

NIAGARA MOHAWK POWER CORPORATION  
NINE MILE POINT NUCLEAR STATION UNIT 2  
OPERATING PROCEDURE

N2-OP-91B

REVISION 01

SAFETY PARAMETER DISPLAY SYSTEM (SPDS)

\*\*\*\*\*  
THIS PROCEDURE IS SAFETY-RELATED  
\*\*\*\*\*

Approved By:  
R. B. Abbott

*R. B. Abbott*  
Plant Manager Unit 2  
**FOR INFORMATION ONLY.**

11/14/90  
Date

THIS REVISION IS A GENERAL REWRITE

THIS REVISION SUPERSEDES TCN-1

Effective Date: 11/20/90

NOT TO BE USED AFTER November 1992  
SUBJECT TO PERIOD REVIEW

9305110288

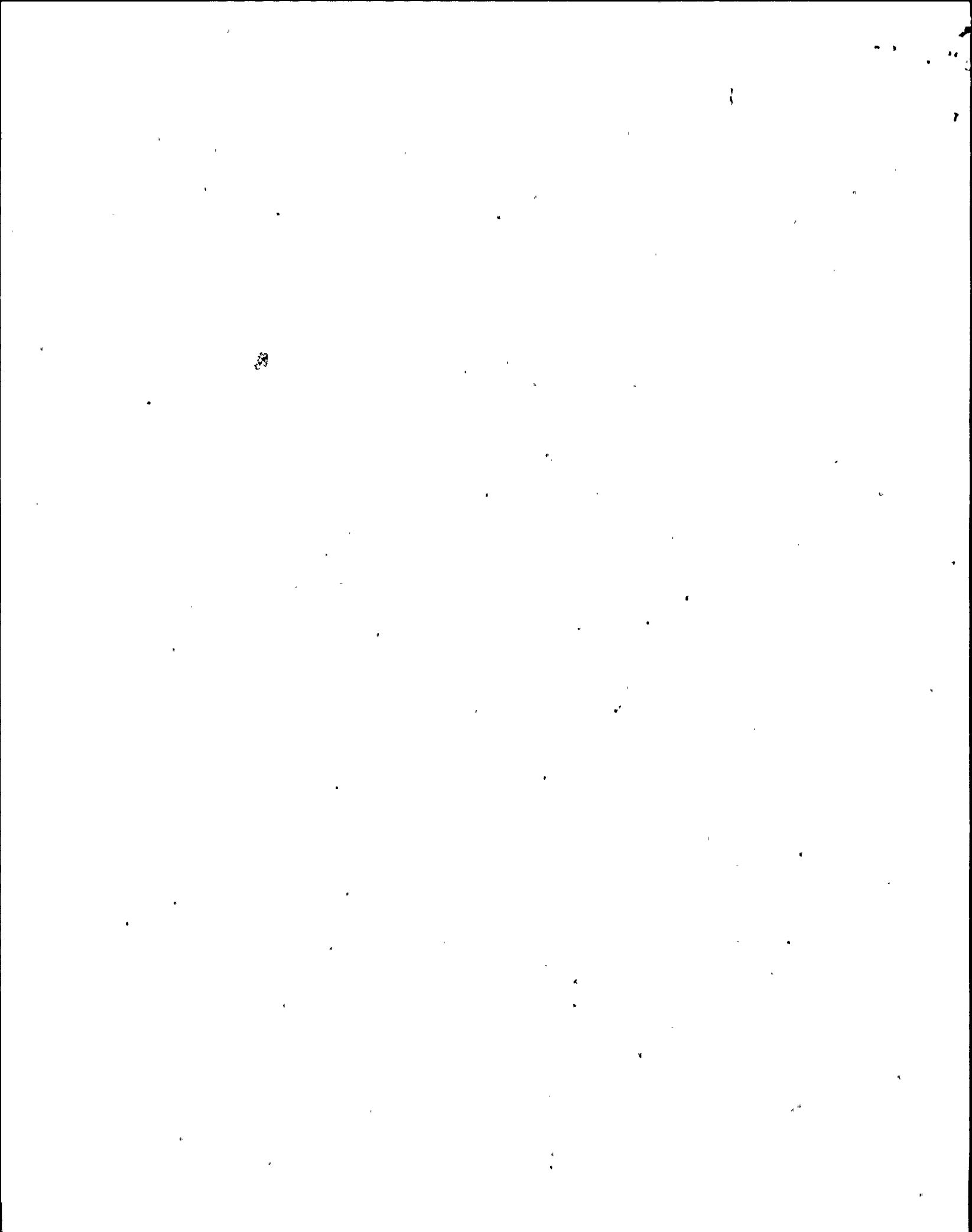
9305110298 911031  
PDR ADDCK 05000410  
S PDR

YIND  
1977  
1978  
1979  
1980  
1981  
1982  
1983  
1984  
1985  
1986  
1987  
1988  
1989  
1990  
1991  
1992  
1993  
1994  
1995  
1996  
1997  
1998  
1999  
2000  
2001  
2002  
2003  
2004  
2005  
2006  
2007  
2008  
2009  
2010  
2011  
2012  
2013  
2014  
2015  
2016  
2017  
2018  
2019  
2020  
2021  
2022  
2023  
2024  
2025

25

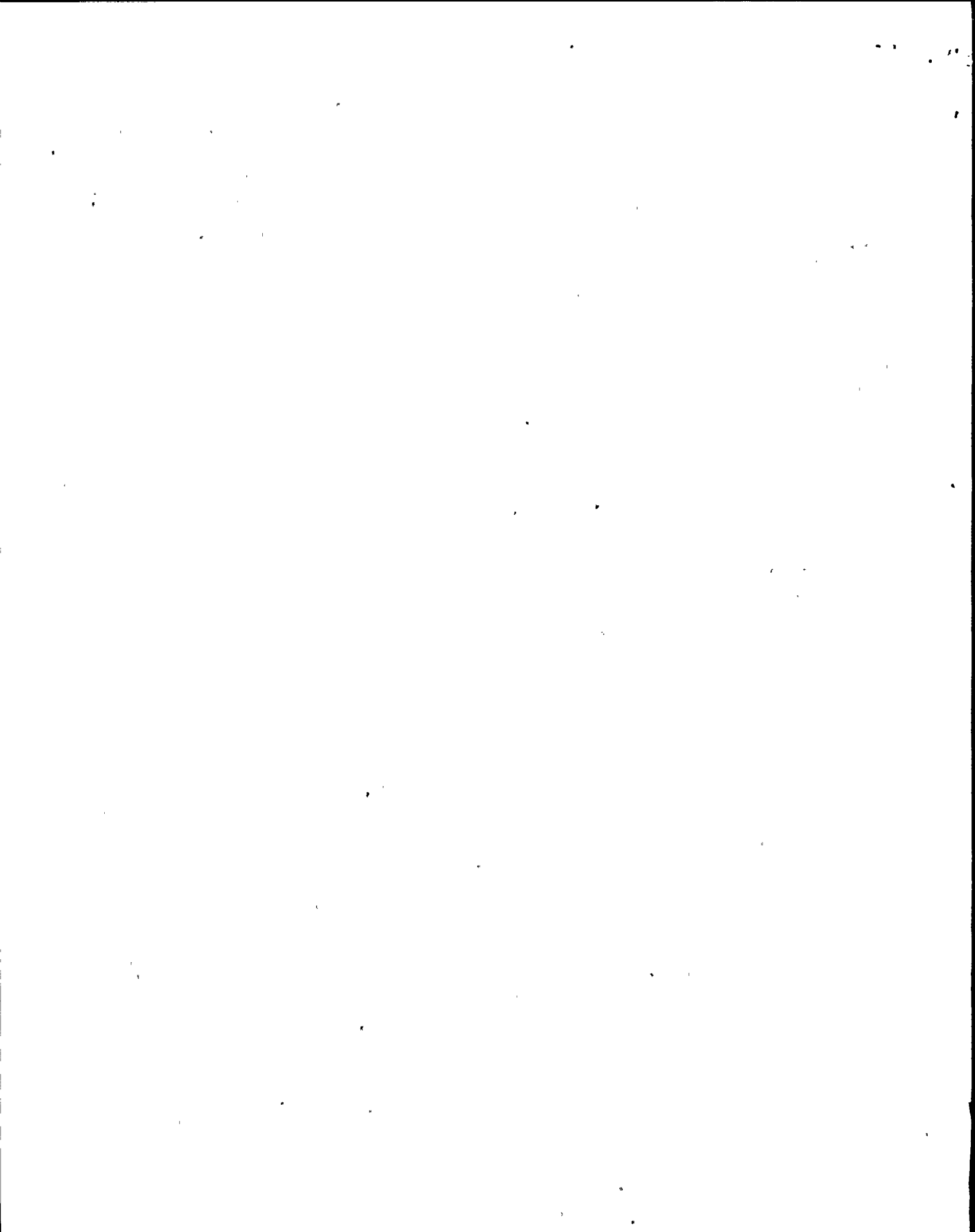
LIST OF EFFECTIVE PAGES

<u>Page No.</u>	<u>Change No.</u>	<u>Page No.</u>	<u>Change No.</u>	<u>Page No.</u>	<u>Change No.</u>
i . . . .	TCN-2	24 . . . .			
ii . . . .		25 . . . .			
1 . . . .		26 . . . .			
2 . . . .		27 . . . .			
3 . . . .		28 . . . .			
4 . . . .		29 . . . .			
5 . . . .		30 . . . .			
6 . . . .	TCN-2	31 . . . .			
7 . . . .		32 . . . .			
8 . . . .		33 . . . .			
9 . . . .					
10 . . . .					
11 . . . .					
12 . . . .					
13 . . . .					
14 . . . .					
15 . . . .					
16 . . . .					
17 . . . .					
18 . . . .					
19 . . . .					
20 . . . .					
21 . . . .					
22 . . . .					
23 . . . .					



## TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
A REFERENCES AND COMMITMENTS	1
B SYSTEM DESCRIPTION	2
C OPERATING REQUIREMENTS	5
D PRECAUTIONS AND LIMITATIONS	6
E STARTUP	6
F NORMAL OPERATIONS	7
1.0 SPDS Display Screen Selection	7
2.0 Reactor Mode Entry	7
G SHUTDOWN	8
H OFF-NORMAL OPERATIONS	8
1.0 Parameter Condition Abnormal Indicated	8
2.0 Parameter Condition Alert/Alarm Indicated	9
3.0 Parameter Fail Indicated	10
4.0 Reactor Mode Error Indicated	10
I PROCEDURE FOR CORRECTING ALARM CONDITIONS	12
Attachment 1: Valve Lineup	14
Attachment 2: Electrical Lineup	15
Attachment 3: SPDS Displays	16
Attachment 4: Safety Status Indicator (SSI) Inputs	23
Attachment 5: SPDS Computer Inputs and Associated Control Room Display Instruments	24
Attachment 6: Mode Error Checking Conditions	28
Attachment 7: Limit Setpoints for SPDS Trended Parameters	30



A. REFERENCES AND COMMITMENTS

1.0 Technical Specification

Amendment No. 17, Section C.8, Safety Parameter Display System

2.0 Licensee Documentation

3.0 Standards, Regulations and Code

NUREG-0800, Standard Review Plan (SRP) for the Review of Safety Analysis Reports for Nuclear Power Plants, LWR Edition Section 18.2, Safety Parameter Display System (SPDS), Revision 0, November 1984

NUREG-0800, Standard Review Plant (SRP) for the Review of Safety Analysis Reports for Nuclear Power Plants, LWR Edition, Section 18.2, Appendix A, Human Factors Review Guidelines for the Safety Parameter Display System, Revision 0, November 1984

4.0 Policies, Programs and Procedures

NMP1L 0419 July 11, 1989, Response to NRC Generic Letter 89-06

NMP-2-SPDS-001, OSC072515201, Safety Parameter Display System Hardware and Software Functional Requirements, Revision 5, April 30, 1990

N2-OP-40, Liquid Radwaste System

N2-OP-71, 13.8KV/4160V/600V AC Distribution

N2-OP-73A, Normal DC Distribution

5.0 Technical Information

5.1 Vendor Manuals

Honeywell System Specification Sections III, IV, VII and VIII

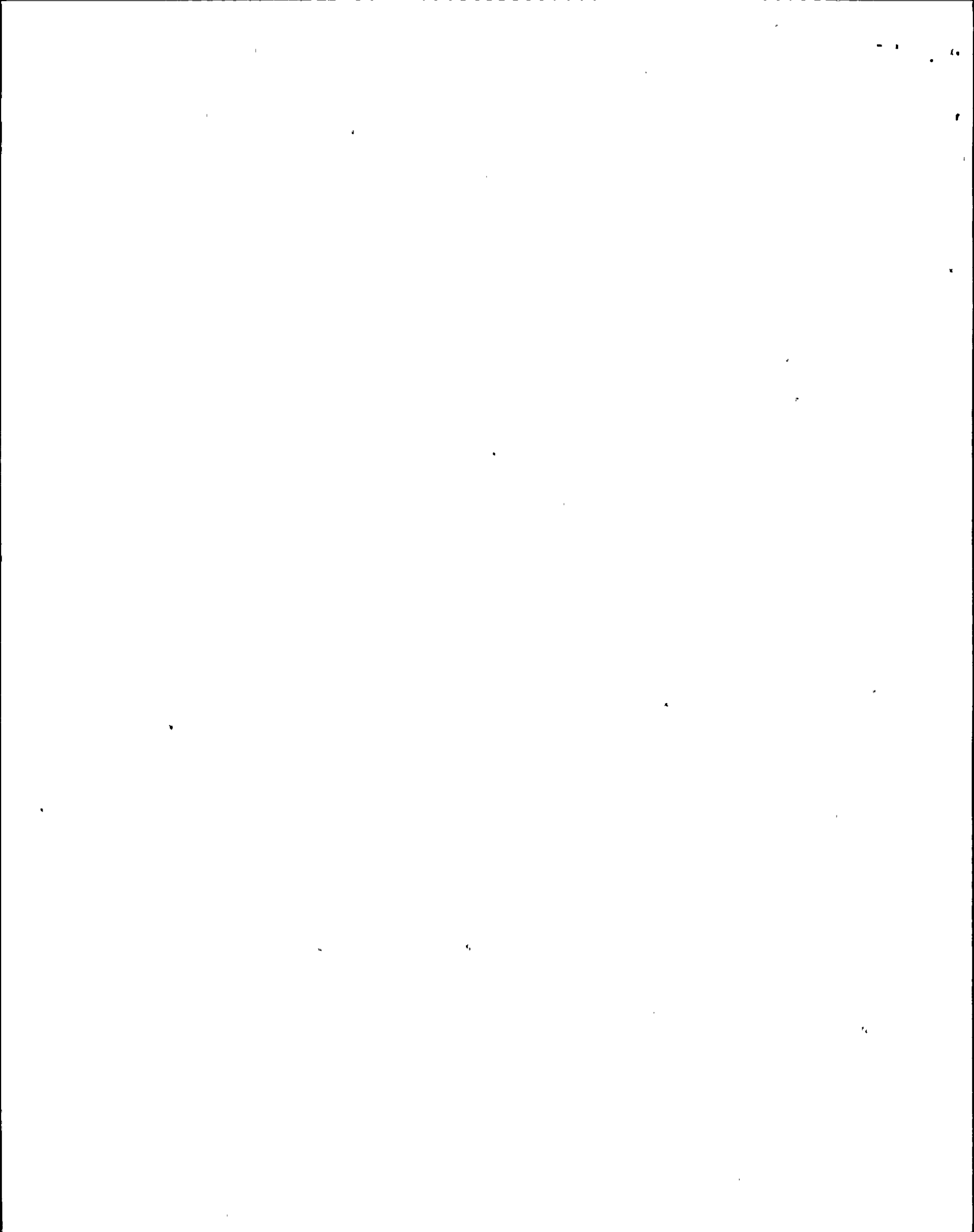
5.2 System Instruction Manuals

Safety Parameter Display Functional Requirements (Revision 04)

6.0 Supplemental References

82-33 December 17, 1982, NRC Generic Letter (NUREG-0737, Supplement 1, Section 4.0, Safety Parameter Display System) Requirements for Emergency Response Capabilities

89-06 April 12, 1989, NRC Generic Letter (NUREG 1342, A Status Report Regarding Industry Implementation of Safety Parameter Display Systems) Task Action Plan Item I.D.2-Safety Parameter Display Systems-10CFR 50.54(f) OEI Document 8809-1, NMP-2-SPDS Parameter Set Evaluation Report, Dec. 1989 OEI Document 8809-1, Supplement 1, Bases for the Revision of Information Presented on the NMP-2 SPDS, Revision 0, October 20, 1989





A. REFERENCES AND COMMITMENTS (Cont)

6.0 (Cont)

OEI Document 8809-1, Supplement 2, Bases for the Revision of Information Presented on the NMP-2-SPDS for Radioactivity Control, Revision 0, April 26, 1990

OEI Document 8809-4, NMP-2-SPDS Set Point Data, Revision 0, May 1990  
2LWS-120, LWS Computer I/O List

7.0 Commitments

<u>Sequence Number</u>	<u>NCTS Number</u>	<u>Description</u>
------------------------	--------------------	--------------------

None

B. SYSTEM DESCRIPTION

1.0 General

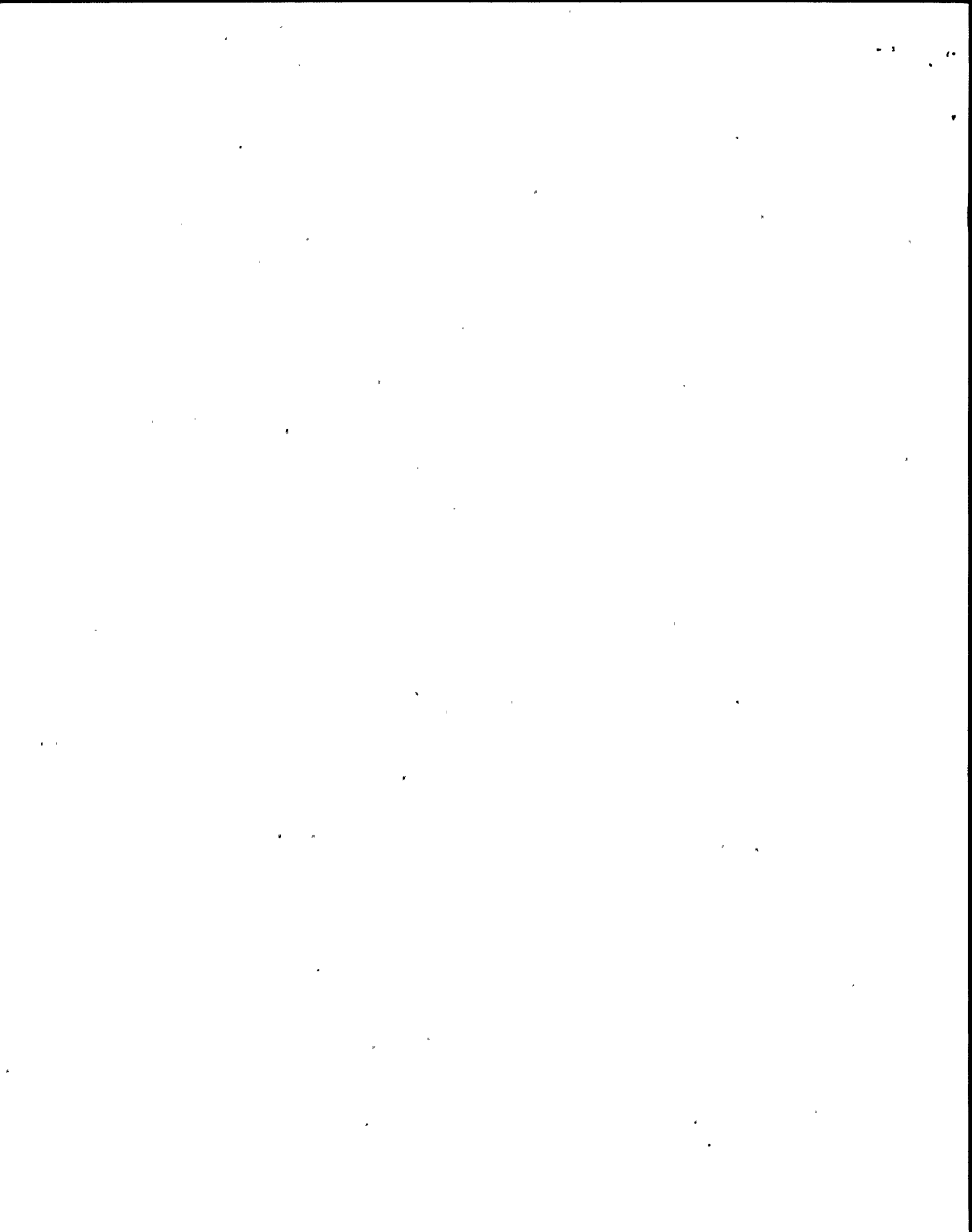
The Nine Mile Point Unit 2 Safety Parameter Display System (SPDS) is a computer based data acquisition and display system located on the Honeywell LWS Computer. Five keyboard/display stations are provided. Two stations are located in the main Control Room, with additional stations located in the Emergency Operating Facility (EOF), the Technical Support Center (TSC), and the LWS Control Room. Each station provides access to all SPDS graphic displays, as well as access to the Emergency Response Facility (ERF) functions which can be used to augment the SPDS.

