators report APRM A failure.

SSS refers to TS (Table  
3.3.1-1 and Table 3.3.6-1).

Sat/Unsat/NA

*Mr*  
*Role Play: When contacted by the operators, report that APRM 'A' is reaching upscale and the switch is in the AVERAGE position*

SSS directs operator to bypass  
APRM Channel A.

Sat/Unsat/NA

CSO/E bypasses APRM A (as  
directed).

Sat/Unsat/NA

CSO/E resets 1/2 scram.

Sat/Unsat/NA

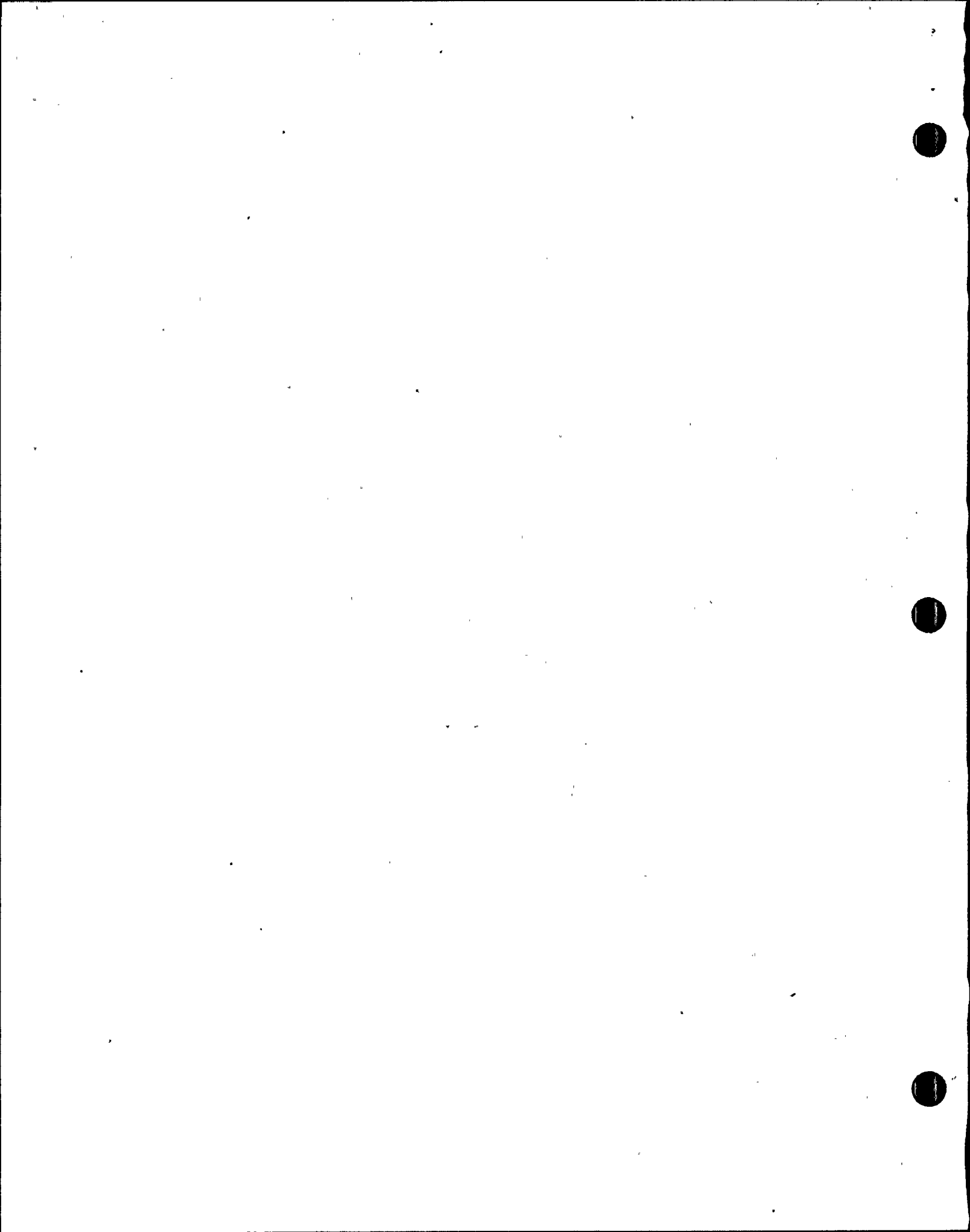
SSS contacts IC to investigate  
APRM failure.

Sat/Unsat/NA

LO-2.0

4. Loss of SWG-16

Three minutes after the 1/2 scram has been  
reset, insert the following I/O and  
malfunction.



IO;1,90-2SPRN15-D,time,,LOWE

Load tap changer for reserve A transformer  
ramps down.

