

07-209-91

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

N2-OP-74A

REVISION 03

EMERGENCY D. C. DISTRIBUTION

THIS PROCEDURE IS SAFETY-RELATED

Approved By:
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Joseph F. Firlit

R.B. Abbott
Vice President - Nuclear Generation
FOR INFORMATION ONLY

9/19/90
Date

THIS REVISION IS A GENERAL REWRITE

THIS REVISION SUPERSEDES TCN-7 THROUGH 10

Effective Date: September 28, 1990

NOT TO BE USED AFTER September 1992
SUBJECT TO PERIODIC REVIEW

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A. REFERENCES AND COMMITMENTS

1.0 Technical Specifications

- 3.8.2.1 DC SOURCES-OPERATING
- 3.8.2.2 DC SOURCES-SHUTDOWN
- 3.8.3.1 ONSITE POWER DISTRIBUTION SYSTEMS
DISTRIBUTION-OPERATING
- 3.8.3.2 ONSITE POWER DISTRIBUTION SYSTEMS
DISTRIBUTION-SHUT DOWN

2.0 Licensee Documentation

USAR, Updated Safety Analysis Report
Section 8.3.2.1.2, SAFETY-RELATED DC SYSTEMS

3.0 Technical Information

3.1 Flow Diagrams

None

3.2 Electrical Diagrams

ESK-7BYS01 - Emerg. D.C. Sys. Div I & II Inop.
ESK-8BYS06 - D.C. Elem. Batt. Gnd. Detect. Scheme
ESK-8BYS12 - D.C. Elem. 125VDC Swgr. Metering
ESK-8BYS13 - D.C. Elem. 125 VDC Swgr. Metering
EE-1CB - 600V One Line Diag. - 2LAC*PNL100A & 300B
EE-1CC - 600V One Line Diag. - 2EJS*PNL100A & 300B
EE-1CM - 100VDC One Line Diag. - Emer. Swgr.
2BYS8SWG002A
EE-1CN - 125VDC One Line Diag. - Emer. Swgr.
2BYS*SWG002B

3.3 Vendor Manuals

Gould GB3384B Stationary Battery Installation and Operating
Instructions. P.O. No. E033A

Power Conversion Products 3S-130-300CE, 3Phase Thyristor
Controlled Battery Charger. P.O. No. E034A

ITE Manual IB7.2.7-2 ITE Low Voltage Power Switchgear. P.O. No.
E015N

4.0 Commitments

<u>Sequence Number</u>	<u>NCTS Number</u>	<u>Description</u>
1	NCTS 700131-01	Operator action on loss of a DC Bus



B. SYSTEM DESCRIPTION

1.0 System Purpose

The emergency D.C. distribution system supplies nuclear safety related DIV I and DIV II D.C. loads. Normally DC loads are supplied by one of two 100% capacity battery chargers. The battery provides power for large load starting transients, and all DC loads in the event of AC power failure, for at least 2 hours.

Normally AC power outages will be brief because the chargers are fed from the Emergency AC Buses and will be re-energized when the diesel driven generators re-energize the Emergency AC Buses.