The purpose of the SPDS is to provide information at the touch of a key on vital operating parameters to aid personnel in assessing the safety status of the plant during any plant operating condition. The ERF functions provide additional capabilities to assist operators in normal plant operation and control.

2.0 Display Description

The SPDS consists of a single Level 1 display and five Level 2 displays. The Level 1 display screen contains all key parameters related to critical plant Safety Functions (Figure 1). These parameters are displayed on a simplified mimic outline of the plant. The Level 2 display screens provide more detailed information about these critical Safety Functions as shown in Attachment 3: SPDS Displays as follows:

- Reactivity Control (Figure 2)
- Core Cooling (Figure 3)



## B. SYSTEM DESCRIPTION (Cont)

### 2.0 (Cont)

- Coolant System Integrity (Figure 4)
- Containment Integrity (2 pages) (Figures 5 and 6)
- Radioactivity Control (Figure 7)

All SPDS display screens contain an identical row of Safety Status Indicators at the bottom of the screen identifying each of the five Level 2 displays. If any parameter trended on a Level 2 display enters an alarm condition, the Safety Status Indicator for that display changes color to alert the operator to select that display and determine the cause of the alarm. This feature allows an operator to monitor the status of all trended parameters with any SPDS screen selected for display (Attachment 3).

There are two means of determining whether or not the SPDS is operating and updating data during steady state conditions. These are the blinking cursor normally located in the upper left corner of the display screen, and the current date/time display on the upper right corner of the display screen. With the LWS computer in operation, the cursor will blink, and the time will update every five seconds if the computer or the display "locks up", the cursor will not blink, and the time will not update.

Reactor Mode Switch Position is displayed in the upper left corner of each display screen. This displayed information must be manually selected by the operator. Selectable positions are RUN; STARTUP; SHUTDOWN; REFUEL. See Attachment 6: Mode Error Checking Conditions for a listing of mode error check conditions for RUN and STARTUP modes.

### 3.0 Basis for SPDS Parameter Selection

The information presented on each of the Level 2 display screens was selected primarily through a detailed review of operator actions required in the stations Emergency Operating Procedures (EOPs). The results of Regulatory Guide 1.97 reviews, the USAR analyses of plant transients and accidents, and operator comments on proposed parameter sets were also used to help select information made available on the SPDS.

Trended information located on the right side of each Level 2 display provides the user with a ready assessment of the short term trends for important EOP parameters. Non-trended information on the left side of each Level 2 display provides the user with at a glance data useful in assessing overall "BIG PICTURE" plant performance while viewing selected trended information on the right side of the screen.



B. SYSTEM DESCRIPTION (Cont)

4.0 SPDS Color Coding

SPDS parameters and information are color coded to assist the operator in determining the Safety Status of the plant. The coding used is as follows: (See Attachment 7: Limit Setpoints for SPDS Trended Parameters for a listing of Limit setpoints for SPDS trended parameters.)

RED: Alarm or alert condition. Computed value exceeds specified high-high or low-low limit; Red is used to:

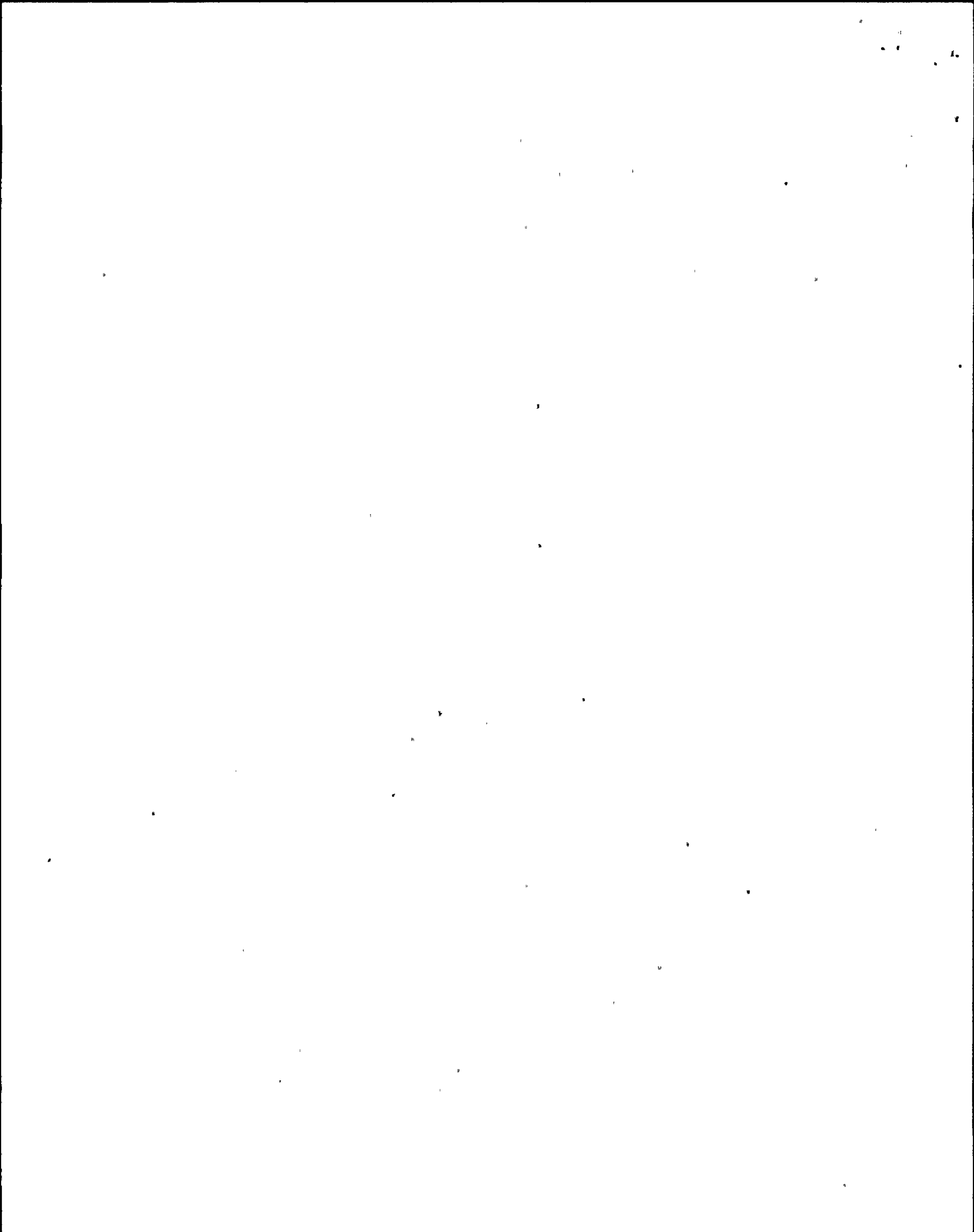
1. Display parameter labels in reverse video (black letters on red background) to indicate a parameter is in alert or alarm;
2. Indicate an alarm or alert condition on a trended parameter when the Safety Status Indicator at the bottom of the screen is Red (typically structural design limits);
3. Indicate high-high or low-low limit setpoint values on the vertical axis of a video trend graph.

YELLOW: Abnormal condition. Computed value exceeds specified high or low limit; Yellow is used to:

1. Display parameter labels in reverse video (black letters on a yellow background) to indicate a parameter is in an abnormal condition;
2. Indicate an abnormal condition on a trended parameter when the Safety Status Indicator at the bottom of the screen is Yellow (typically EOP Entry Conditions);
3. Indicate high or low limit setpoint values on the vertical axis of a video trend graph.

GREEN: Normal Condition. Computed value is within specified high or low limit; Green is used to:

1. Display parameter labels in reverse video (black letters on green background) to indicate a parameter is in a normal condition;
2. Indicate normal conditions on all trended parameters when the Safety Status Indicator at the bottom of the screen is Green.



B. SYSTEM DESCRIPTION (Cont)

4.0 (Cont)

MAGENTA: Questionable parameter value. Green, Yellow, and Red coding functions still apply to questionable parameters; the parameter is outside of specified validation criteria.

WHITE: Informational data. Uses include:

1. Date and time;
2. Non-trended parameter labels (parameters not associated with the Safety Status Indicators at the bottom of a page);
3. Trend graph axis values;
4. Failed parameter labels (black letters on white background). Word FAIL appears in white below this label.

CYAN: Informational data. Uses include:

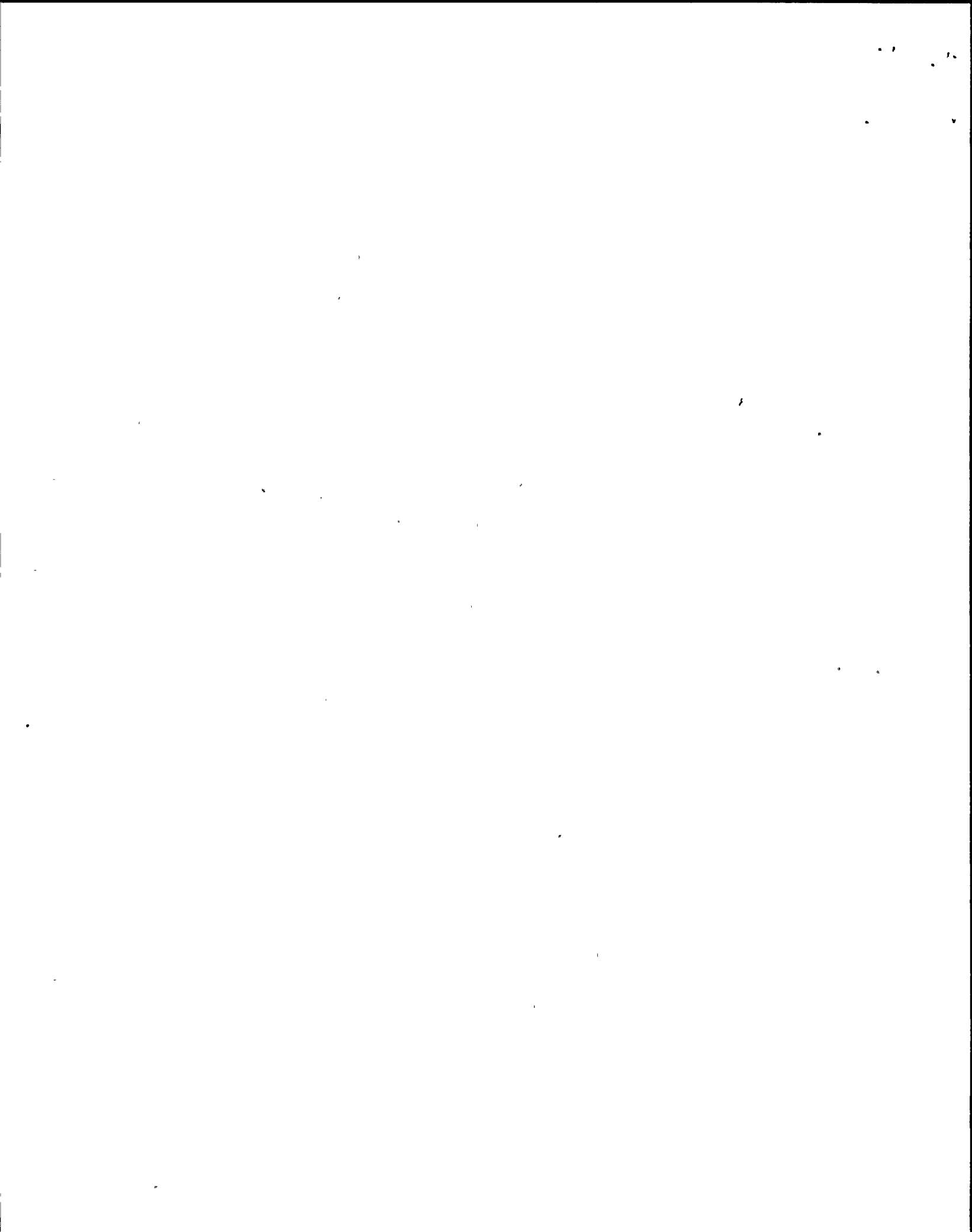
1. Display titles;
2. Mimic labels;
3. Borders for trend graphs;
4. Borders for non-trended parameter values.

The SPDS is intended to be an aid to operators in assessing the safety status of the plant. The SPDS is not intended to be used to the exclusion of other instruments/indications available to the operator. When possible, confirmation of indication obtained from the SPDS should be made using other Control Room indications.

C. OPERATING REQUIREMENTS

The following systems must be in operation to support the Safety Parameter Display System (SPDS):

- N2-OP-71, 13.8KV/4160V/600V AC Distribution
- N2-OP-73A, Normal DC Distribution
- N2-OP-40, Liquid Radwaste



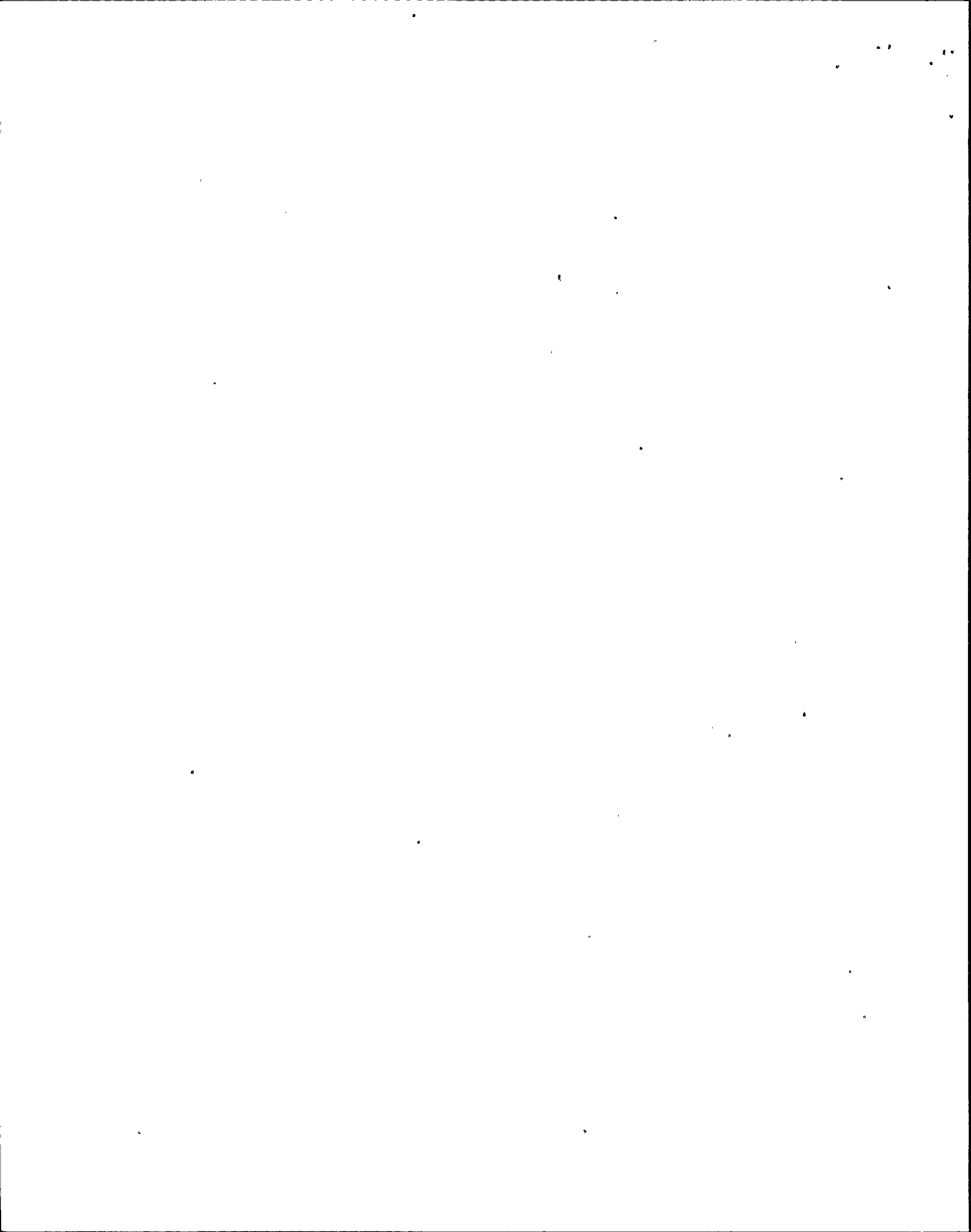


D. PRECAUTIONS AND LIMITATIONS

- 1.0 The Station Shift Supervisor must be notified immediately of any SPDS inoperability. | TCN- 2
- 2.0 The SPDS is considered operable when parameters necessary to assess plant safety status using the five Level 2 displays are available at the SPDS. When a safety function status can no longer be accurately assessed the SPDS must be considered inoperable. (Attachments 4 and 5 are general lists of SPDS inputs.) Individual inputs may be inoperable due to surveillance or hardware failure provided that the out of service time is minimal. | TCN- 2
- 3.0 All unplanned outages on the LWS Computer or the SPDS system must be approved by the SSS. | TCN- 2
- 4.0 Mode selection should be consistent with the Reactor Mode switch position.
- 5.0 A FAIL condition could be the result of one of the following:
- Invalid analog inputs
  - Monitor/analyzer sample path unavailable
  - Loss of one of the inputs to a display feature requiring two or more inputs for computation
- 6.0 Parameter FAIL status is omitted from the Safety Status Indicators features.
- 7.0 Reactor Mode Error Checking is performed only when the SPDS is selected for the RUN or STARTUP mode.
- 8.0 Open input signals to the ERF computer are provided by valve control power. IF the control power is de-energized THEN the ERF computer will indicate the valve as closed even if it is open. This could result in faulty indication of a containment isolation group on the SPDS Level 2 display.
- 9.0 At least one Control Room ERF CRT should be selected for SPDS display at all times to alert operators in changes of plant safety status.
- 10.0 An inoperable SPDS is not reportable under 10CFR50.72.b.5. This inoperability does not constitute a major loss of emergency assessment capability since all SPDS parameters are also available in other locations in the Control Room. | TCN- 2

E. STARTUP

The Safety Parameter Display System (SPDS) is an integral part of the Liquid Radwaste (LWS) Computer and is placed in service in accordance with N2-OP-40, Liquid Radwaste System.



F. NORMAL OPERATIONS

NOTE: All SPDS/ERF computer operations are performed at any ERF Computer Access Terminal.

1.0 SPDS Display Screen Selection

1.1 Select parameter to be viewed from those listed below:

- 1.1.1 Safety Function Status
- 1.1.2 Reactivity Control
- 1.1.3 Core Cooling
- 1.1.4 Coolant System Integrity
- 1.1.5 Containment Integrity Page 1
- 1.1.6 Containment Integrity Page 2
- 1.1.7 Radioactivity Control

1.2 Depress cyan function key at the associated CRT keyboard.

NOTE: At least one Control Room ERF CRT shall be selected for SPDS display at all times to alert operators of plant safety status.