*3*  
MF;4,ED04F,,,time:30  
Loss of SWG 16

Operators report loss of SWG 16. Sat/Unsat/NA

Note: On loss of  
SWG 16 the  
following buses  
will be lost:  
Div. I SWG  
Div. III SWG

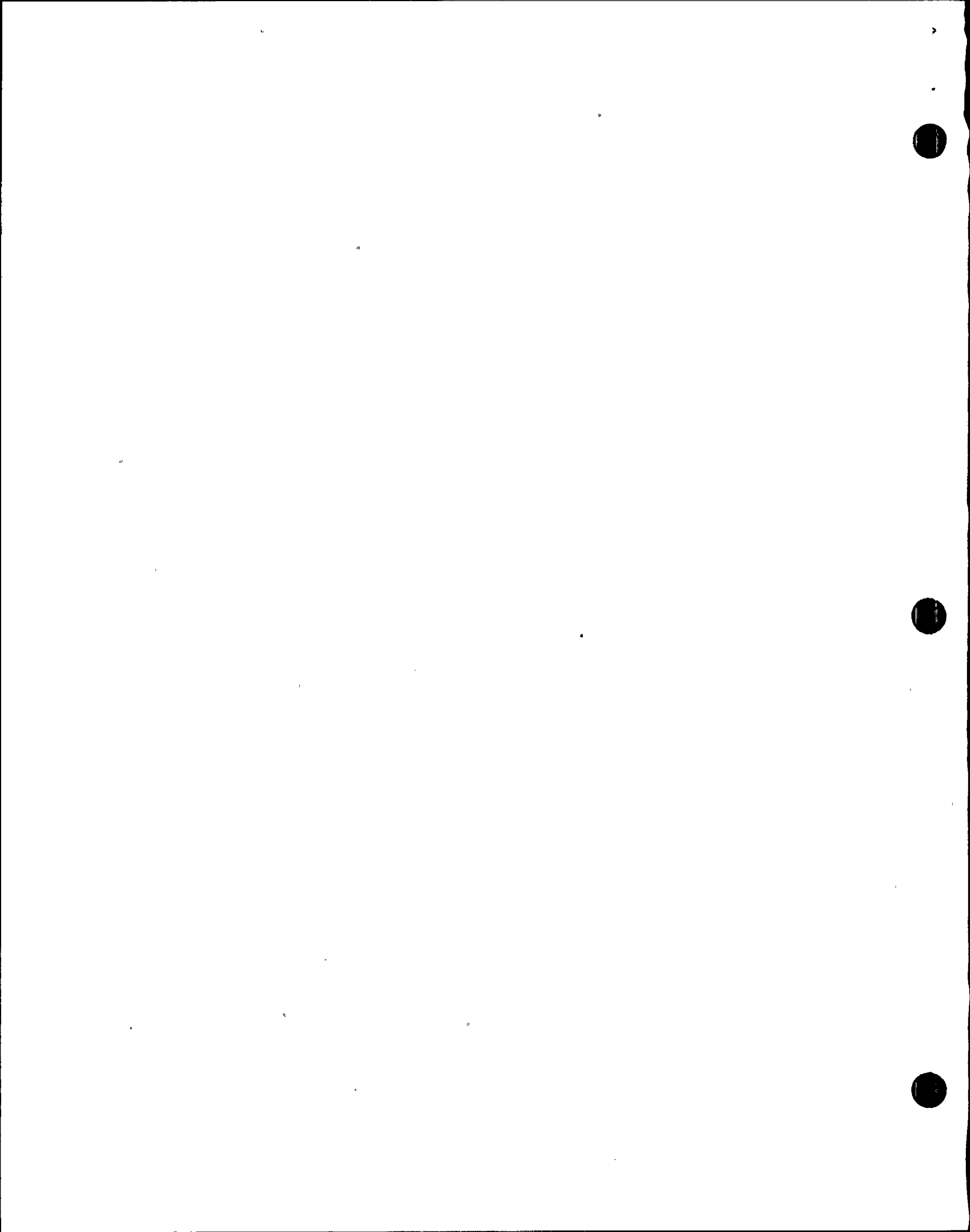
Note: This is to simulate high current  
due to lowering voltage.

Operators report Div. I and  
Div. III EDG are supplying the  
bus. Sat/Unsat/NA

Operators report the servicewater  
system line up. *u* Sat/Unsat/NA

Operators report the loss of  
*u* ~~Div. I~~ Drywell Cooling. Sat/Unsat/NA

SSS directs operator to  
establish flow through the B  
RHR HTX. (IAW OP-11  
H.5.0) Sat/Unsat/NA



EXPECTED STUDENT RESPONSE

SAT/UNSAT/NA

COMMENTS

CSO/E establishes flow (as directed) by opening SWP\*MOV 90B and SWP\*MOV 33B to obtain 3000 gpm.