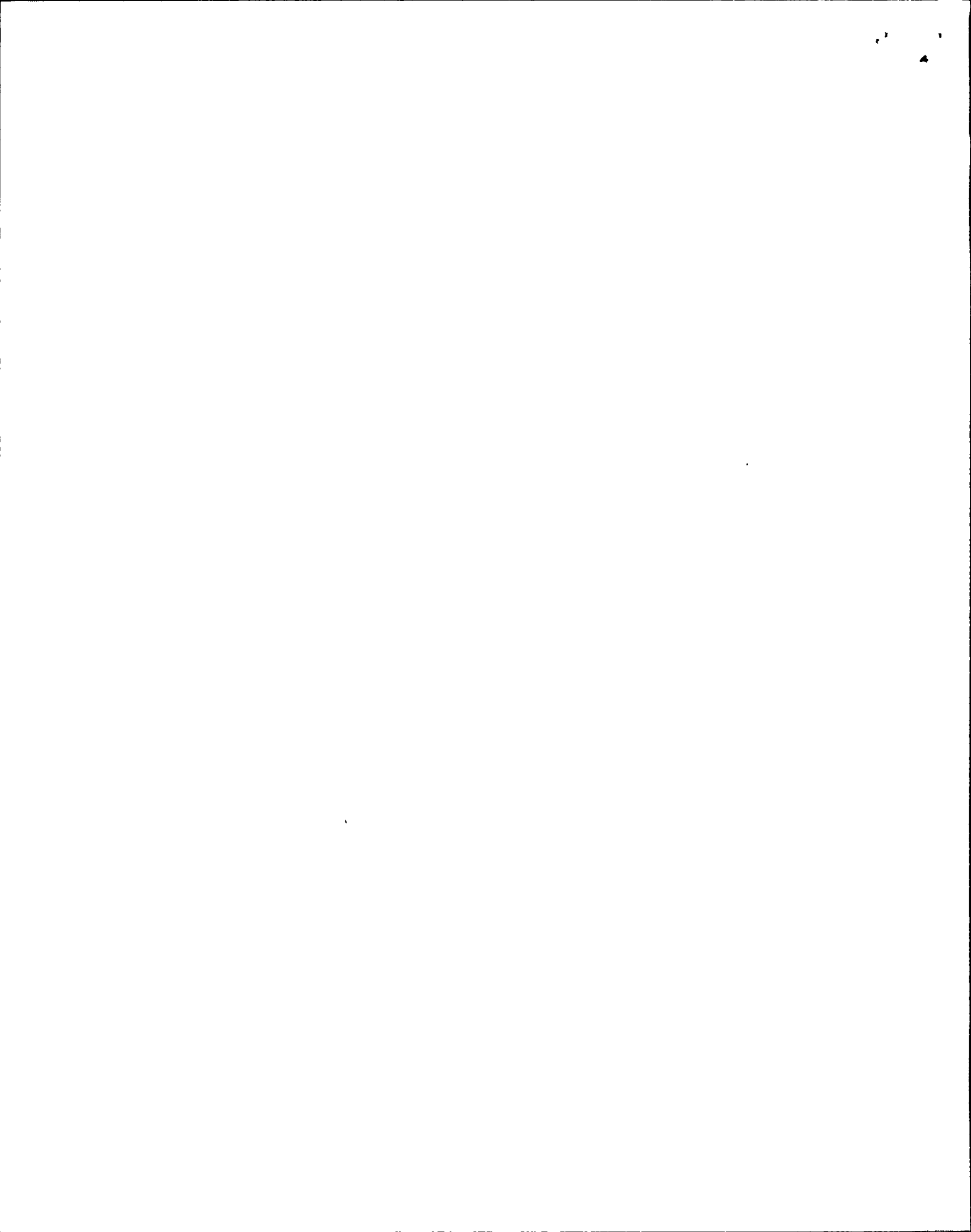
2.0 General Description

The Emergency D.C. Distribution consists of two independent 125 volt ungrounded DC Systems, Division I & Division II. Each system is composed of a Gould 60 cell 2550 A.H. lead calcium battery, two 300 AMP static battery chargers and a DC switchgear. Division I & II systems are physically separated to provide reliability. Div I & II Emergency DC Systems are located on elevation 261 of the control building, in the stand-by switchgear rooms.

During normal operation, each Emergency DC System is lined up with its battery (2BYS*BAT2A or 2B) and one of its chargers (2BYS*CHGR2A1, A2 or 2B1, B2) connected to its switchgear. The second charger is kept in standby. Normally, all load current is supplied by the charger with the battery being charged at 135 Volts. The battery will supply current to the DC Bus when large loads are starting. The input & output circuit breakers in the alternate charger are open unless maintenance is being performed on the preferred charger.

3.0 Summary of Operations

The static chargers are Thyristor controlled 575V AC to a variable DC output (125V to 145V) and have 2 modes of operation. The float mode is the normal mode. The output voltage for this mode is approx. 135V DC. The equalize mode provides a rapid means of restoring the battery to a fully charged condition, and equalizing the individual cell's state of charge. To place the static chargers in the equalize position, two methods are provided: (1) A 120 hour timer and, (2) The float-equalize switch which, when used, must be manually returned to the float position. Equalizing voltage is set at approx. 140V DC.



C. OPERATING REQUIREMENTS

The following systems must be in operation to support the Emergency DC Distribution System.