1.3 Verify the selected SPDS display (Attachment 3, Figures 1 through 7) appears on the desired CRT.

1.4 Verify display generator is functioning as indicated by continuous time display updating every five seconds.

1.5 Monitor SPDS at least once per shift to ensure plant safety function status.

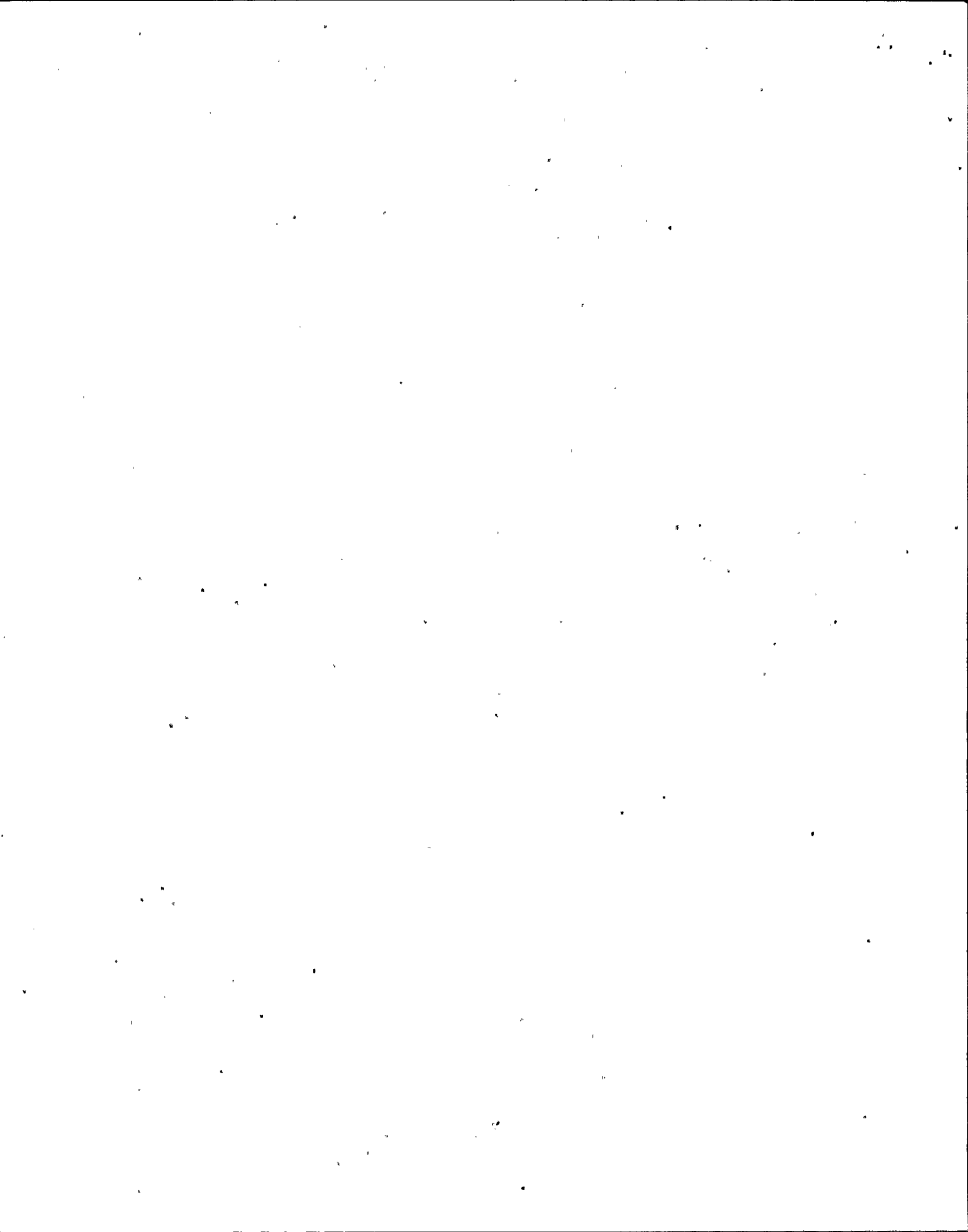
2.0 Reactor Mode Entry

NOTE: Mode selection should be consistent with the Reactor Mode switch position.

2.1 Depress REACTOR MODE SELECT function key at either SPDS keyboard.

2.2 Observe the following Reactor Mode Select Menu appears on the associated CRT:

- RUN
- STARTUP/HOT STANDBY



F. NORMAL OPERATIONS (Cont)

2.2 (Cont)

- COLD SHUTDOWN
- REFUEL

2.3 Select desired reactor mode by performing the following:

2.3.1 Position cursor by using the TAB FWD function key.

2.3.2 Depress EXECUTE function key.

2.4 Verify selected mode is displayed along side CURRENT MODE heading on the Reactor Mode Select Menu.

2.5 IF desired THEN select parameter for SPDS Display Screen in accordance with Section F.1.0. of this procedure.

2.6 Verify correct mode selected indicates in the upper left corner of the screen.

G. SHUTDOWN

None

H. OFF-NORMAL OPERATIONS

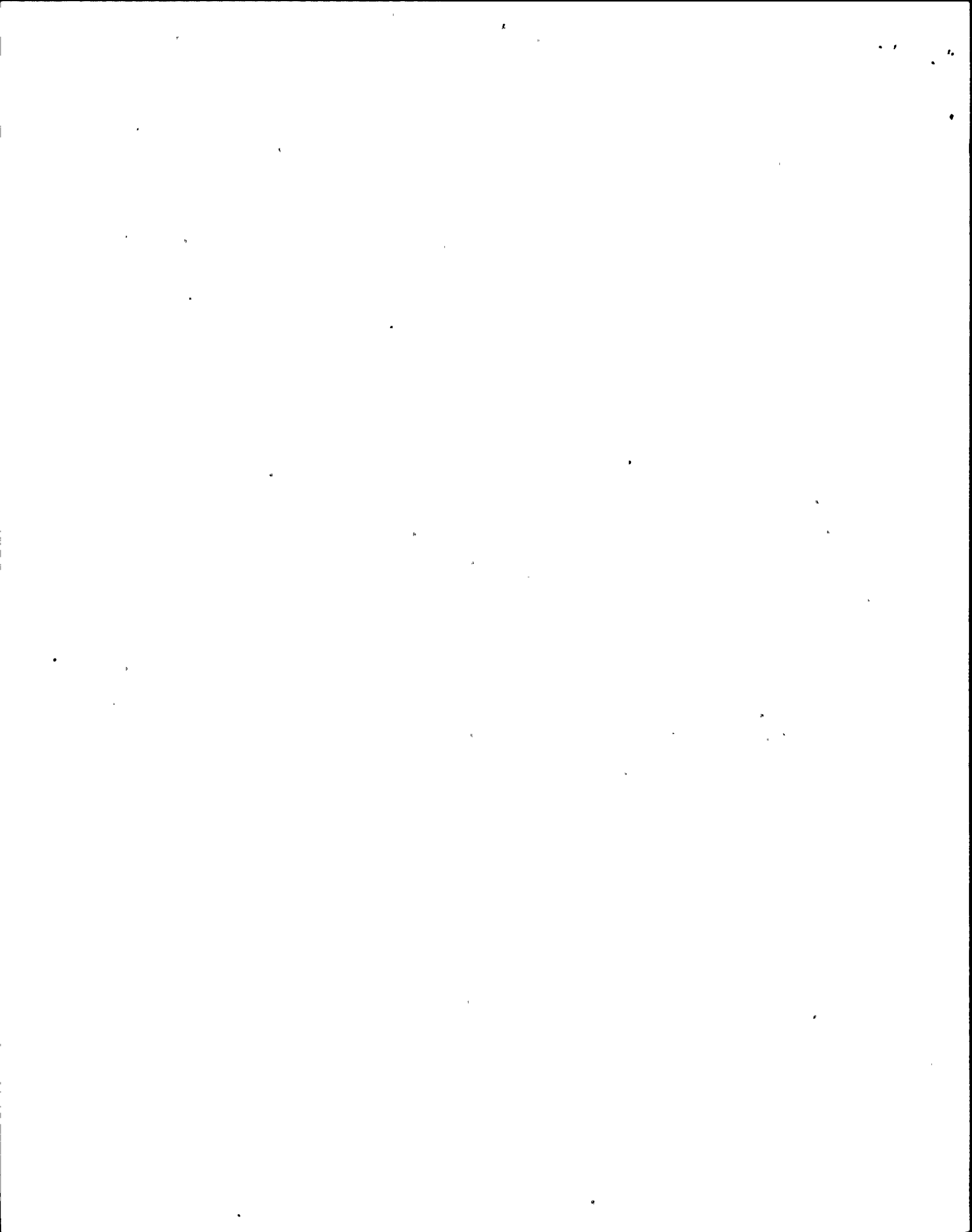
1.0 Parameter Condition Abnormal Indicated

1.1 Observe parameter condition abnormal as indicated by one or more of the following:

1.1.1 Level 1 screen has parameter label with black lettering on yellow background.

1.1.2 Level 2 screen Trend Plot has parameter label with black lettering on yellow background.

1.1.3 Safety Status Indicator displays in black lettering on yellow background.

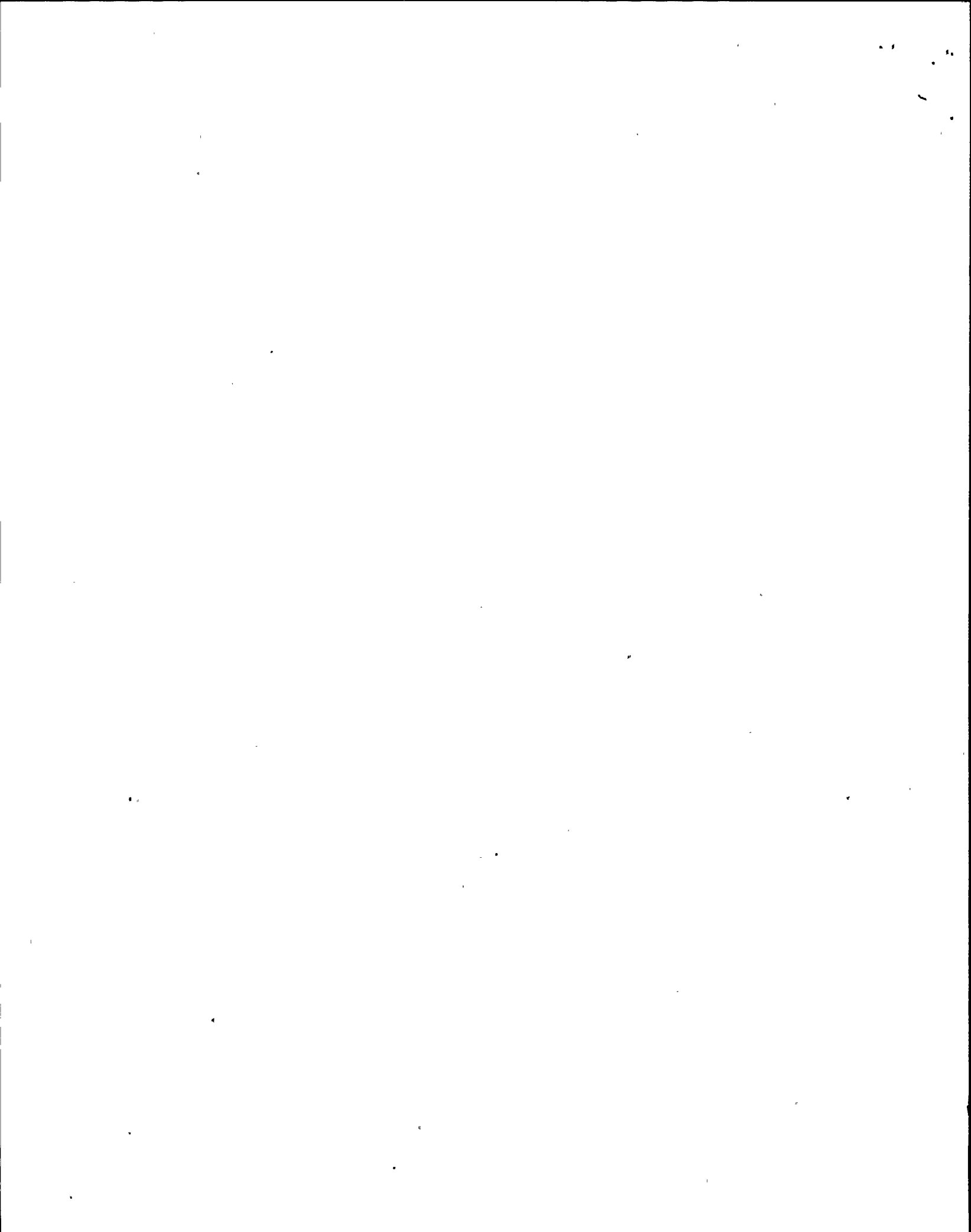


H. OFF-NORMAL OPERATIONS (Cont)

- 1.2 IF parameter condition abnormal is indicated THEN perform the following:
  - 1.2.1 Select SPDS screen associated with the Safety Status Indicator that is indicating abnormal condition.
  - 1.2.2 Ensure parameter is abnormal as indicated by applicable Control Room instrumentation.
  - 1.2.3 Notify the SSS of the alert/alarm condition.
  - 1.2.4 Take corrective action for the abnormal condition in accordance with applicable procedures.

2.0 Parameter Condition Alert/Alarm Indicated

- 2.1 Observe parameter condition alert/alarm as indicated by one or more of the following:
  - 2.1.1 Level 1 screen has parameter label with black lettering on red background.
  - 2.1.2 Level 2 screen Trend Plot has parameter label with black lettering on red background.
  - 2.1.3 Safety Status Indicator displays in black lettering on red background.
- 2.2 IF parameter condition alert/alarm is indicated THEN perform the following:
  - 2.2.1 Select SPDS screen associated with the Safety Status Indicator that is indicating alert/alarm condition.
  - 2.2.2 Ensure parameter is alert/alarm as indicated by applicable Control Room instrumentation.
  - 2.2.3 Notify the SSS of the alert/alarm condition.
  - 2.2.4 Take corrective action for the alert/alarm condition in accordance with applicable procedures.





H. OFF-NORMAL OPERATIONS (Cont)

3.0 Parameter Fail Indicated

NOTE: A fail condition could be the result of one of the following:

- Invalid analog inputs
- Monitor/analyzer sample path unavailable
- Loss of one of the inputs to a display feature requiring two or more inputs for computation.

3.1 Observe parameter condition fail as indicated by the word FAIL displayed in white lettering on a black background in place of numerical values and units screen display.

NOTE: Parameter FAIL status is omitted from the Safety Status Indicators features.

3.2 IF parameter condition fail is indicated THEN perform the following:

3.2.1 Ensure parameter is failed as indicated by applicable Control Room instrumentation.

3.2.2 Verify Control Room operations personnel are aware of the requirements to monitor applicable Control Room instrumentation as a result of the failed condition.

3.2.3 Notify the SSS of the alert/alarm condition.

3.2.4 Determine cause of the fail condition.

3.2.5 Take corrective action for the failed condition in accordance with applicable procedures.

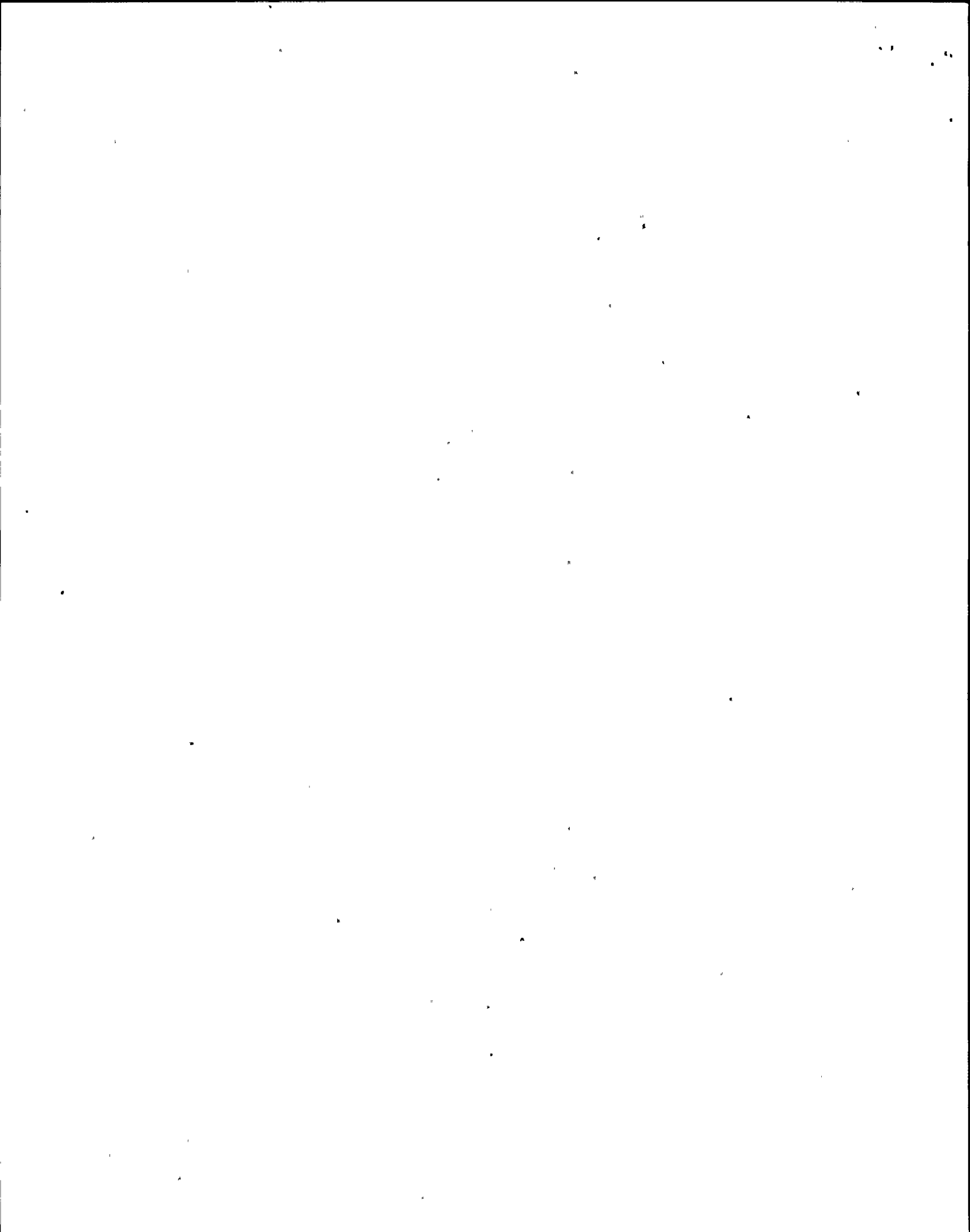
3.2.6 IF necessary to correct fail condition THEN perform the following:

- a. Initiate a work request to repair the problem.
- b. Enter in the Equipment Status Log for tracking.
- c. Conspicuously label the user terminal as failed.

4.0 Reactor Mode Error Indicated

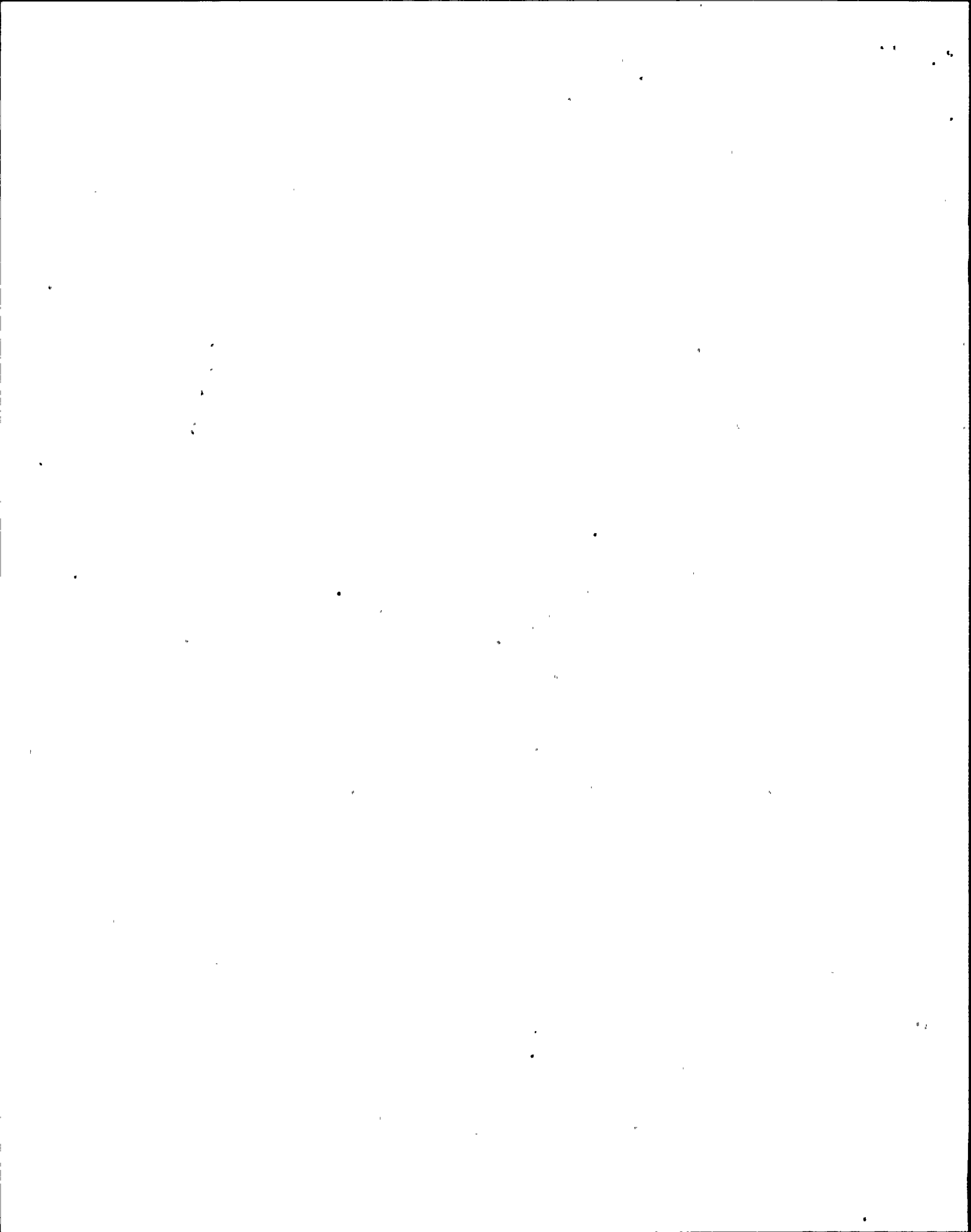
NOTE: Reactor Mode Error Checking is performed only when the SPDS is selected for the RUN or STARTUP mode.