Sat/Unsat/NA

CSO/E (after service water pump starts) opens TB and RB supply valves on 601.

Sat/Unsat/NA

Note: OP-11 does not allow >1 SW pump started on EDG.

CSO/E calls RP to start rad monitors 23B.

Sat/Unsat/NA

Note: OP-11 allows 3 SW pumps on Div. II.

*SSS makes 4 hour notification due to ESF Activation (SBGT) GTS*

*Sat/Unsat/NA*

SSS directs operators to restore DW cooling.

Sat/Unsat/NA

CSO/E restores DW cooling (as required).

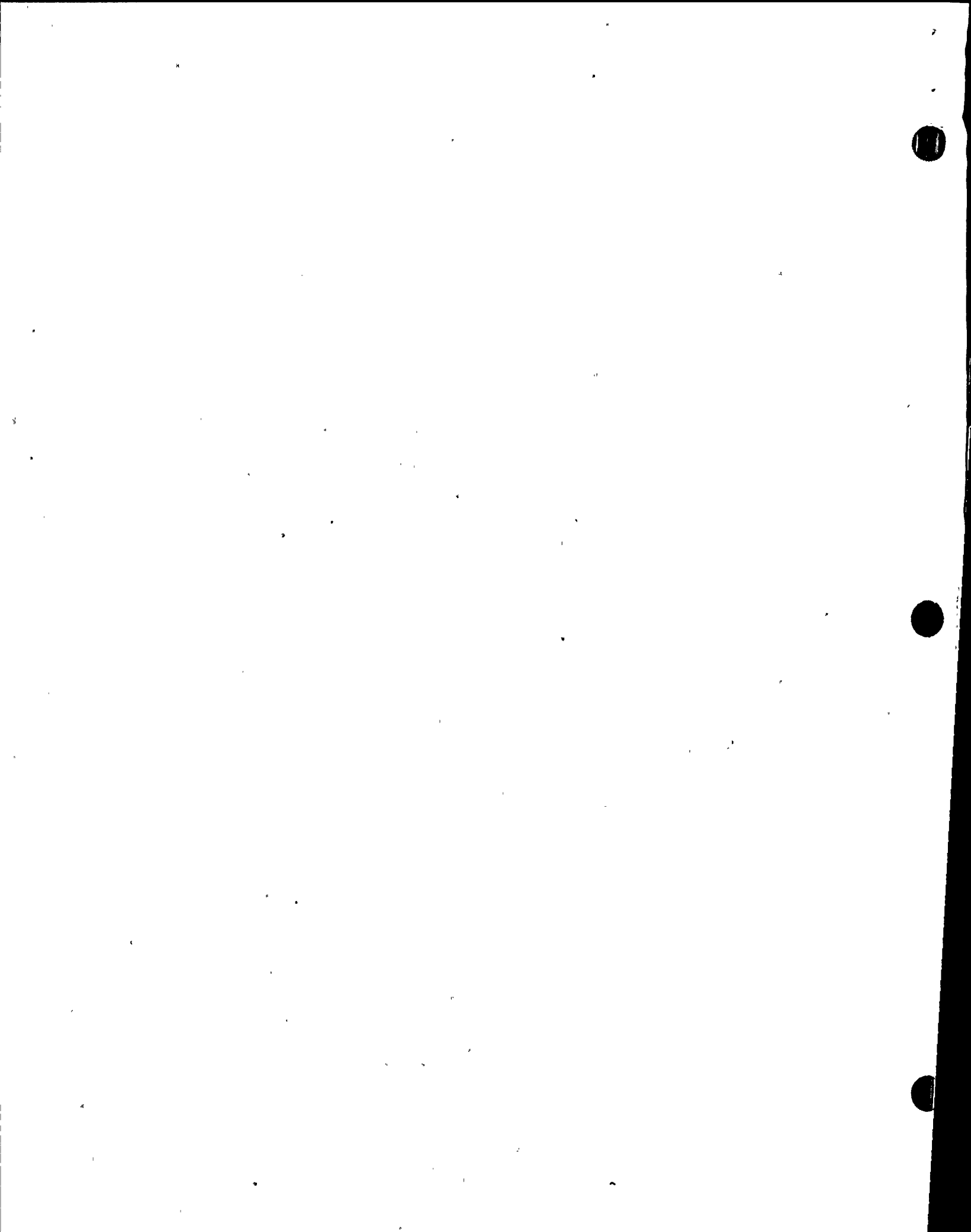
Sat/Unsat/NA

Note: When performing the following role, ensure that the normal feeder BKR CS are in PTL.

SSS directs operator to feed Div. I and III from an alternate power source.

Sat/Unsat/NA

Role Play: As the operator dispatched, when asked to open Ckt #4 on 2BYS\*PNL201A is open and Toggle 15 on page ED2.