4.1 Observe reactor mode error condition as indicated by the MODE variable field display changing to yellow background.



H. OFF-NORMAL OPERATIONS (Cont)

- 4.2 IF reactor mode error condition is indicated THEN perform the following:
- 4.2.1 Verify selected SPDS mode is the same as the position of the Reactor Mode Switch.
  - 4.2.2 IF the SPDS and Reactor Mode Switch agree THEN refer to Attachment 6: Mode Error Checking for a list of parameter and associated conditions used for Mode Error Checking.
  - 4.2.3 Determine cause of the error condition.
  - 4.2.4 Notify the SSS of the alert/alarm condition.
  - 4.2.5 Take corrective action for the error condition in accordance with applicable procedures.
  - 4.2.6 IF necessary to correct error condition THEN perform the following:
    - a. . Initiate a work request to repair the problem.
    - b. Enter in the Equipment Status Log for tracking.



I. PROCEDURES FOR CORRECTING ALARM CONDITIONS

601150

Refresh: None

SPDS PARAMETER ALARM	150
----------------------------	-----


<u>Computer Point</u>	<u>Printout</u>	<u>Source</u>	<u>Setpoint</u>
None	None	SPDS Safety Status Indicator in abnormal, alert or alarm condition.	Various - see Attachment 4.

Automatic Response

None

Operator Actions

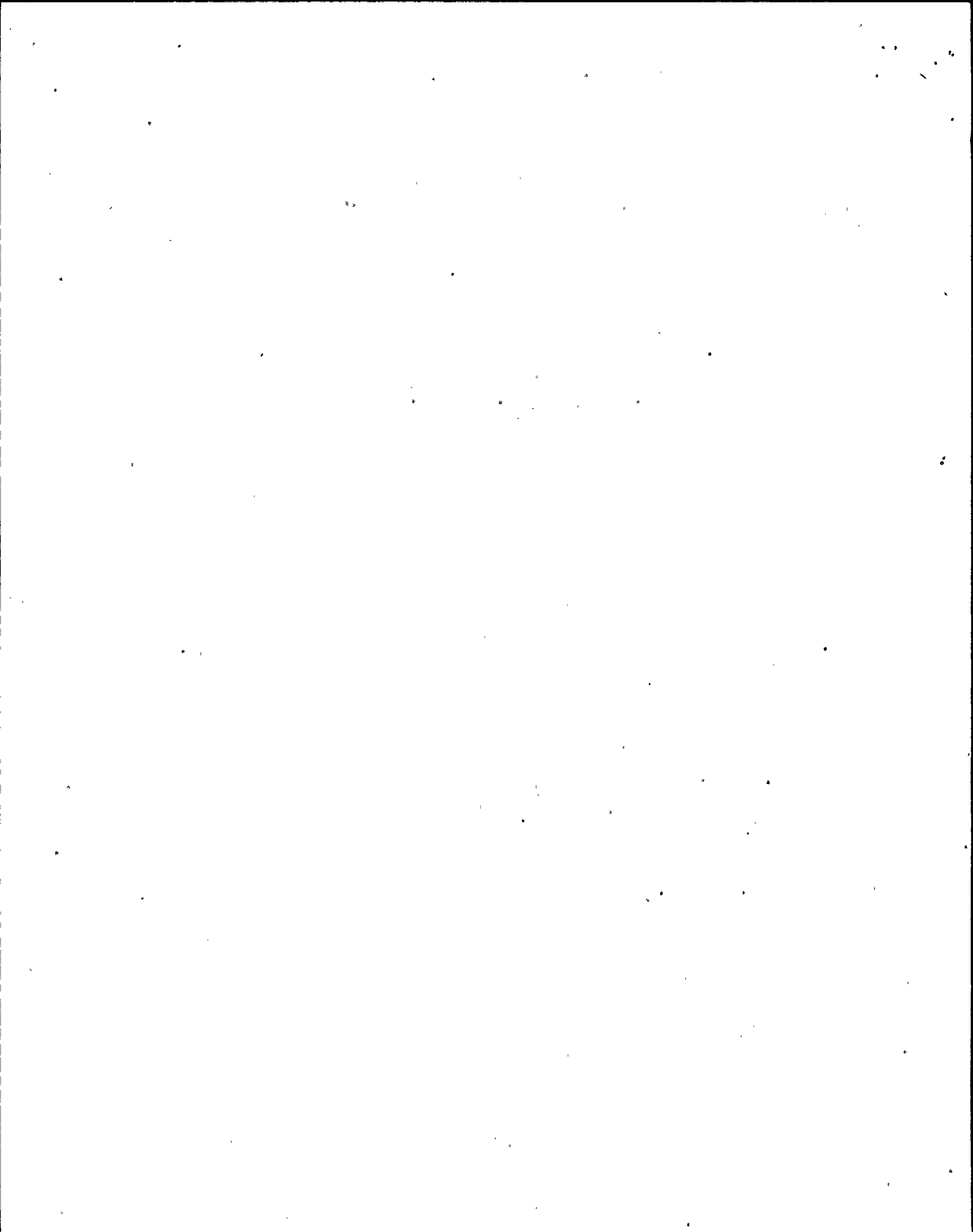
- On any of the SPDS keyboards, depress the ALARM ACK function key and verify that alarm 601150 clears.
- Review the Safety Status Indicator boxes located at the bottom of the SPDS screen to identify which Safety Function is in the alarm condition.
- Notify SSS immediately of any abnormal plant safety status noted.
- Refer to Section H.1.0 or H.2.0 as appropriate.

Possible Causes

None

References

- N2-OP-91B, Safety Parameter Display System
- N2-OP-40, Liquid Radwaste System



I. PROCEDURES FOR CORRECTING ALARM CONDITIONS

601160

Refresh: None

SPDS COMPUTER ALARM	160
---------------------------	-----


Computer Point

Printout

Source

Setpoint

None

None

LWS computer  
fault.

None

Automatic Response

None

Operator Actions

- a. Acknowledge alarm 601160 and log the time that the alarm condition was received.
- b. Evaluate SPDS operability and take appropriate NRC notification action in accordance with N2-OP-91B, Safety Parameter Display System.
- c. Contact the Radwaste Control Room to determine the cause of the alarm condition.
- d. IF the Liquid Radwaste computer system is not returned to operable status (i.e., SPDS COMPUTER ALARM cleared) within five (5) minutes, THEN notify System Engineering Computer Personnel and request they take appropriate corrective action.

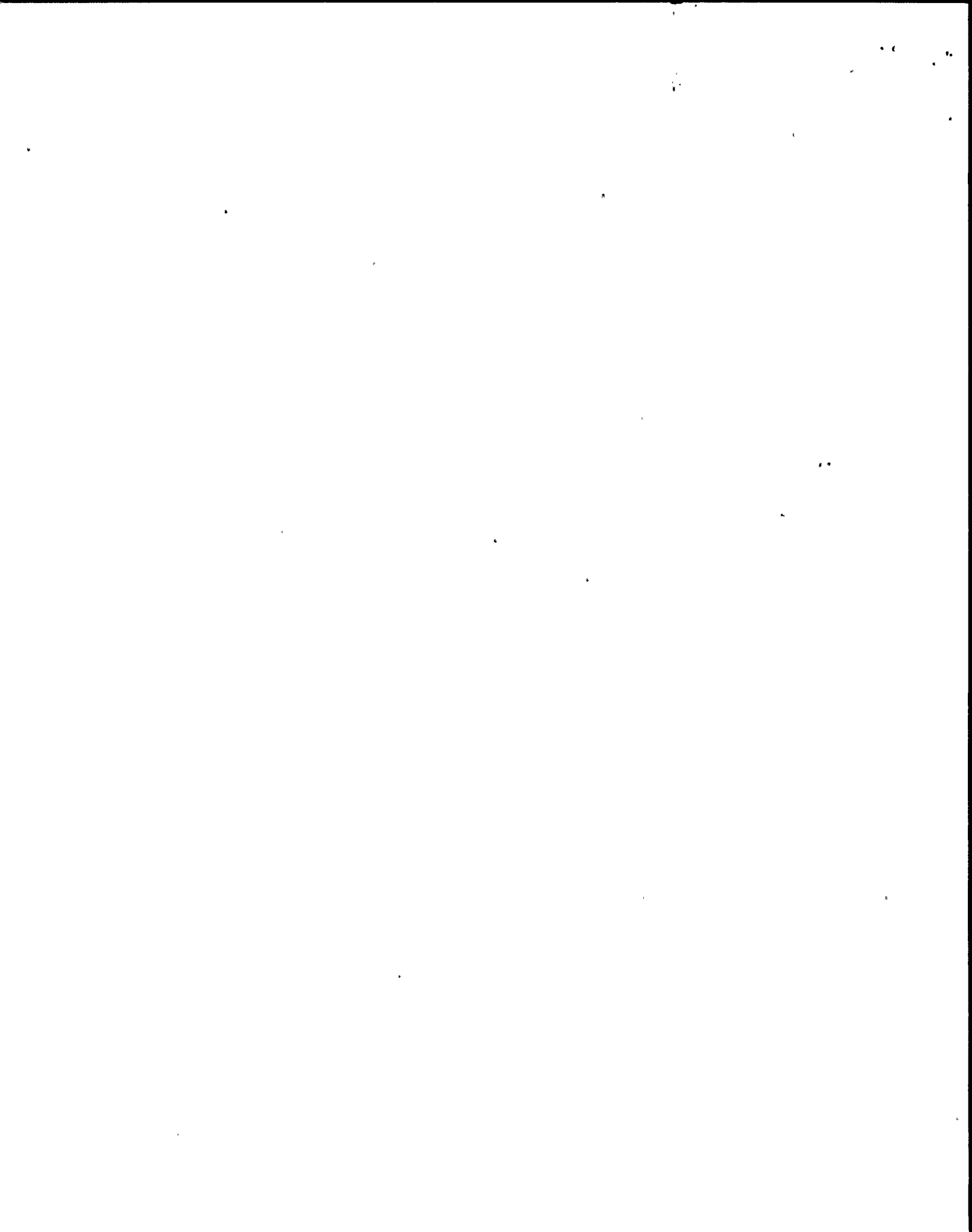
Possible Causes

None

References

N2-OP-91B, Safety Parameter Display System

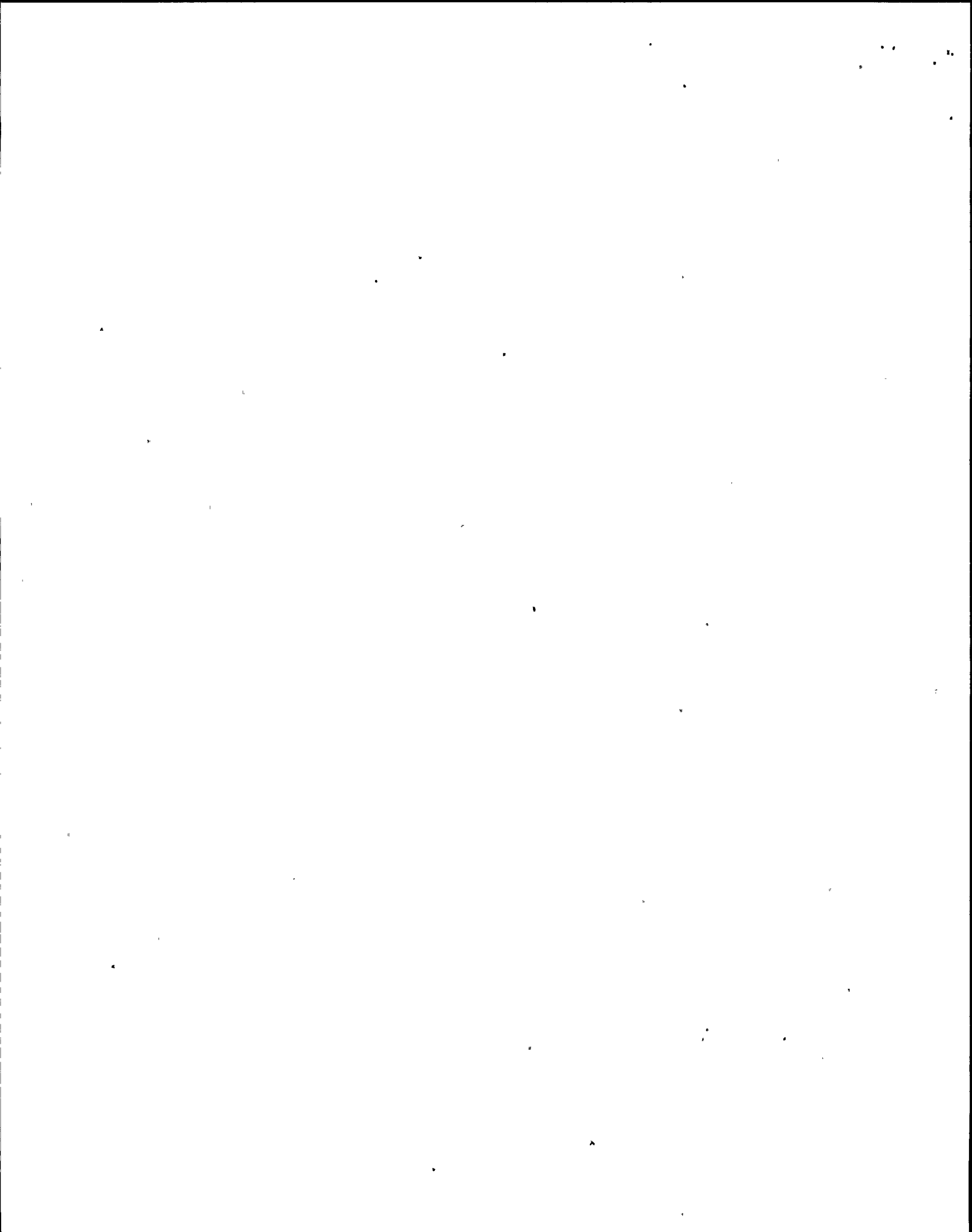
N2-OP-40, Liquid Radwaste System





ATTACHMENT 1  
VALVE LINEUP

INTENTIONALLY LEFT BANK

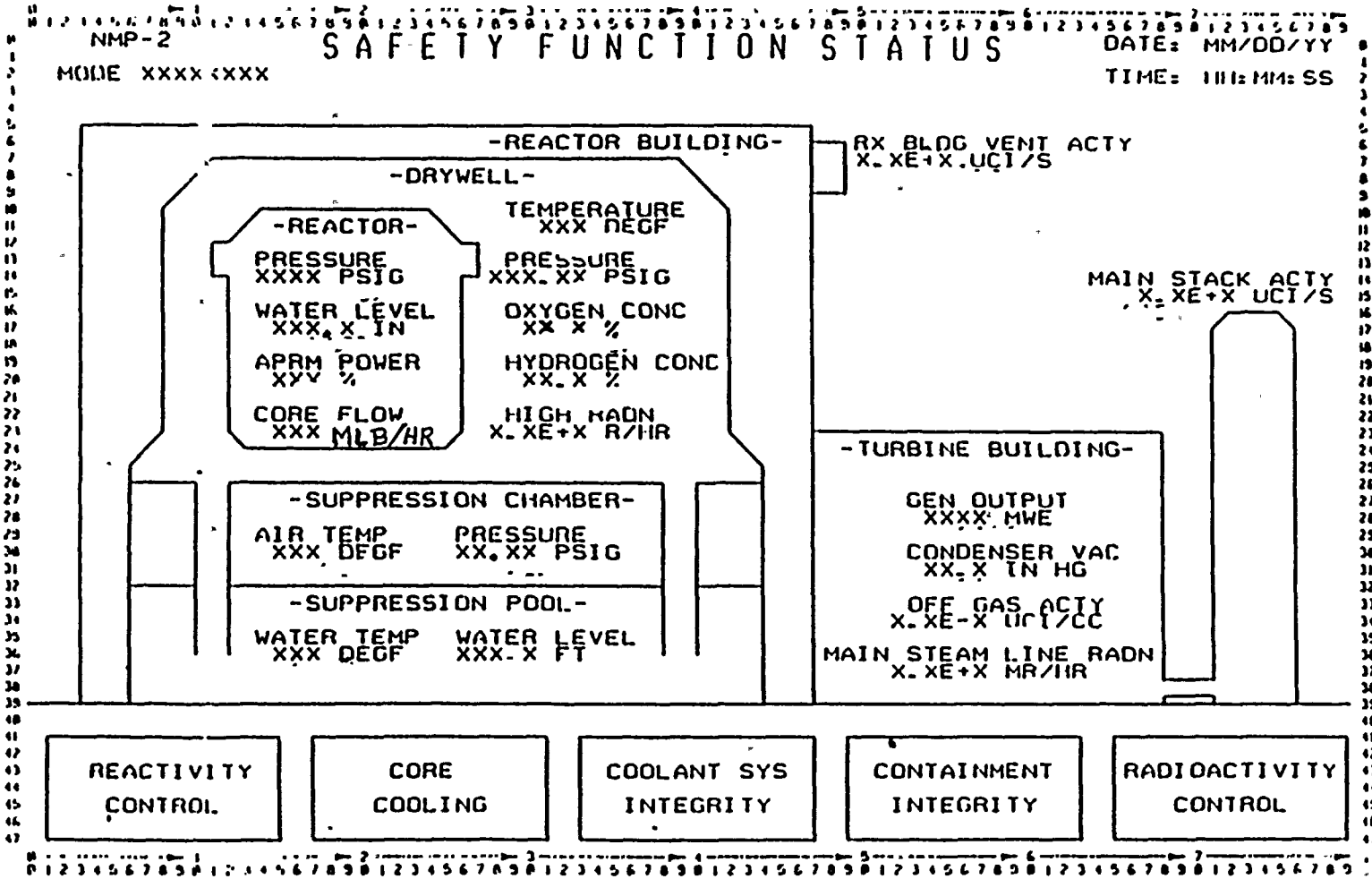


ATTACHMENT 2  
ELECTRICAL LINEUP

INTENTIONALLY LEFT BANK

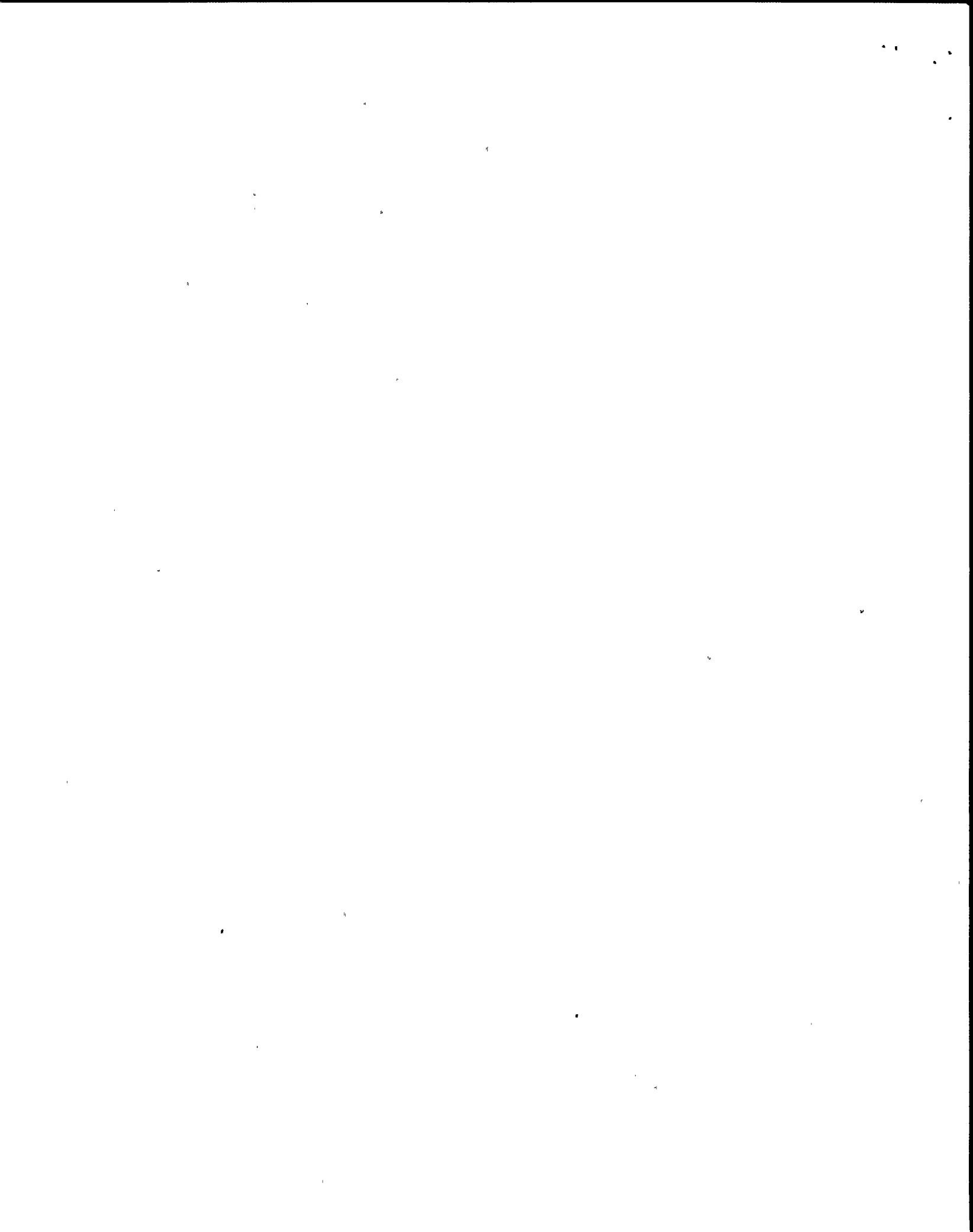


ATTACHMENT 3  
 SPDS DISPLAYS  
 FIGURE 1 - SAFETY FUNCTION STATUS



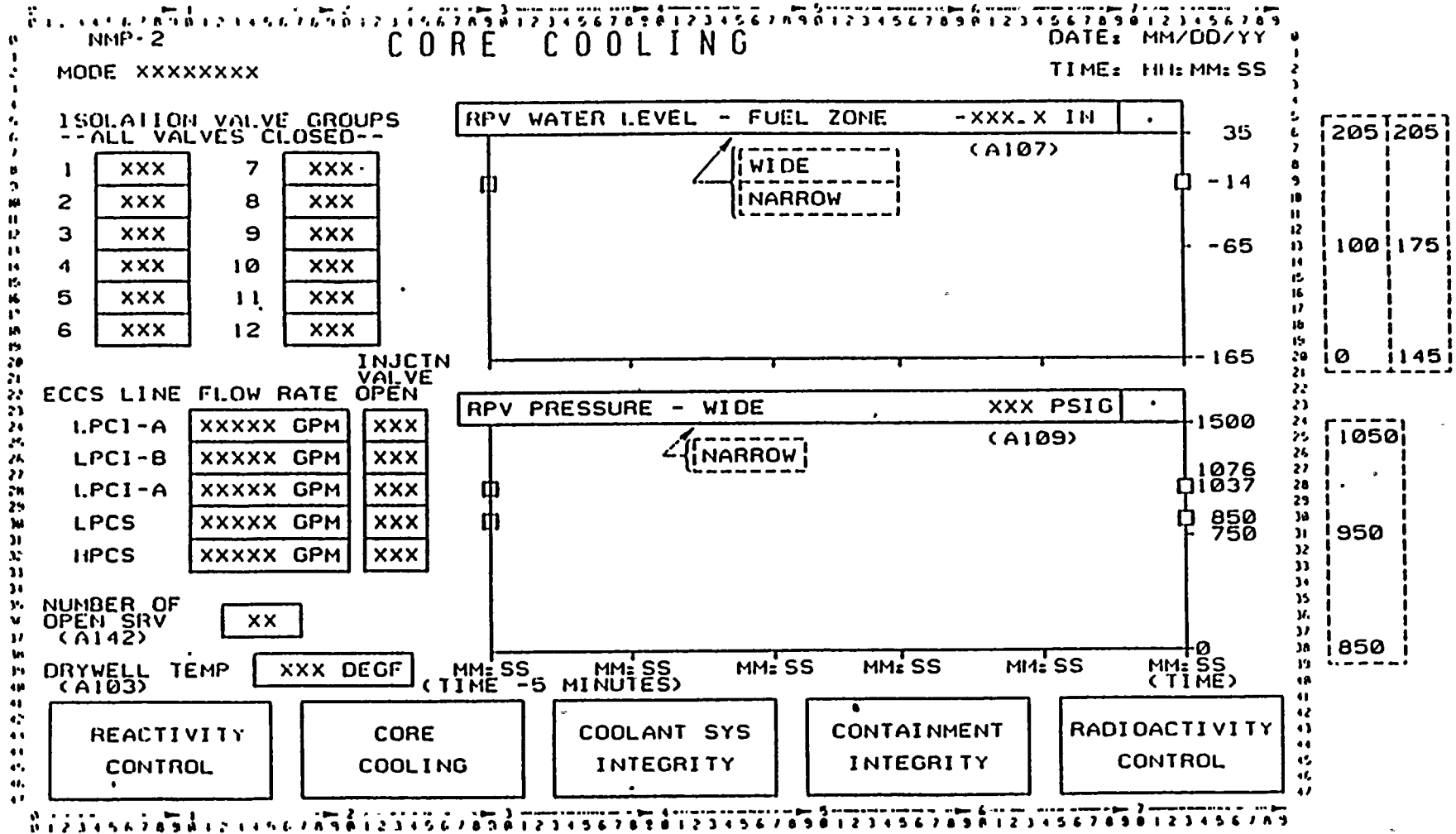


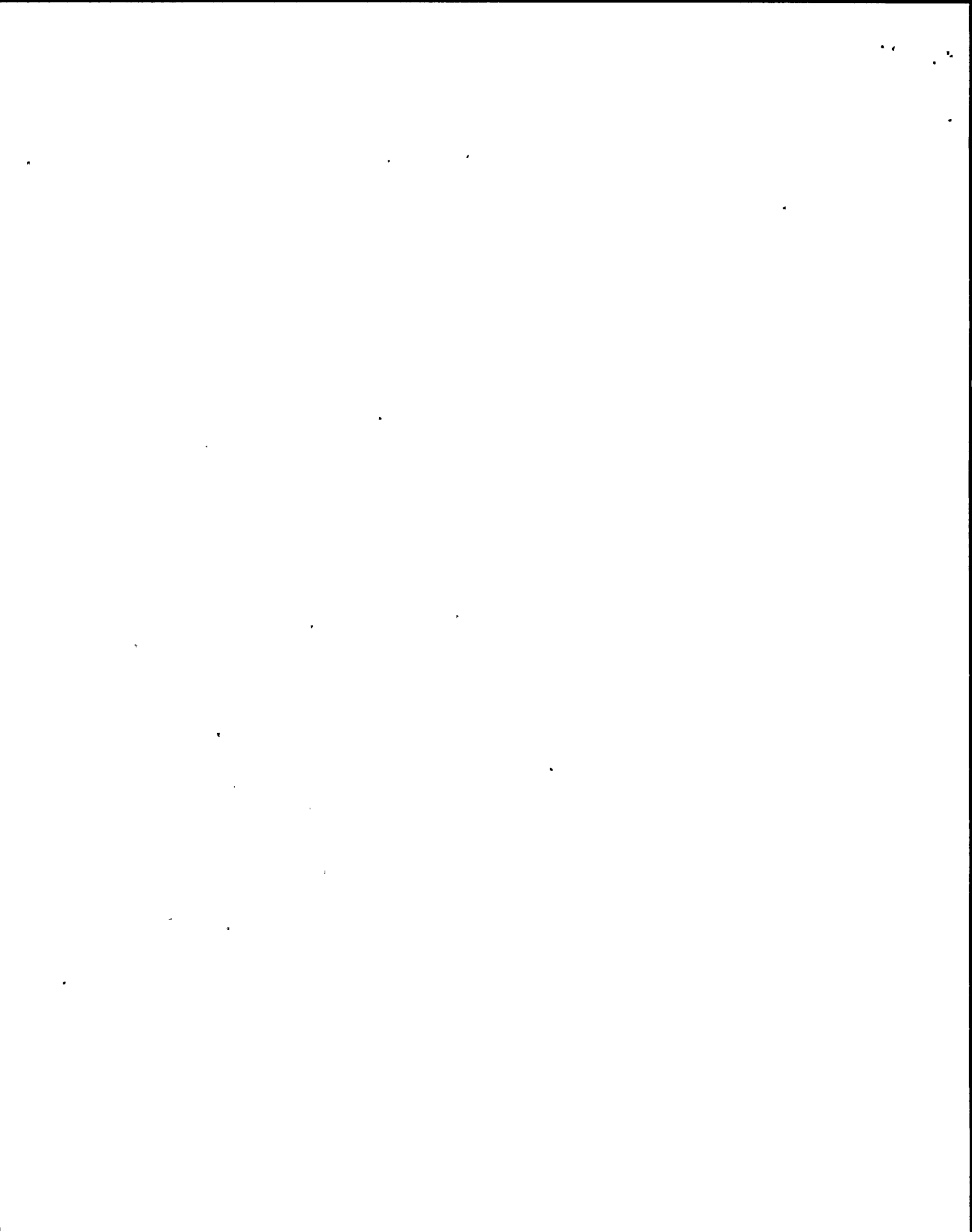




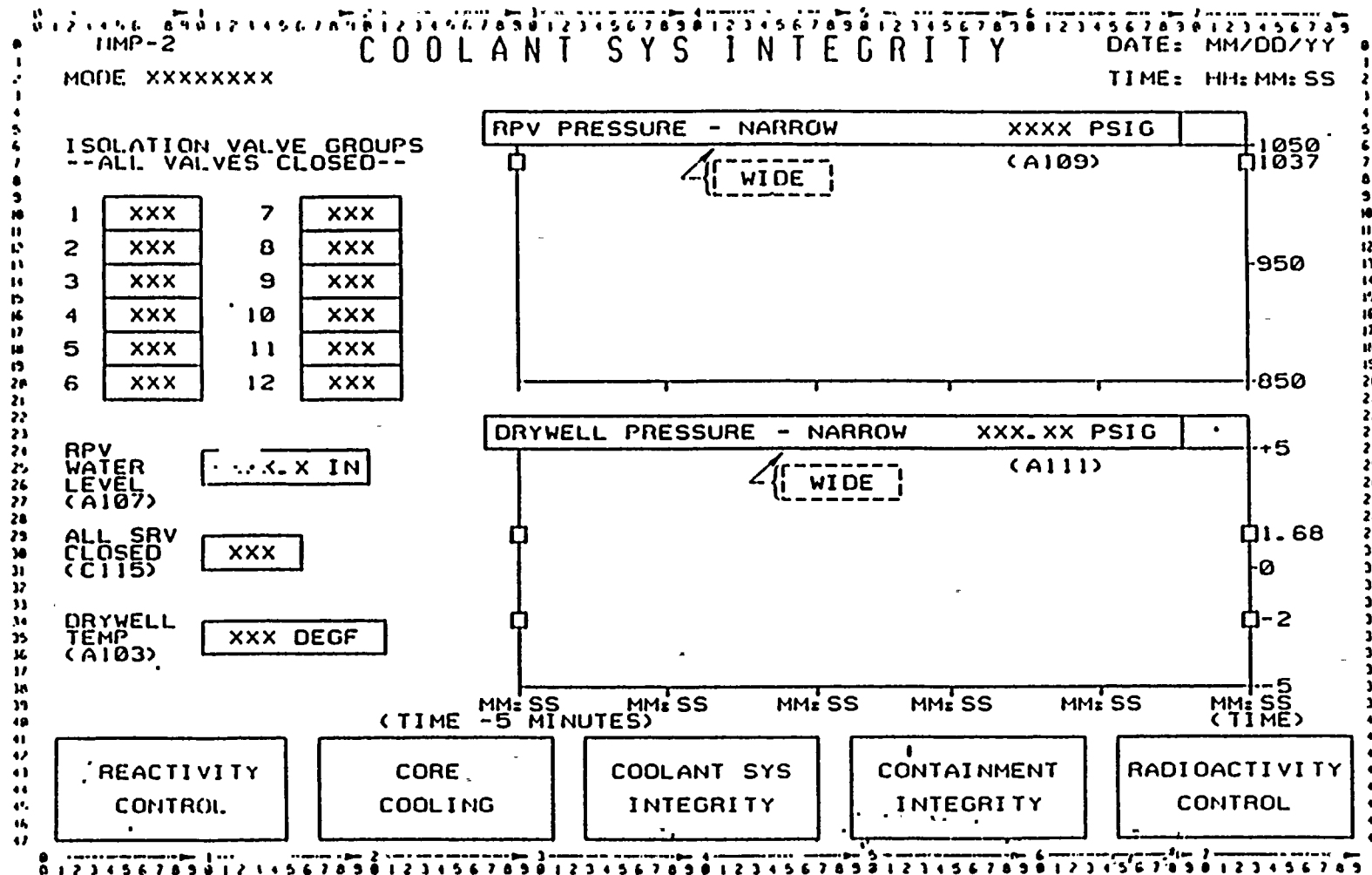


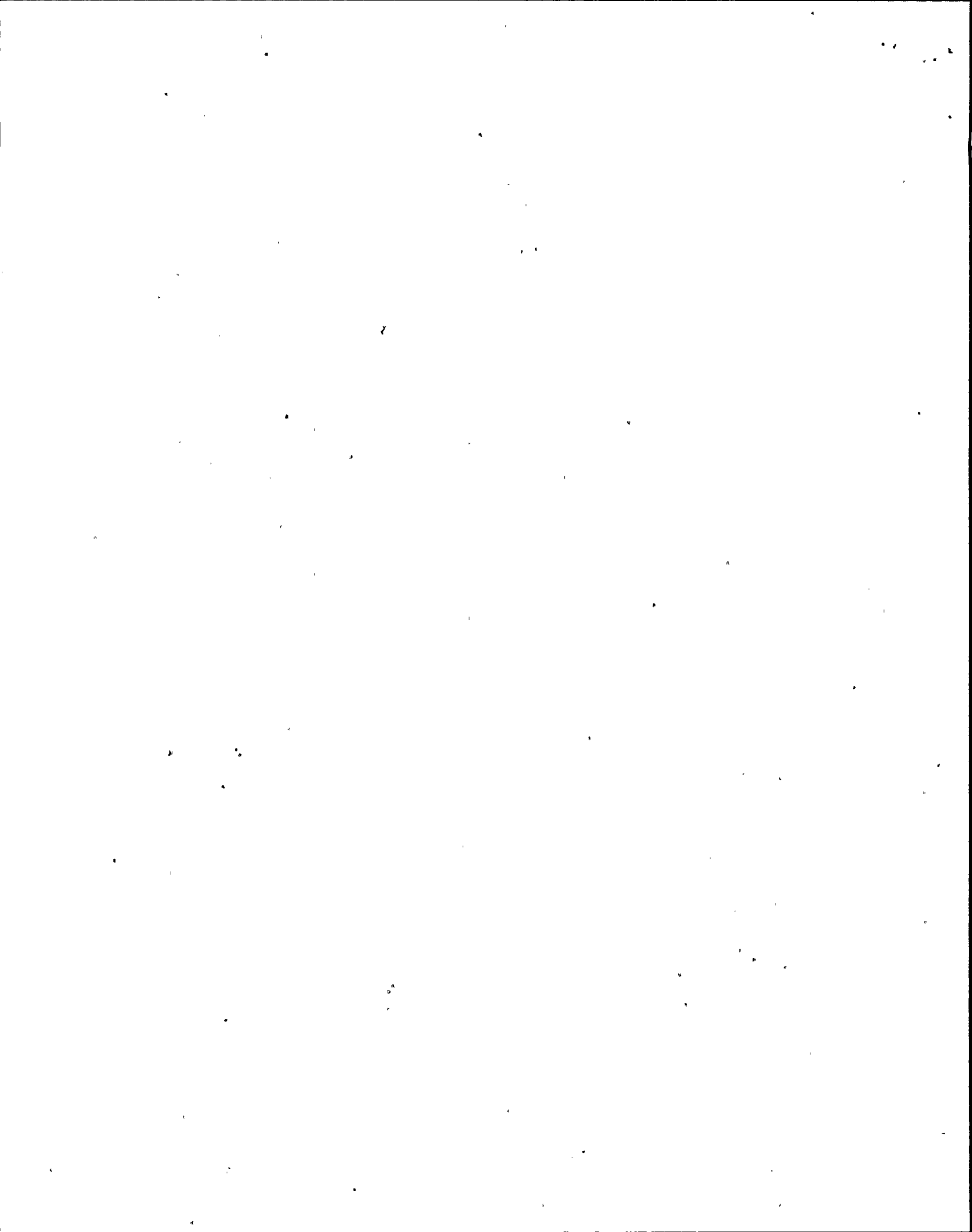
ATTACHMENT 3  
SPDS DISPLAYS  
FIGURE 3 - CORE COOLING