Role Play: As the operator dispatched, wait 5 minutes and report that the BKR has been transferred to the alternate cubicle for Div. I.

(OP-71 H-14.0 and H-15.0)

CSO/E transfer Div. I and III to alternate feed (as directed).

Sat/Unsat/NA

LO-3.0

Toggle 5 on page ED2.

Role Play: Wait 5 minutes more and report that the BKR has been transferred to the alternate cubicle for Div. II.

Toggle 6 on page ED2.

Role Play: When ask as operator dispatched report that ck #4 is closed on 2BYS\*PNL201A and  
Toggle 15 on page ED2.

SSS directs operator to return SW to 2 pumps per division (when Div. I and III have been transferred).

Sat/Unsat/NA

5. Main Steam Leak in Tunnel

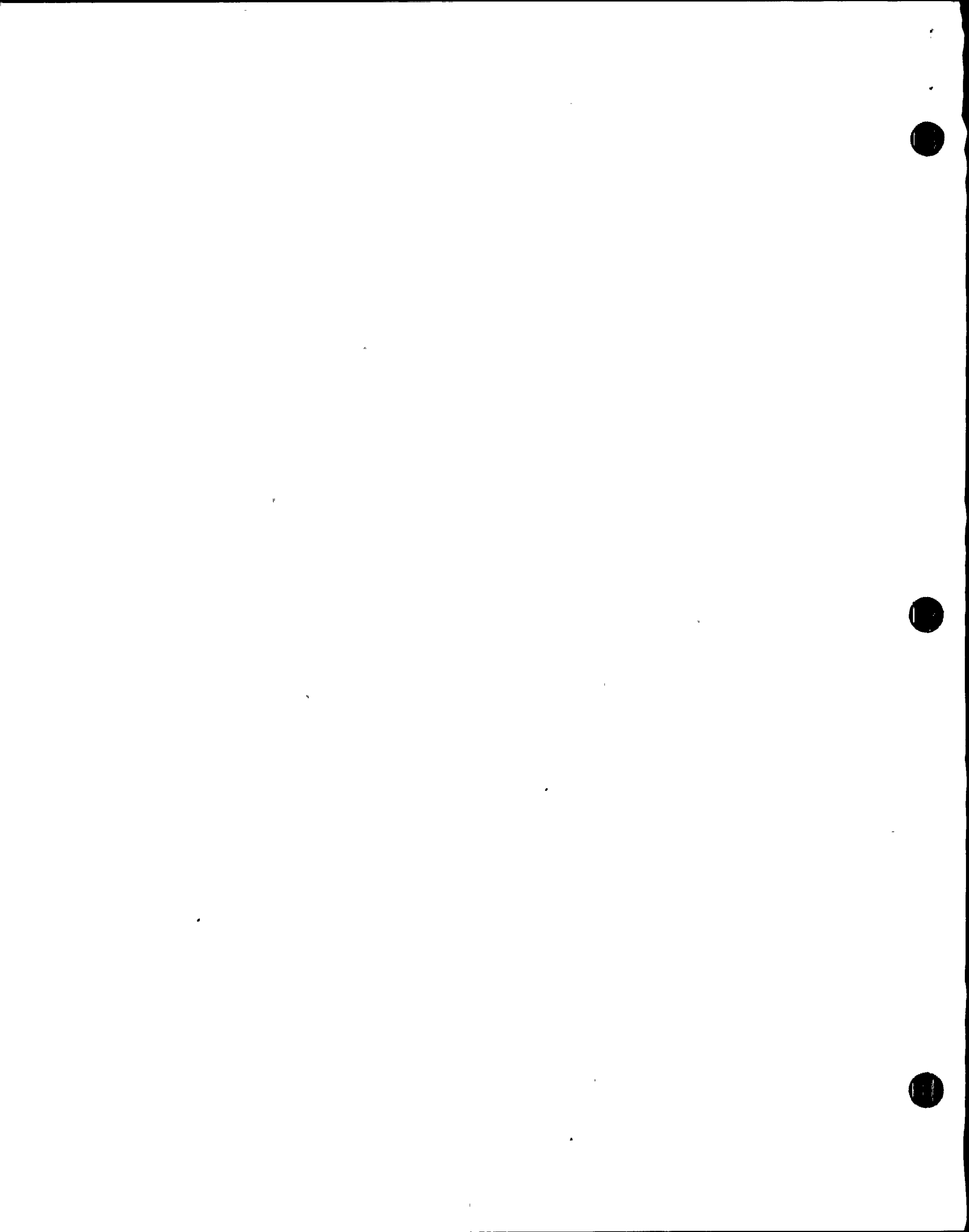
CSO/E starts SW pumps (as directed).

Sat/Unsat/NA

When the service water system has been restored, insert the following malfunction:

Operators report steam tunnel temperatures.