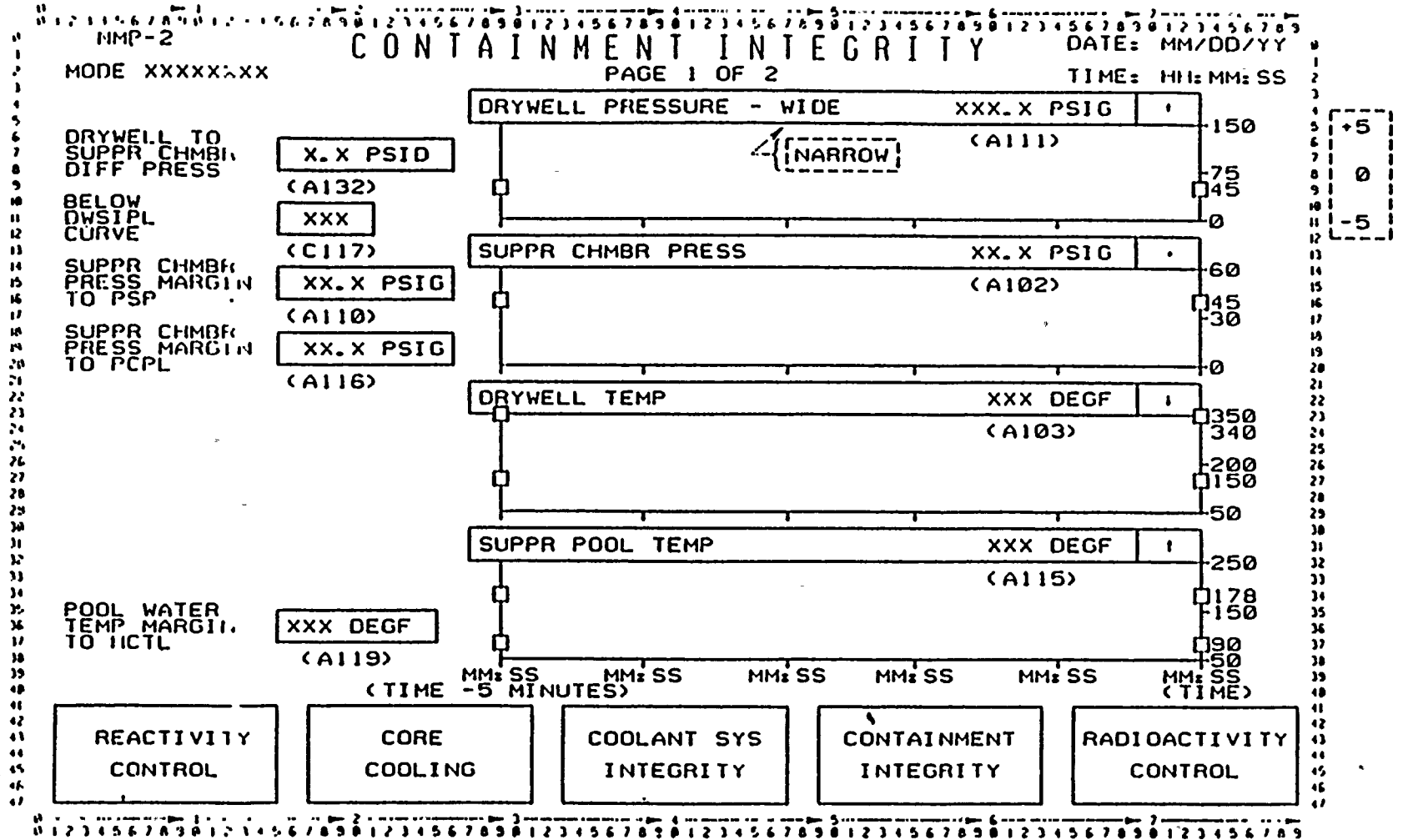


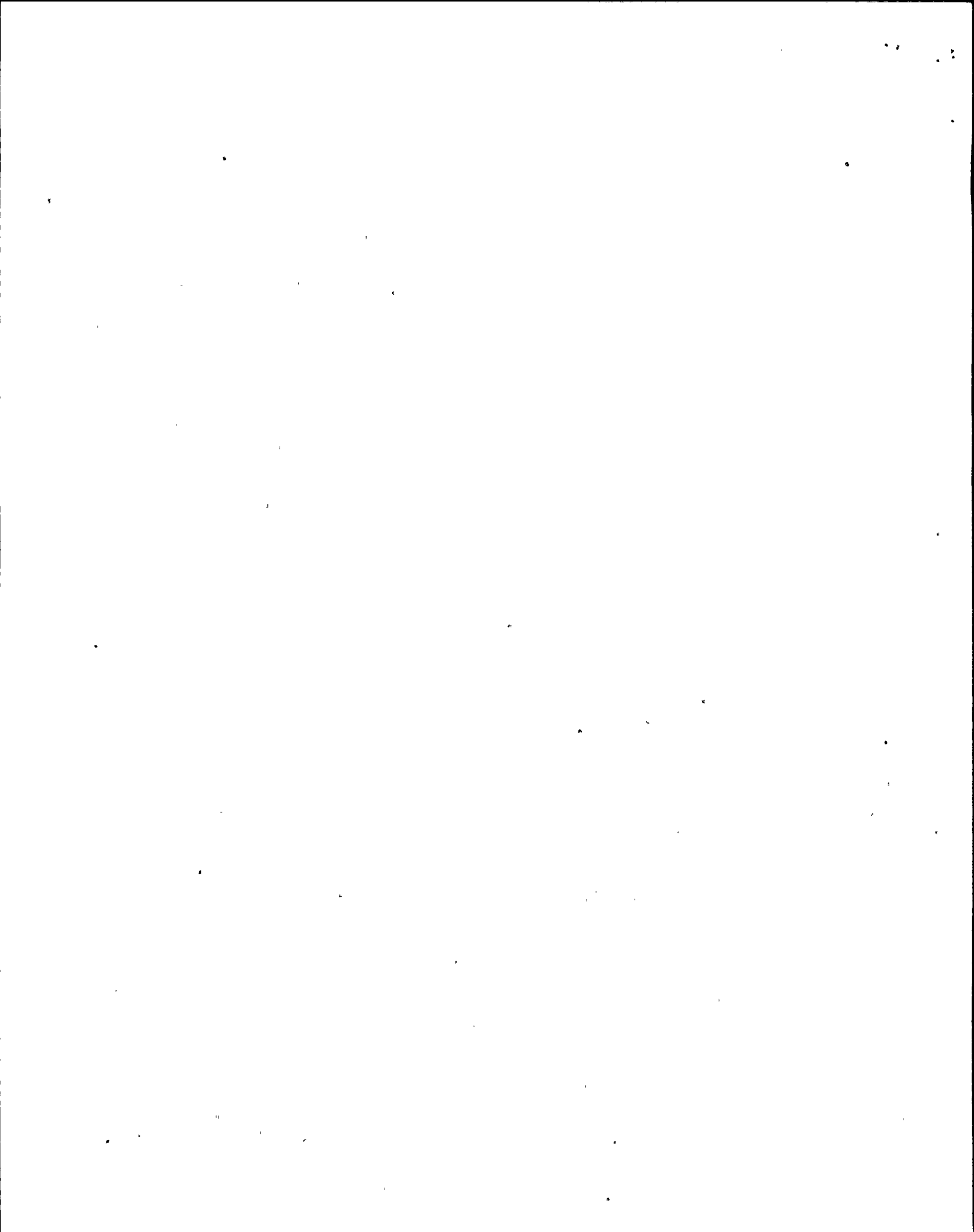
ATTACHMENT 3  
 SPDS DISPLAYS  
 FIGURE 4 - COOLANT SYS INTEGRITY



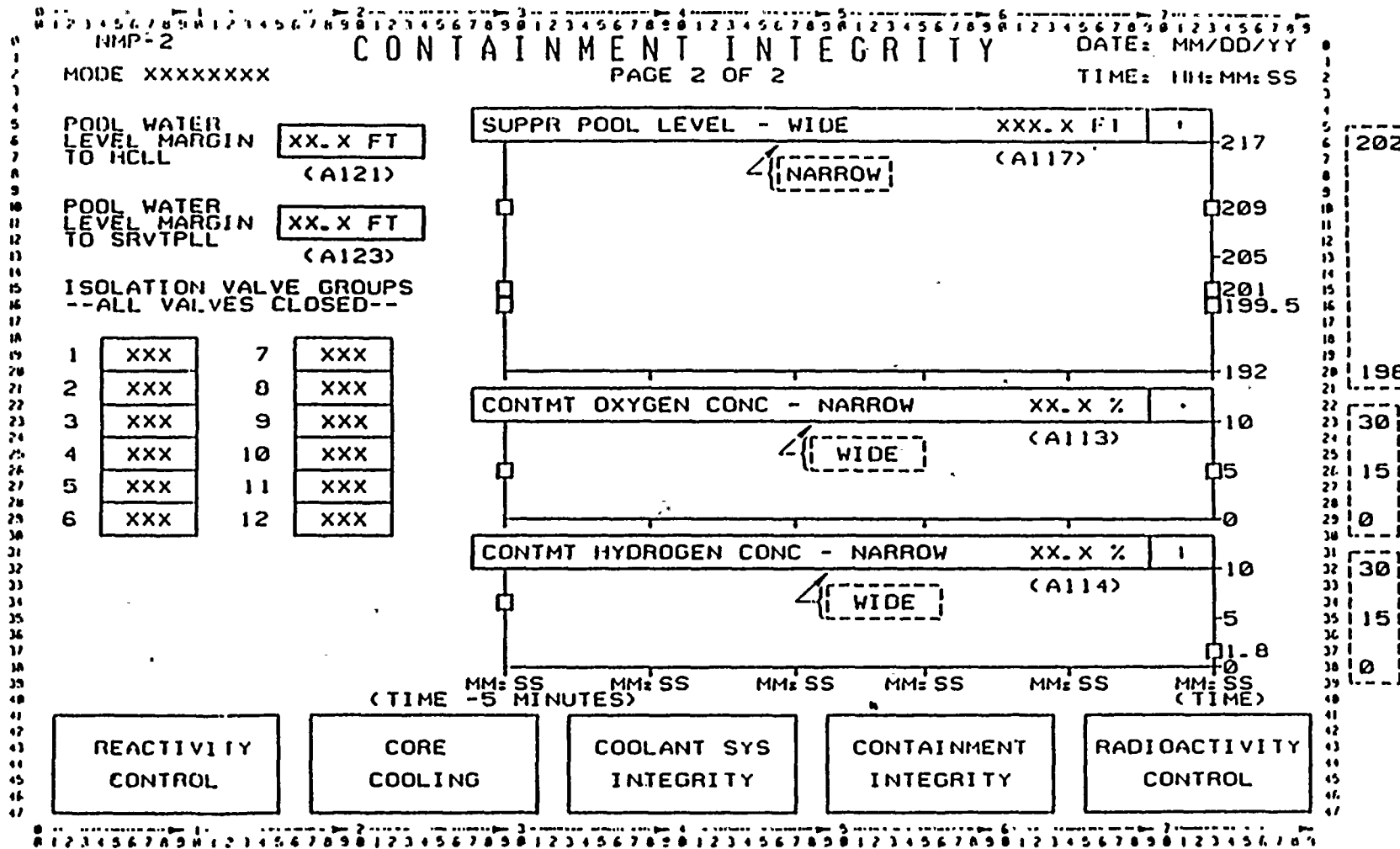


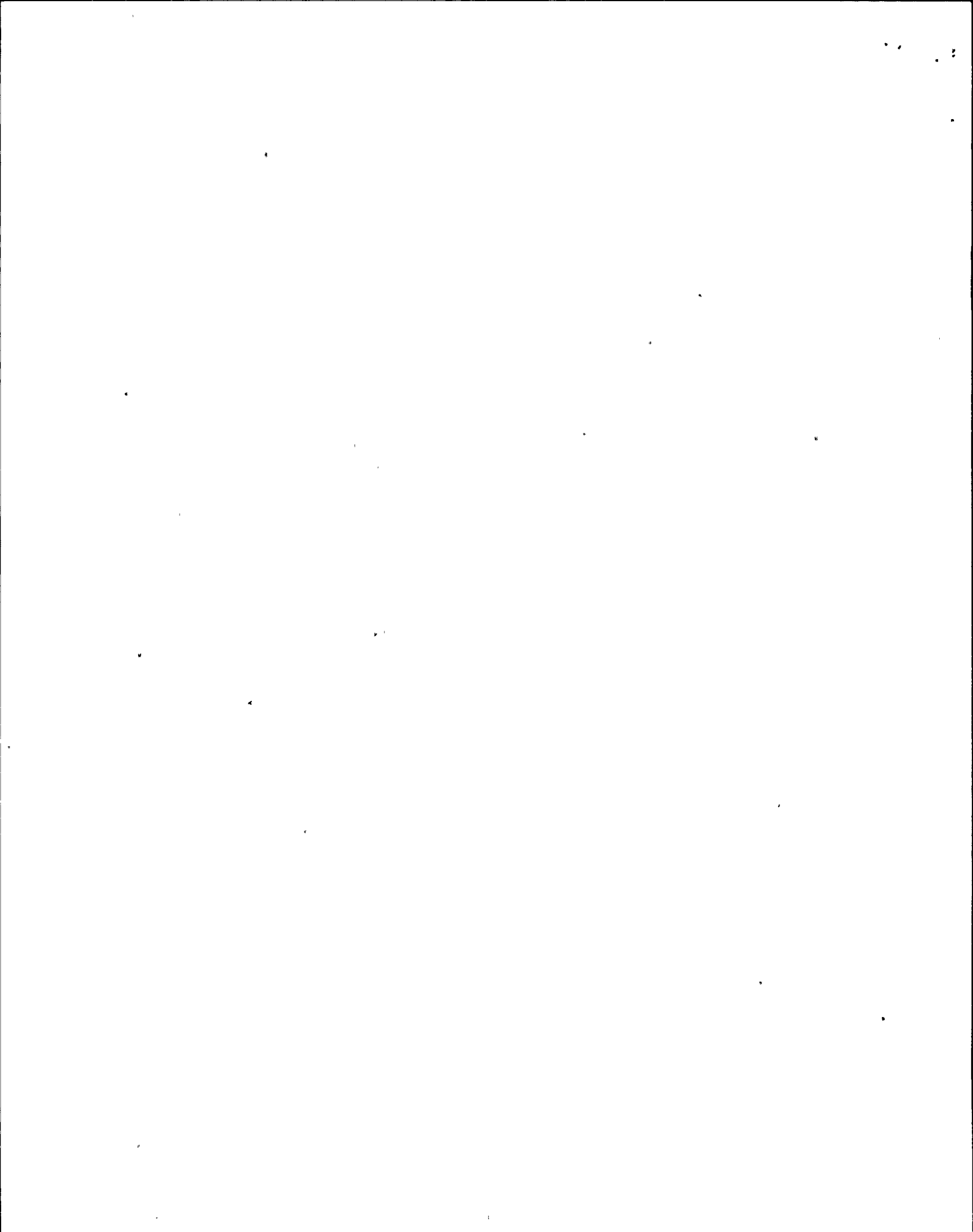
ATTACHMENT 3  
SPDS DISPLAYS  
FIGURE 5 - CONTAINMENT INTEGRITY





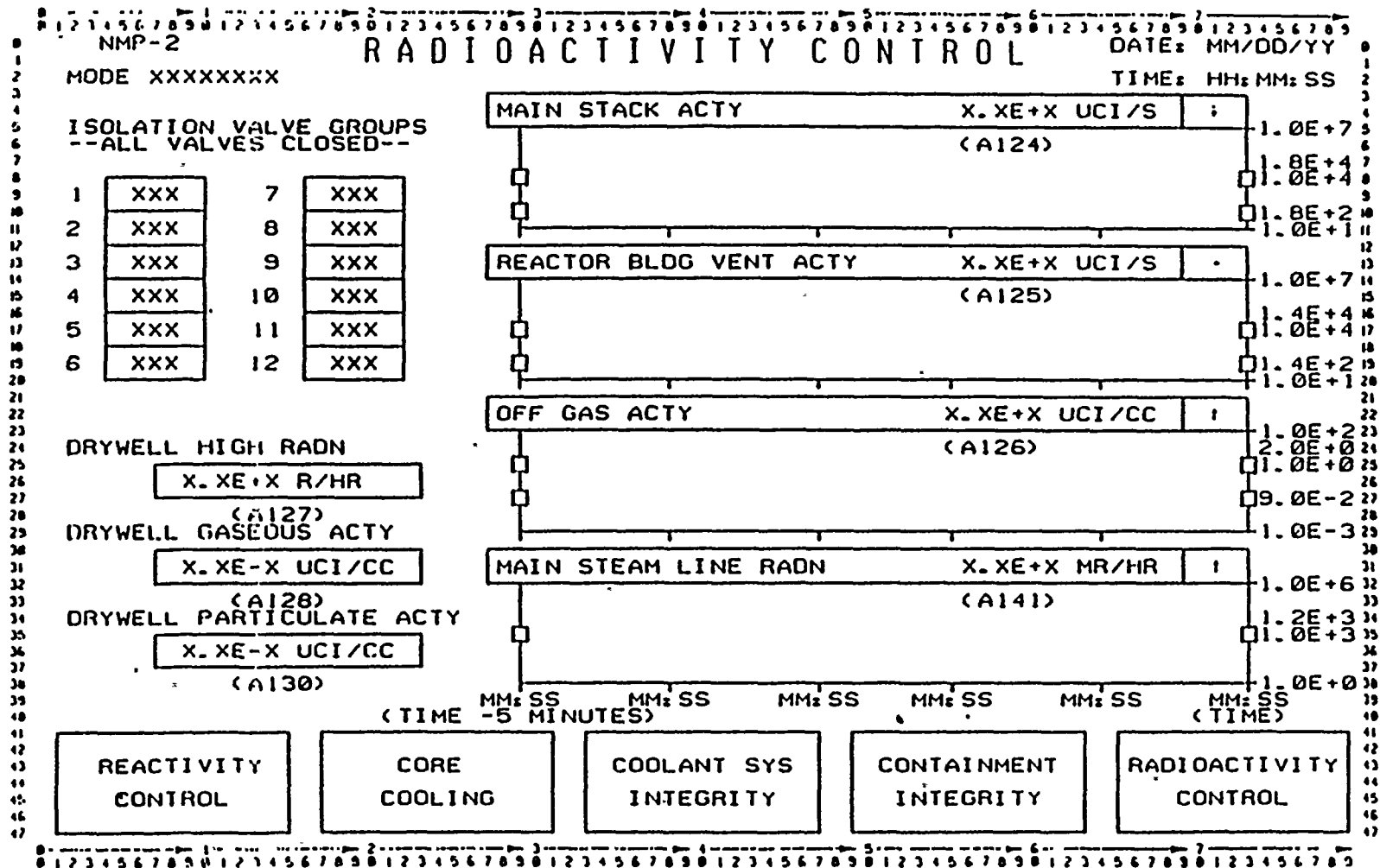
ATTACHMENT 3  
 SPDS DISPLAYS  
 FIGURE 6 - CONTAINMENT INTEGRITY

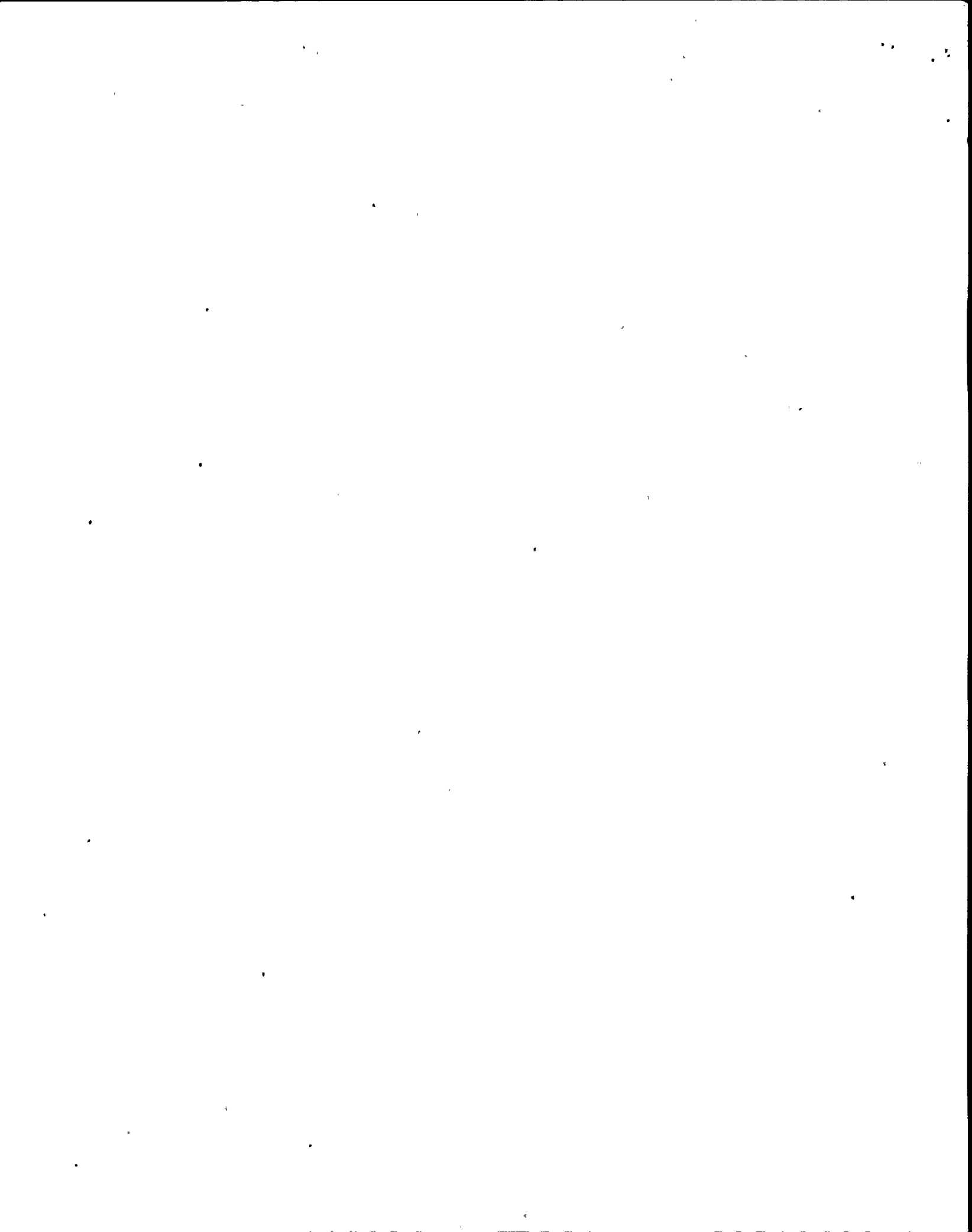






ATTACHMENT 3  
SPDS DISPLAYS  
FIGURE 7 - RADIOACTIVITY CONTROL





ATTACHMENT 4  
SAFETY STATUS INDICATOR (SSI) INPUTS

For REACTIVITY CONTROL (SSI Box 1):

APRM Reactor Power  
RPV Water Level  
RPV Pressure

For CORE COOLING (SSI Box 2):

RPV Water Level  
RPV Pressure

For COOLANT SYS INTEGRITY (SSI Box 3):