Sat/Unsat/NA



<sup>4</sup> MF, MSO1,3,1

Steam leak in tunnel.

Operators report Div. I and II  
isolation failures.

Sat/Unsat/NA

Note: Preset malfunction will require  
manual MSIV closure by the operators.

SSS orders Rx. Scram.

Sat/Unsat/NA

SSS orders Group I isolation.

Sat/Unsat/NA

CSO/E scrams reactor and makes  
initial reports.

Sat/Unsat/NA

CSO/E shuts MSIVs.

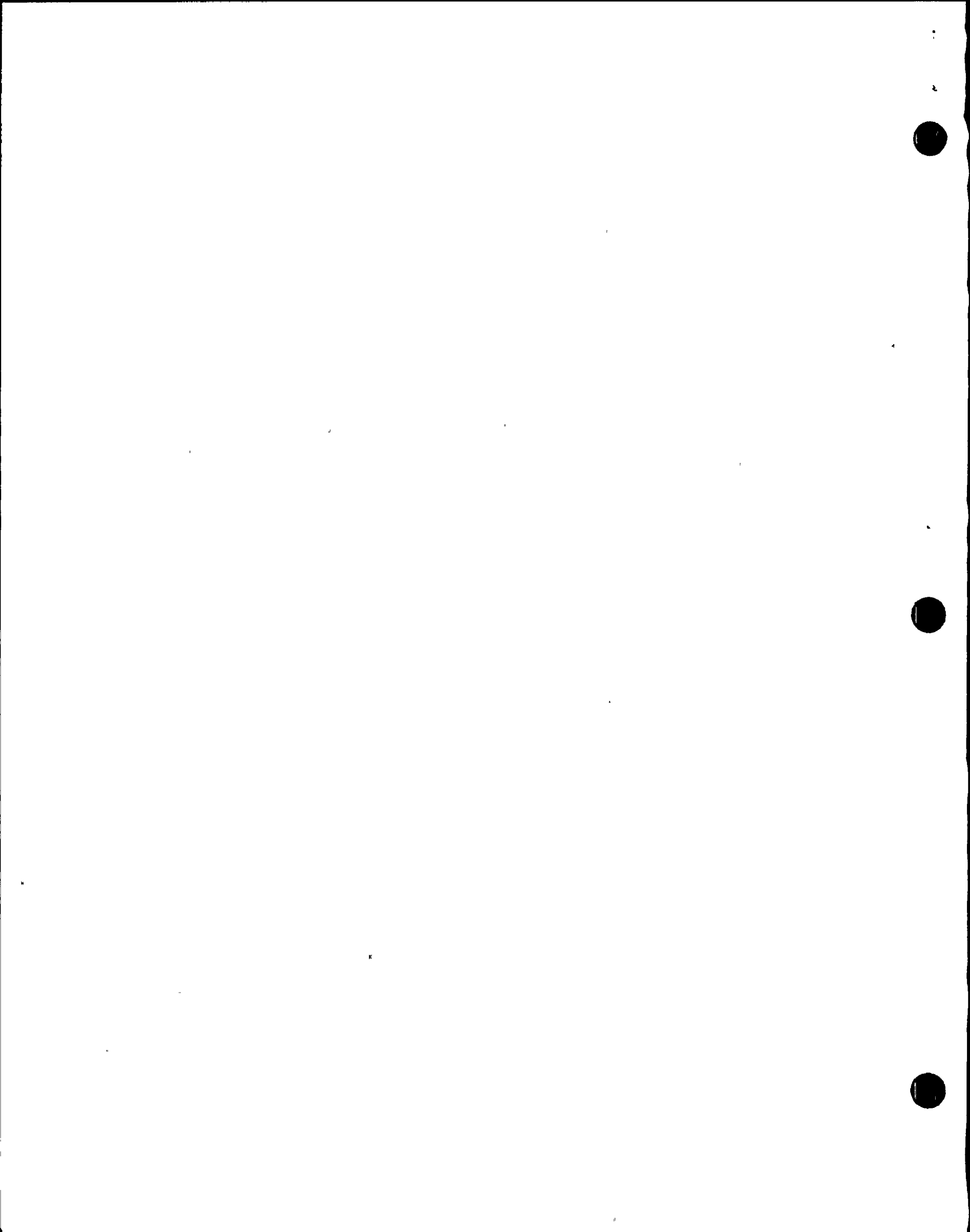
Sat/Unsat/NA

LO-4.0

SSS directs to control pressure  
<1037 psig with any/all of the  
following:

Sat/Unsat/NA

- SRVs
- RHR in STM condensing
- RCIC
- RWCU



SSS directs operator to control  
RPV level to 159.3 to 202.3  
using the following:

- Feedwater
- CRD
- RCIC
- HPCS

Sat/Unsat/NA

CSO/E control RPV pressure (as  
directed).

Sat/Unsat/NA

CSO/E controls RPV level (as  
directed).

Sat/Unsat/NA

SSS directs operators to  
establish SP cooling (if  
required).

Sat/Unsat/NA

Operators establish SP cooling  
(as directed).

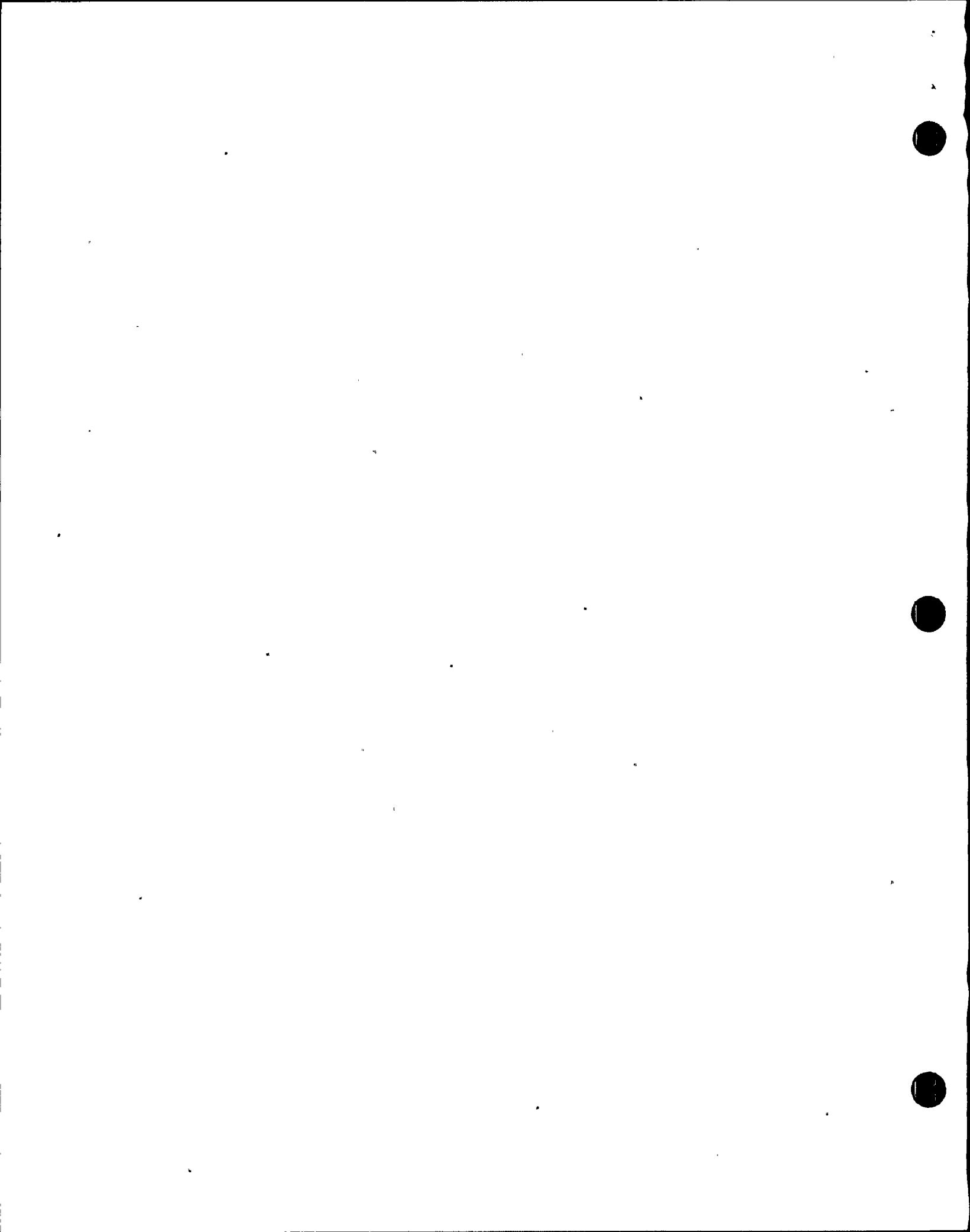
Sat/Unsat/NA

6. Notifications

SSS declares the event as an  
alert. *or higher.*

Sat/Unsat/NA

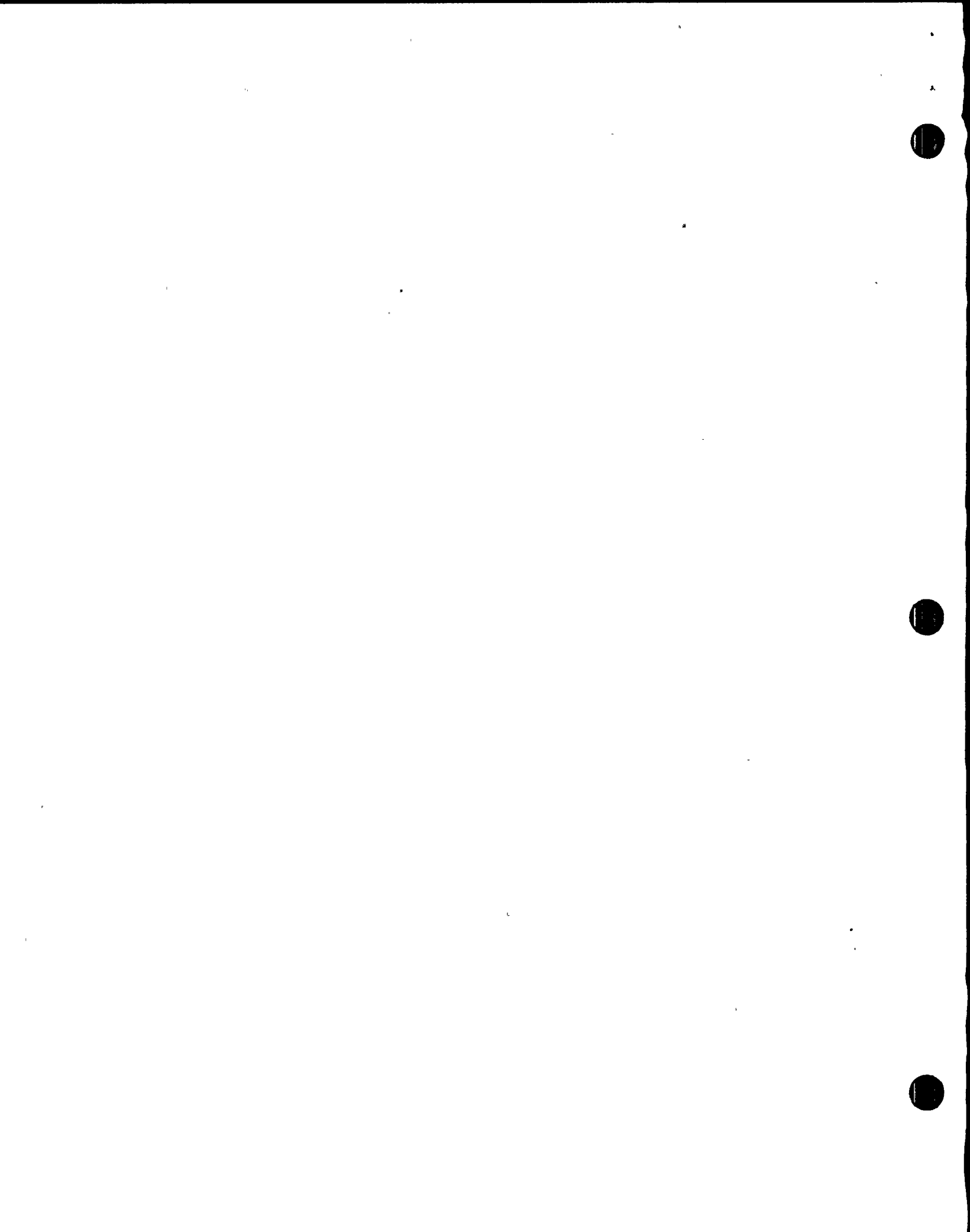
LO-5.0



SSS directs operator to make  
the notifications.

Sat/Unsat/NA

Termination Cue: Terminate the scenario  
when an alternate RPV pressure control has  
been established with RPV pressure <1037  
psig.





## K. POST EXERCISE ASSESSMENT

1. The instructor may review the Scenario Summary, Learning Objectives and the Lessons Learned with the crew.

The Lessons Learned should be reviewed even if no errors were committed.

2. The crew may perform a self assessment.

Have the crew assess their performance in relation to the Lessons Learned and the Learning Objectives for this exercise.