RPV Pressure  
Drywell Pressure

For CONTAINMENT INTEGRITY (SSI Box 4):

Drywell Pressure  
Suppression Chamber Pressure  
Drywell Temperature  
Suppression Pool Temperature  
Suppression Pool Water Level  
Containment Oxygen Concentration  
Containment Hydrogen Concentration

For RADIOACTIVITY CONTROL (SSI Box 5):

Main Stack Activity  
Reactor Building Vent Activity  
Off Gas Activity  
Main Steam Line Radiation



ATTACHMENT 5  
 SPDS COMPUTER INPUTS AND ASSOCIATED  
CONTROL ROOM DISPLAY INSTRUMENTS

**FOR APRM REACTOR POWER:**

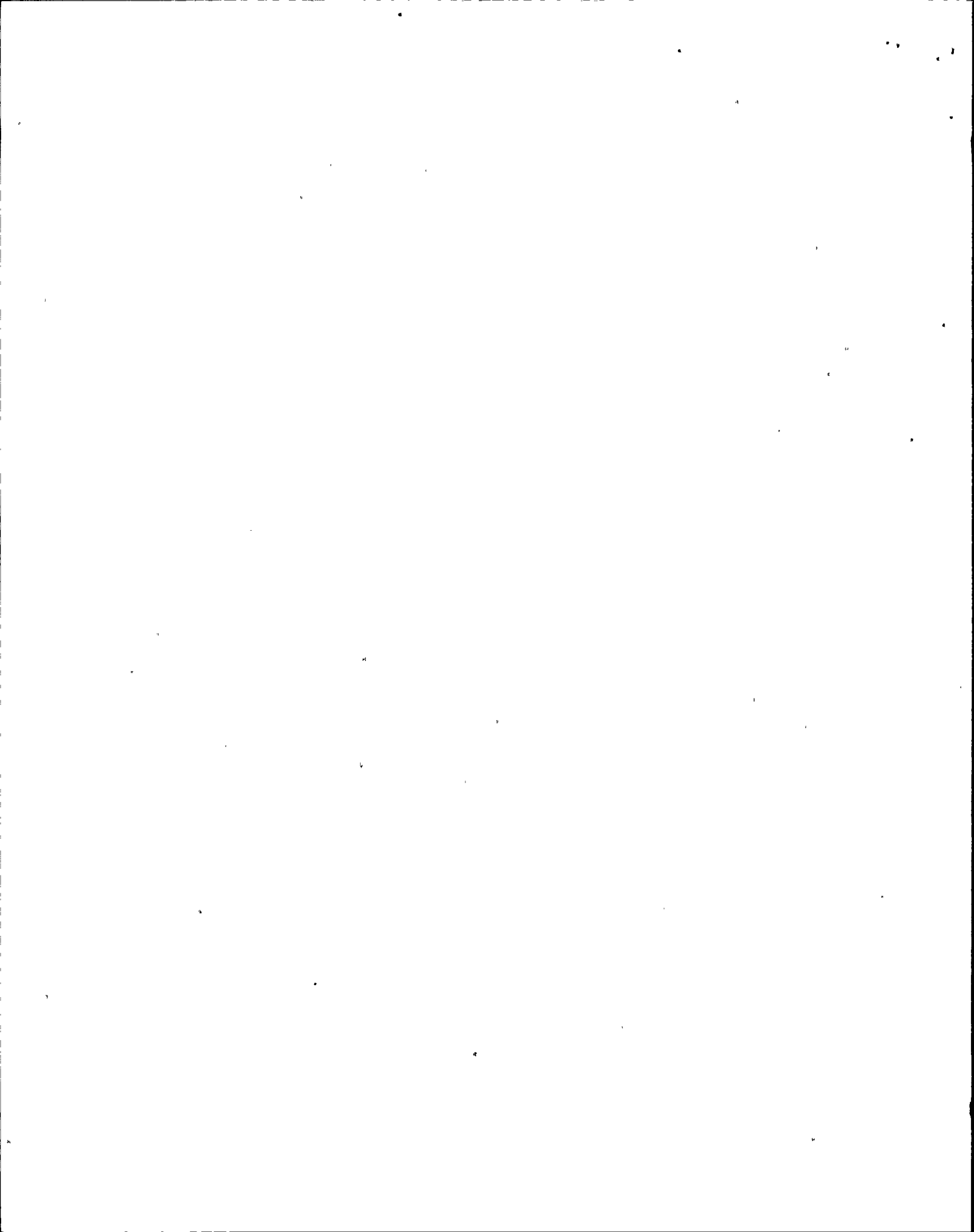
<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
NMP2A273	Channel A	C51-R603A on P-603
NMP2A274	Channel B	C51-R603B on P-603
NMP2A275	Channel C	C51-R603A on P-603
NMP2A276	Channel D	C51-R603B on P-603
NMP2A277	Channel E	C51-R603C on P-603
NMP2A278	Channel F	C51-R603D on P-603

**FOR RPV PRESSURE:**

<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
ISCPA100	Channel A	B22-R623A on P-601
ISCPA101	Channel B	B22-R623B on P-601

**FOR RPV WATER LEVEL:**

<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
ISCLA102	Wide Range Channel A	B22-R623A on P-601
ISCLA103	Wide Range Channel B	B22-R623B on P-601
ISCLA104	Fuel Zone Channel A	B22-R615 on P-601
ISCLA105	Fuel Zone Channel B	B22-R610 on P-601
ISCLA106	Narrow Range Channel A	C33-R606A on P-603
ISCLA107	Narrow Range Channel B	C33-R606B on P-603



**FOR DRYWELL PRESSURE:**

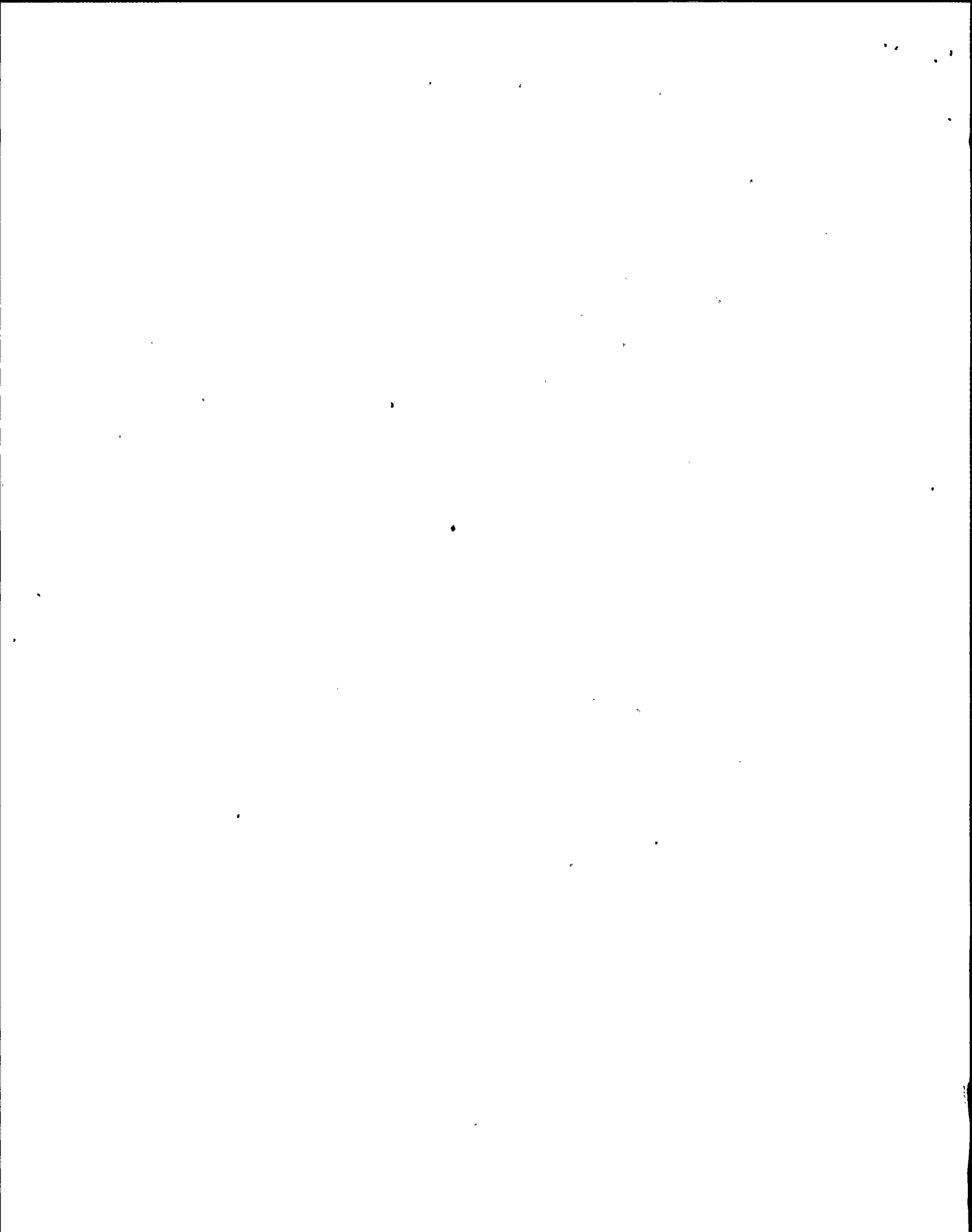
<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
CMSPA100	Wide Range Channel A	2CMS*PI2A on P-601
CMSPA101	Wide Range Channel B	2CMS*PR2B on P-898
CMSPA102	Narrow Range Channel A	2CMS*PI1A on P-601
CMSPA103	Narrow Range Channel B	2CMS*PI1B on P-601

**FOR SUPPRESSION CHAMBER PRESSURE:**

<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
CMSPA104	Channel A	2CMS*PI7A on P-601
CMSPA105	Channel B	2CMS*PI7B on P-898

**FOR DRYWELL TEMPERATURE:**

<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
CMSTA108	EL 306-314 FT	CMS*TRX140 on P-875
CMSTA109	EL 289-302 FT	CMS*TRX140 on P-875
CMSTA110	EL 279-284 FT	CMS*TRX140 on P-875
CMSTA111	EL 261-278 FT	CMS*TRY140 on P-875
CMSTA112	EL 249-258 FT	CMS*TRY140 on P-875
CMSTA113	EL 240-248 FT	CMS*TRY140 on P-875
CMSTA117	EL 306-314 FT	CMS*TRX130 on P-873
CMSTA118	EL 289-302 FT	CMS*TRX130 on P-873
CMSTA119	EL 279-284 FT	CMS*TRX130 on P-873
CMSTA120	EL 261-278 FT	CMS*TRY130 on P-873
CMSTA121	EL 249-258 FT	CMS*TRY130 on P-873
CMSTA122	EL 240-248 FT	CMS*TRY130 on P-873





**FOR SUPPRESSION POOL TEMPERATURE:**

<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
CMSTA100	Channel A, TE 67A	2CMS*TI175 Position 10
CMSTA101	Channel B, TE 67B	2CMS*TI174 Position 10
CMSTA102	Channel C, TE 68A	2CMS*TI175 Position 11
CMSTA103	Channel D, TE 68B	2CMS*TI174 Position 11
CMSTA104	Channel E, TE 69A	2CMS*TI175 Position 01
CMSTA105	Channel F, TE 69B	2CMS*TI174 Position 01
CMSTA106	Channel G, TE 70A	2CMS*TI175 Position 02
CMSTA107	Channel H, TE 70B	2CMS*TI174 Position 02

**FOR SUPPRESSION POOL WATER LEVEL:**

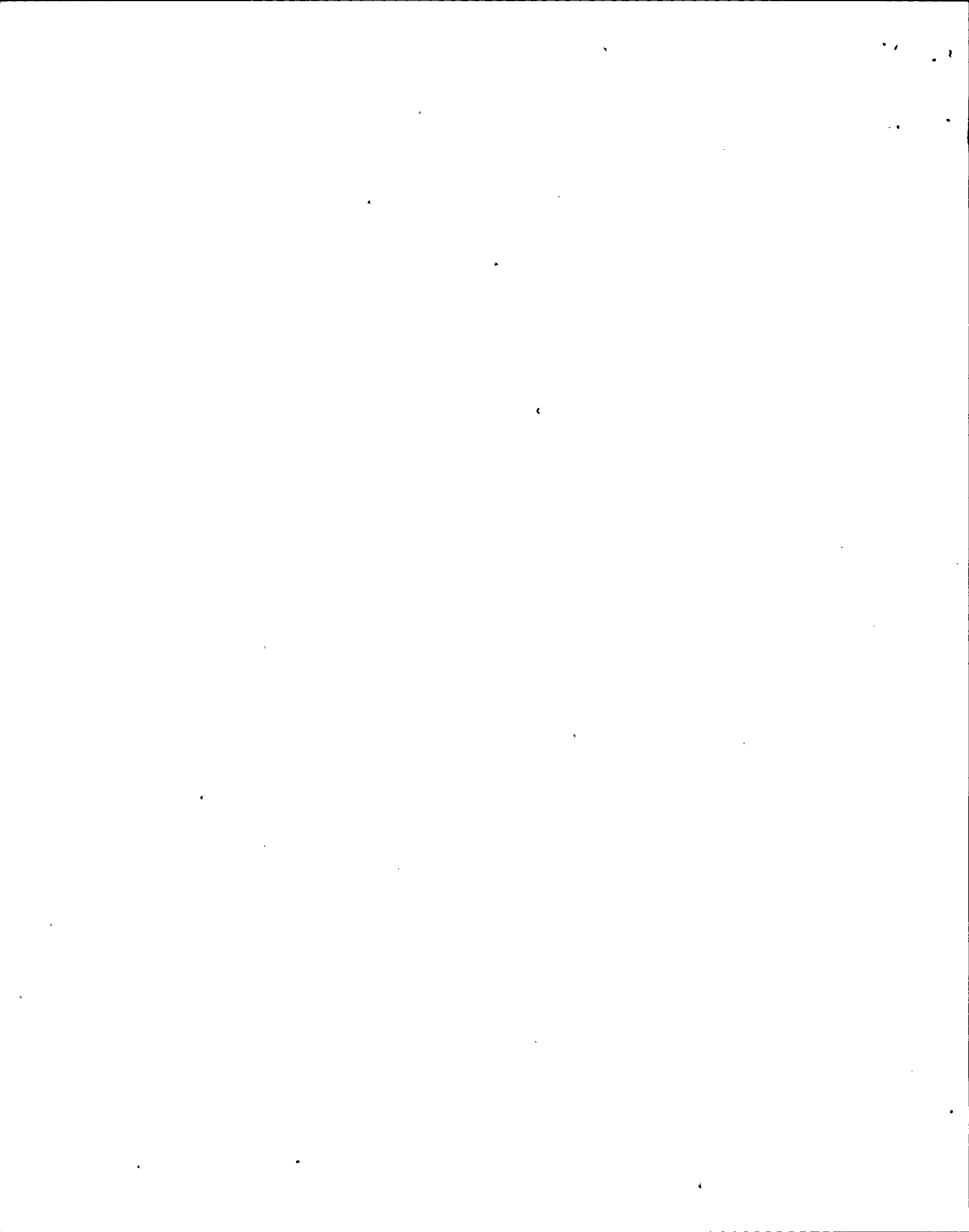
<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
CMSLA100	Wide Range Channel A	2CMS*LI9A on P-601
CMSLA101	Wide Range Channel B	2CMS*LR9B on P-598
CMSLA102	Narrow Range Channel A	2CMS*LI11A on P-601
CMSLA103	Narrow Range Channel B	2CMS*LI11B on P-601

**FOR CONTAINMENT OXYGEN CONCENTRATION:**

<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
CMSOA100	Channel A	2CMS*AIX7A on P-601
CMSOA101	Channel B	2CMS*AR7B on P-898

**FOR CONTAINMENT HYDROGEN CONCENTRATION:**

<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
CMSYA100	Channel A	2CMS*AIX6A on P-601
CMSYA101	Channel B	2CMS*AR6B on P-898



ATTACHMENT 5 (Cont)

**FOR MAIN STACK ACTIVITY:**

<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
RMSRA104	(Composed point)	GEMS

**FOR REACTOR BUILDING VENT ACTIVITY:**

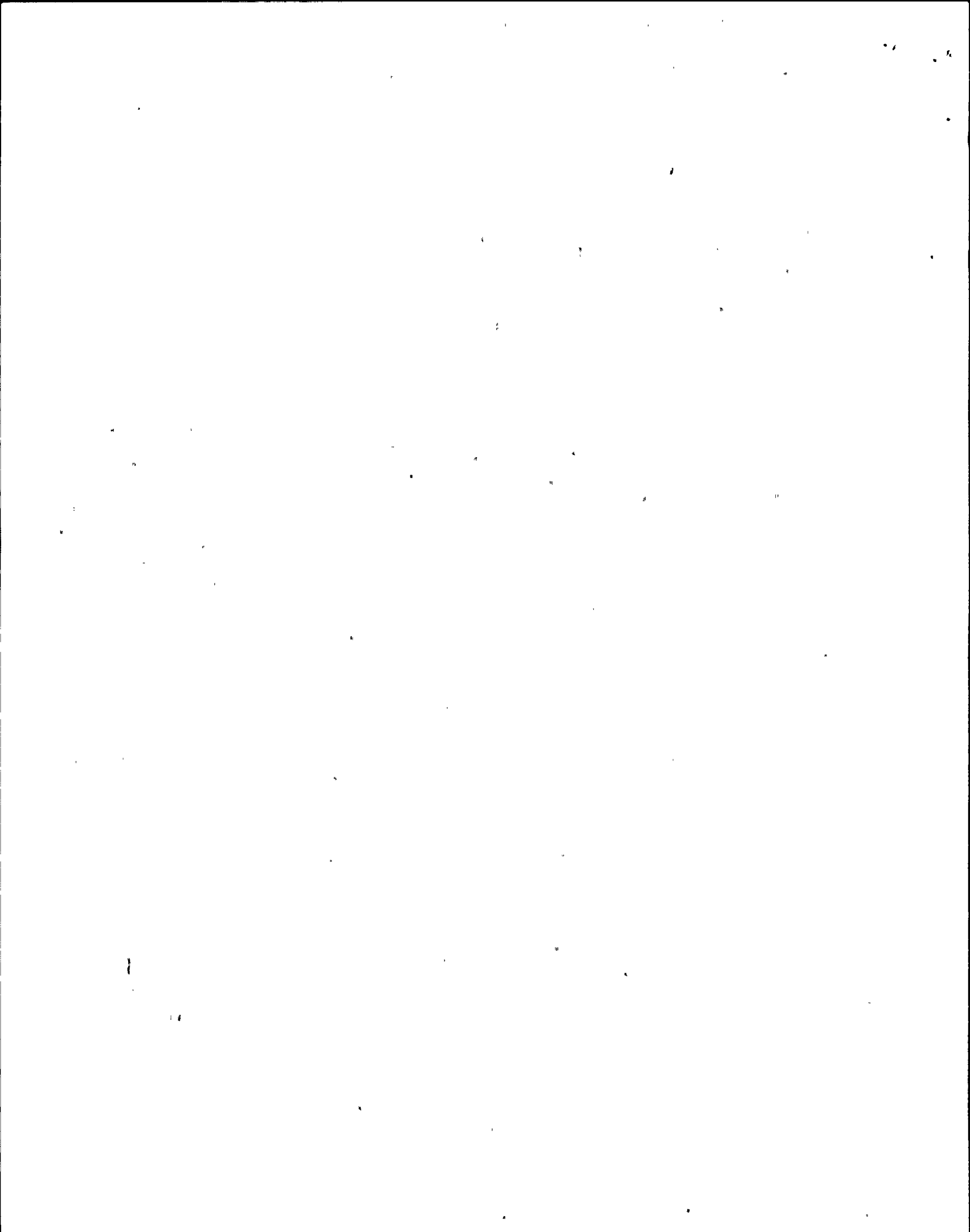
<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
RMSRA105	(Composed point)	GEMS

**FOR OFF GAS ACTIVITY:**

<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
OFGRA100	Channel A	DRMS (OFG13A)
OFGRA101	Channel B	DRMS (OFG13B)

**FOR MAIN STEAM LINE RADIATION:**

<b>Computer Input PID</b>	<b>Range - Channel</b>	<b>Control Room Panel Instrument</b>
MSSRA100	Channel A	Rad'n Mon. Instr. Panel A
MSSRA101	Channel B	Rad'n Mon. Instr. Panel B
MSSRA102	Channel C	Rad'n Mon. Instr. Panel C
MSSRA103	Channel D	Rad'n Mon. Instr. Panel D

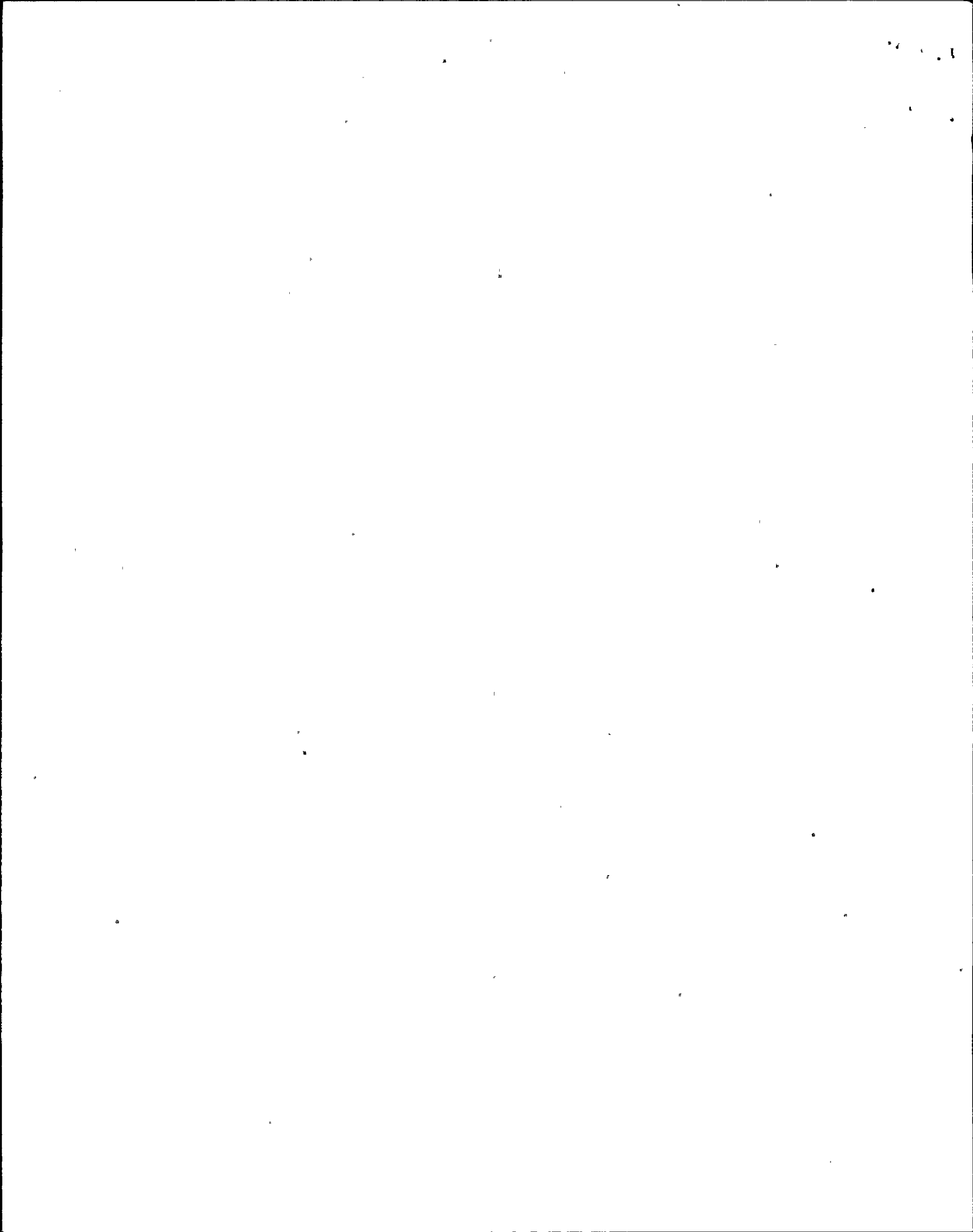


ATTACHMENT 6  
MODE ERROR CHECKING CONDITIONS

For RUN Mode:

A MODE error is indicated if any of the following conditions are true:

1. APRM Reactor Power is below 4%.
2. RPV Water Level is below 159.3 inches.
3. RPV Pressure is above 1037 psig.
4. RPV Pressure is below 785 psig.
5. Suppression Pool Water Temperature is above 110°F.
6. Drywell Pressure is above 1.68 psig.
7. Drywell Temperature is above 150°F.
8. Containment Hydrogen Concentration is above 1.0%.
9. Suppression Pool Water Level is above 201.0 feet.
10. Suppression Pool Water Level is below 199.5 feet.

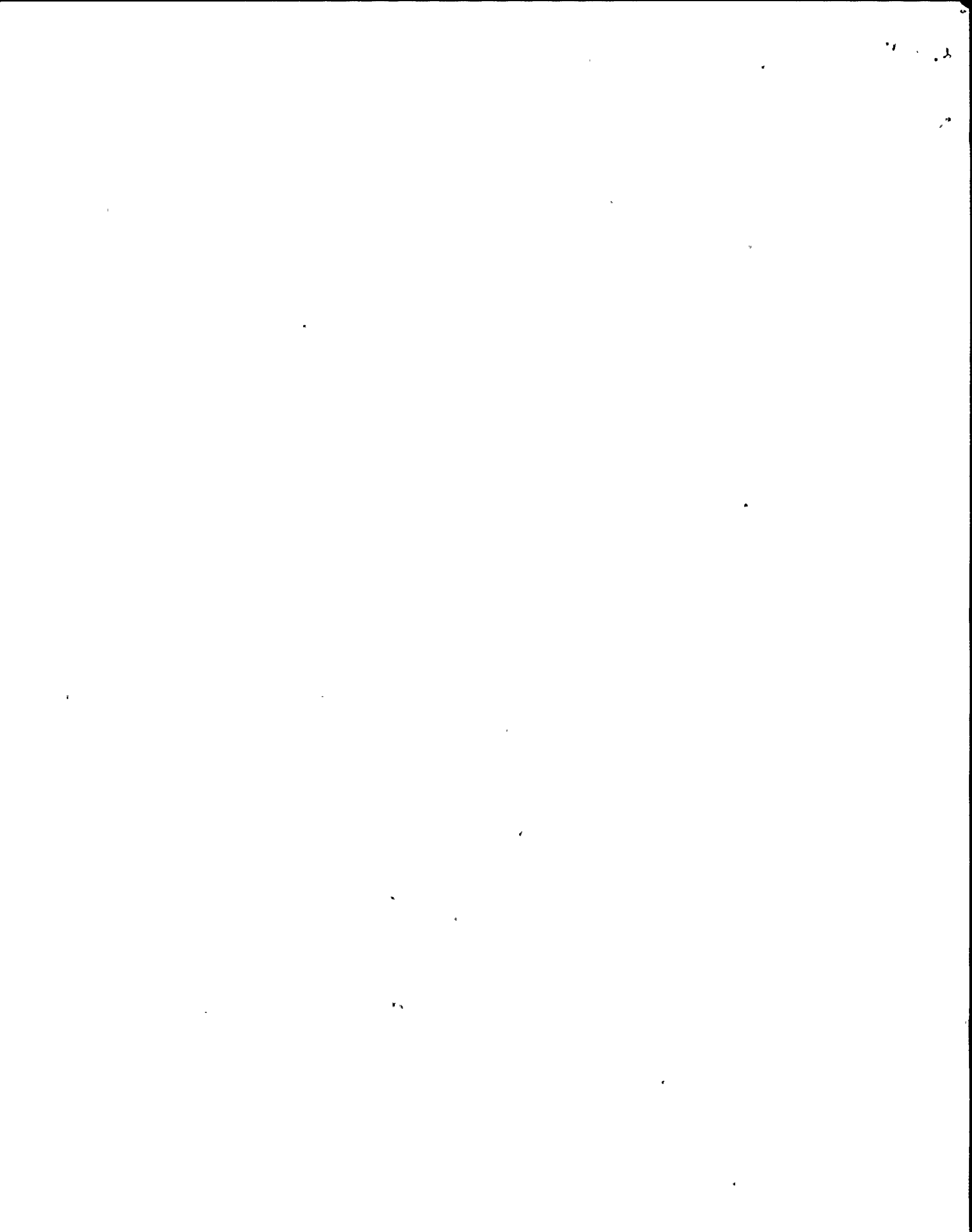


ATTACHMENT 6 (Cont)

For STARTUP Mode:

A MODE error is indicated if any of the following conditions are true:

1. APRM Reactor Power is above 12%.
2. RPV Water Level is below 159.3 inches.
3. RPV Pressure is above 1037 psig.
4. Suppression Pool Water Temperature is above 110°F.
5. Drywell Pressure is above 1.68 psig.
6. Drywell Temperature is above 150°F.
7. Containment Hydrogen Concentration is above 1.0%.
8. Suppression Pool Water Level is above 201.0 feet.
9. Suppression Pool Water Level is below 199.5 feet.





ATTACHMENT 7  
LIMIT SETPOINTS FOR SPDS TRENDING PARAMETERS

For APRM Reactor Power - RUN Mode:

Engineering Units: Percent of rated reactor power.

HHL: None	HL: 113.5	LL: None	LLL: None
HHR: N/A	HR: 111.5	LR: N/A	LLR: N/A

For APRM Reactor Power - STARTUP Mode:

Engineering Units: Percent of rated reactor power.

HHL: None	HL: 15	LL: None	LLL: None
HHR: N/A	HR: 13	LR: N/A	LLR: N/A

For APRM Reactor Power - SHUTDOWN and REFUEL Modes:

Engineering Units: Percent of rated reactor power.

HHL: None	HL: 4	LL: None	LLL: None
HHR: N/A	HR: 2	LR: N/A	LLR: N/A

For RPV Pressure - RUN Mode:

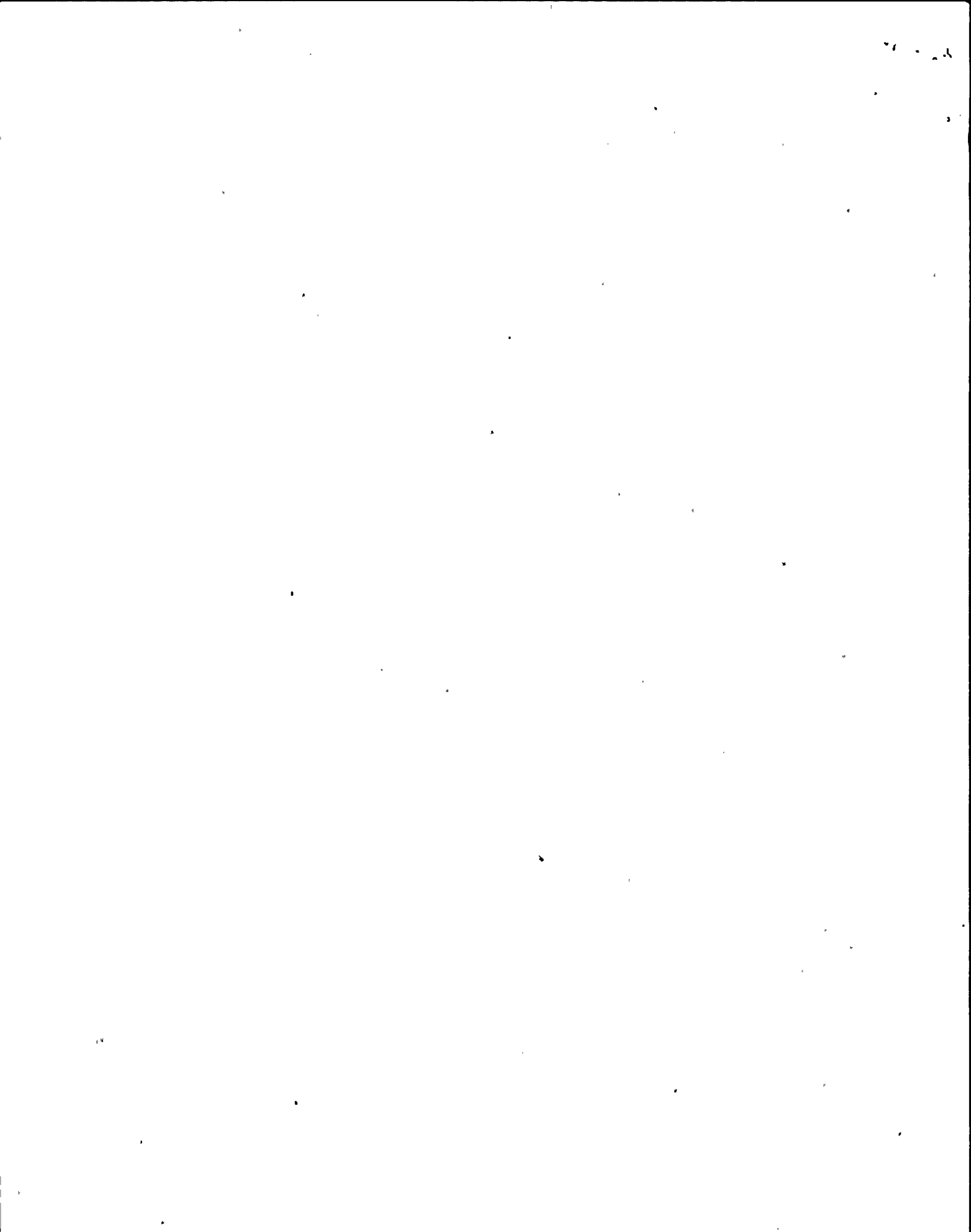
Engineering Units: psig

HHL: 1076	HL: 1037	LL: 785	LLL: None
HHR: 1071	HR: 1032	LR: 790	LLR: N/A

For RPV Pressure - STARTUP, SHUTDOWN, and REFUEL Modes:

Engineering Units: psig

HHL: 1076	HL: 1037	LL: None	LLL: None
HHR: 1071	HR: 1032	LR: N/A	LLR: N/A



ATTACHMENT 7 (Cont)

For RPV Water Level:

Engineering Units: inches

HHL: None	HL: 202.3	LL: 159.3	LLL: -14.0
HHR: N/A	HR: 198.3	LR: 163.3	LLR: -10.0

For Drywell Pressure:

Engineering Units: psig

HHL: 45.00	HL: 1.68	LL: -2.00	LLL: None
HHR: 42.00	HR: 1.58	LR: -1.90	LLR: N/A

For Suppression Chamber Pressure:

Engineering Units: psig

HHL: 45.00	HL: 10.0	LL: None	LLL: None
HHR: 43.80	HR: 9.8	LR: N/A	LLR: N/A

For Drywell Temperature:

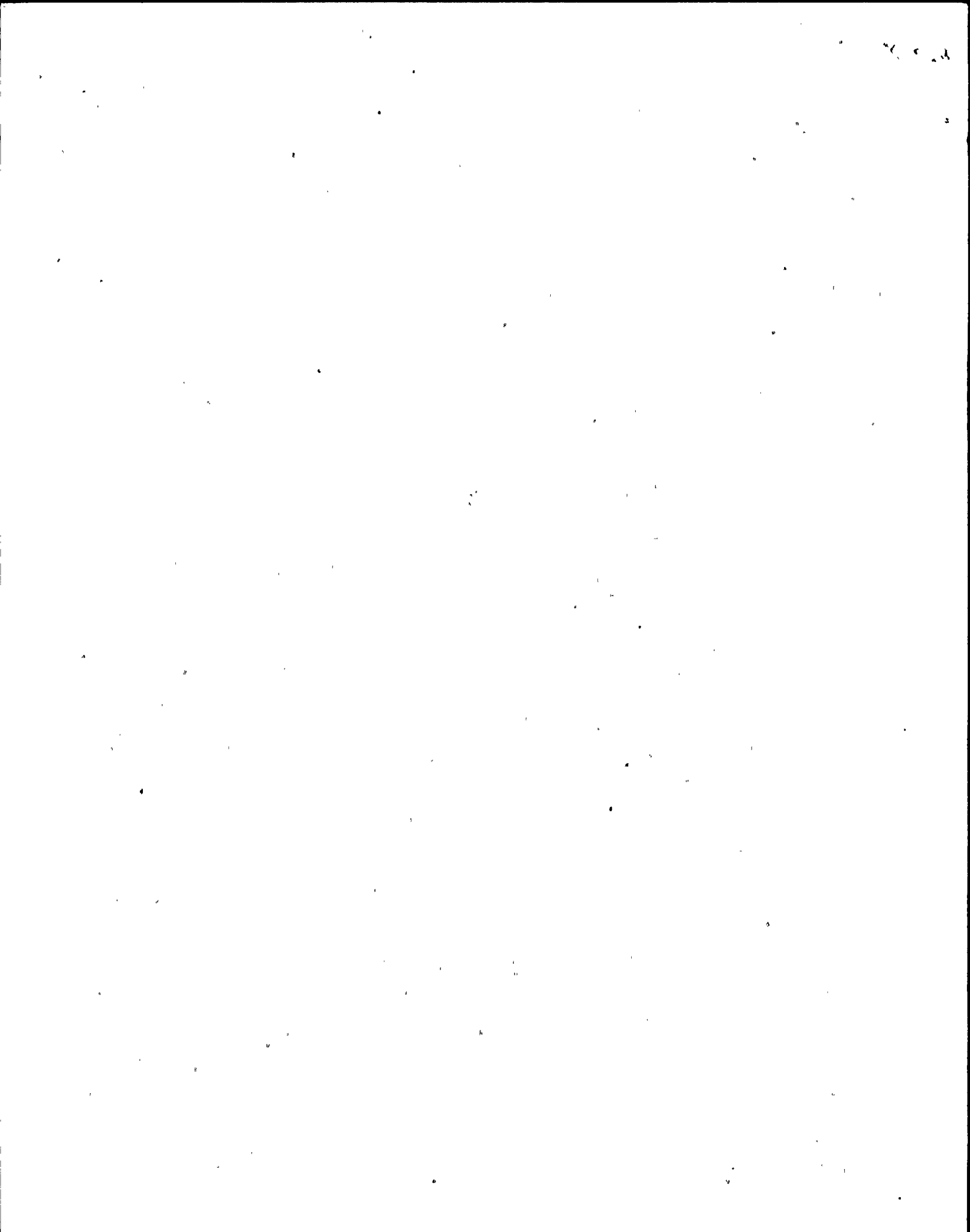
Engineering Units: °F

HHL: 340	HL: 150	LL: None	LLL: None
HHR: 334	HR: 144	LR: N/A	LLR: N/A

For Suppression Pool Temperature:

Engineering Units: °F

HHL: 178	HL: 90	LL: None	LLL: None
HHR: 174	HR: 86	LR: N/A	LLR: N/A



ATTACHMENT 7 (Cont)

For Suppression Pool Water Level:

Engineering Units: feet

HHL: 209.0	HL: 201.0	LL: 199.5	LLL: None
HHR: 208.9	HR: 200.9	LR: 199.6	LLR: N/A

For Containment Oxygen Concentration - RUN Mode:

Engineering Units: % (percent concentration by volume)

HHL: 5.0	HL: None	LL: None	LLL: None
HHR: 4.9	HR: N/A	LR: N/A	LLR: N/A

For Containment Oxygen Concentration - STARTUP, SHUTDOWN, and REFUEL Mode:

Engineering Units: % (percent concentration by volume)

HHL: None	HL: None	LL: None	LLL: None
HHR: N/A	HR: N/A	LR: N/A	LLR: N/A

For Containment Hydrogen Concentration:

Engineering Units: % (percent concentration by volume)

HHL: 6.0	HL: 1.8	LL: None	LLL: None
HHR: 5.9	HR: 1.7	LR: N/A	LLR: N/A

For Main Stack Activity:

Engineering Units:  $\mu\text{Ci/s}$  (microcuries per second)

HHL: 1.8 E+4	HL: 1.8 E+2	LL: None	LLL: None
HHR: 1.6 E+4	HR: 1.6 E+2	LR: N/A	LLR: N/A



ATTACHMENT 7 (Cont)

For Reactor Building Vent Activity:

Engineering Units:  $\mu\text{Ci/s}$  (microcuries per second)

HHL: 1.4 E+4	HL: 1.4 E+2	LL: None	LLL: None
HHR: 1.2 E+4	HR: 1.2 E+2	LR: N/A	LLR: N/A

For Off Gas Activity:

Engineering Units:  $\mu\text{Ci/cc}$  (microcuries per cubic centimeter)

HHL: 2.0 E+0	HL: 9.0 E-2	LL: None	LLL: None
HHR: 1.8 E+0	HR: 8.8 E-2	LR: N/A	LLR: N/A

For Main Steam Line Radiation:

Engineering Units: R/hr (Rem per hour)

HHL: None	HL: 1.2 E+3	LL: None	LLL: None
HHR: N/A	HR: 1.0 E+3	LR: N/A	LLR: N/A