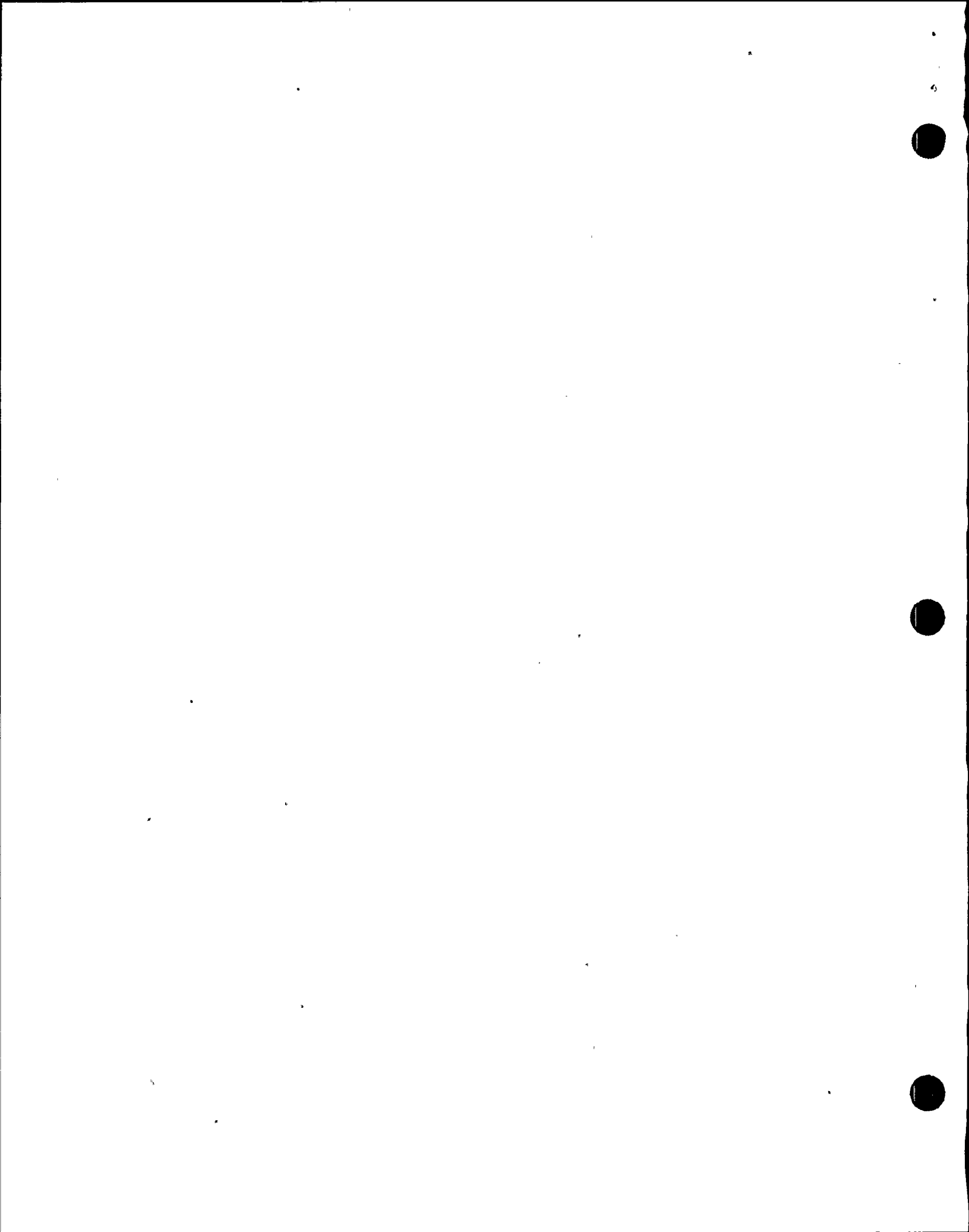
The individual who was the SSS during the scenario should lead the assessment.

3. Instructors Assessment

The instructors may provide an assessment of the crew's performance (as necessary) during the execution of the crew's self-assessment. The bases of this assessment shall be the Lesson Plan Notes, Team Work Rating Scale and the topics covered in the Lesson Plan. The comments from the Scenario Checklist should be detailed and focused on individual performance. The comments from the Team Work Rating Scale should be global and should be focused on the team as a whole.

The below are examples that may be used during the assessment:

- a. Control Room formality
- b. Actions taken and differences from expected actions
- c. Procedural use and compliance
- d. Attentiveness to control panels and indications
- e. Teamwork and communications
- f. Meeting the Learning Objectives
- g. Logkeeping



- h. Understanding plant/system response
  - i. Diagnosis of events/conditions
  - j. Recognize progress and good performance
  - k. Compliance/use of Technical Specifications
  - l. Supervisory control
  - m. Emergency plan implementation
  - n. Notifications and administrative requirements
  - o. Self verification techniques
  - p. Conservative approach to reactor safety
- (NCTS 5) q. Realism

Summarize any performance weaknesses or trainees misconceptions and provide guidance or training to correct these weaknesses. Any questions asked during the scenario should be reviewed with the entire crew.

- 4. Questions raised during the assessments, or at any time during the training session, that cannot be immediately answered should be researched and answered before the end of the day, if possible. If the answer is found after the training cycle is completed, bring the question and the answer to the program coordinator for disposition.
- 5. Questions concerning interpretations of procedural steps, technical specifications or station policy will be answered by contacting the responsible station management person and relaying the answer to the crew. For further clarification, it may be necessary to complete the appropriate plant/simulator documentation.
- 6. Video taping may be used to enhance the crew's strengths and weaknesses..

(NCTS 3)