Control Building Air Conditioning and Ventilation	N2-OP-53A
Station Electrical Feed 115KV Switchyard	N2-OP-70
13.8KV/4160V/608V A.C. Power Distribution	N2-OP-71
Standby and Emergency A.C. Distribution	N2-OP-72
Standby Diesel Generators, Mechanical	N2-OP-100A

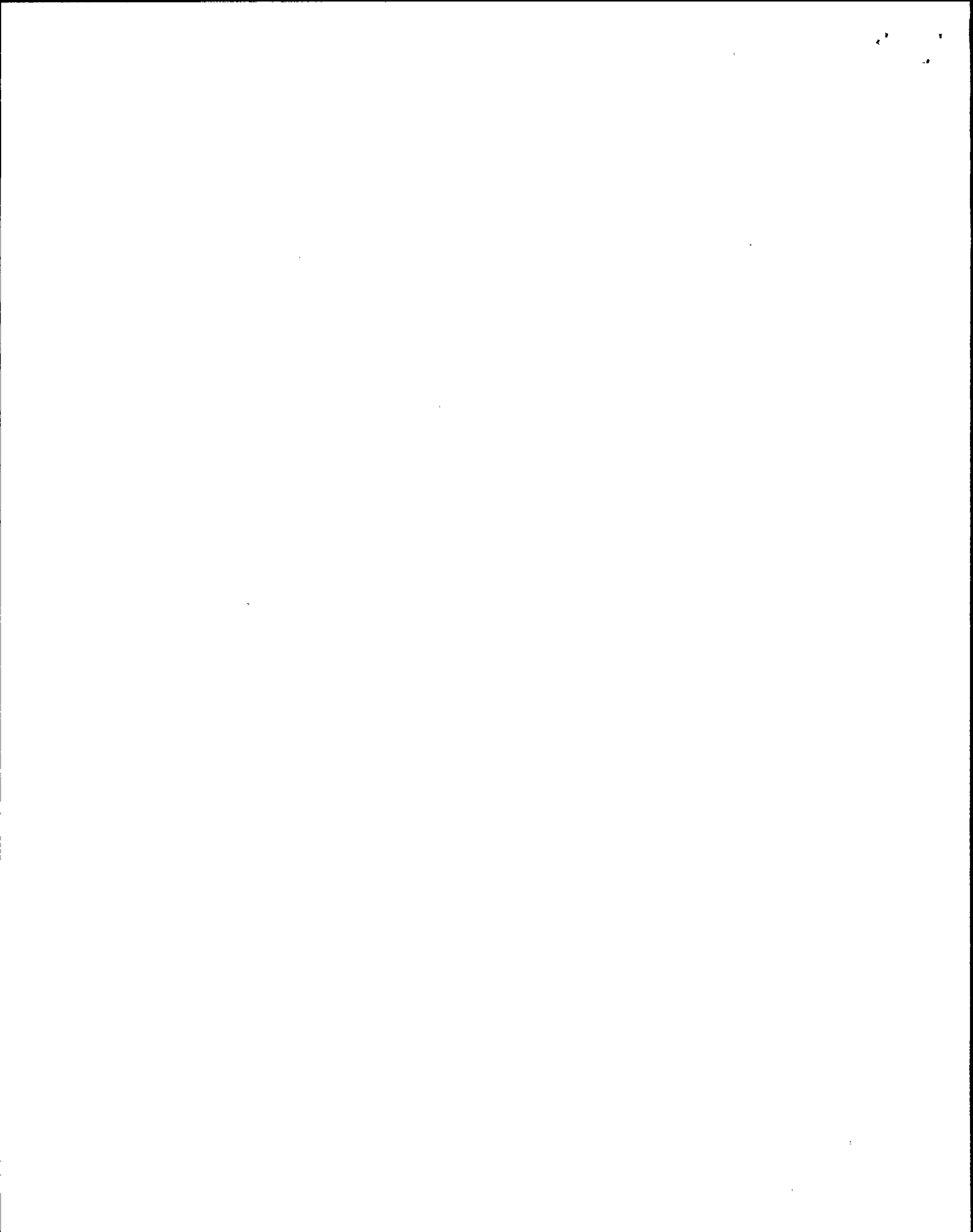
D. PRECAUTIONS AND LIMITATIONS

- 1.0 The battery rooms shall be ventilated at all times to prevent hydrogen gas build-up.
- 2.0 Eyewash stations shall be functioning prior to performing work in the battery rooms.
- 3.0 Battery electrolyte levels should be inspected and indicate normal.
- 4.0 The following safety equipment shall be worn when working with electrolyte:

Rubber Gloves
Rubber Apron
Face Shield
- 5.0 Battery rooms will normally be locked and only authorized persons will be allowed entry.
- 6.0 The following are forbidden in the battery rooms:

Open flames
Smoking
Use of spark producing devices or tools
- 7.0 Flash Arresters shall be in place on all cells in the battery.
- 8.0 Tools capable of causing a short between battery cell terminals shall be taped with insulating tape.
- 9.0 Electrolyte spills shall be cleaned up immediately using soda water solution to neutralize the spill.

Use care to prevent introducing baking soda into a battery cell.



D. PRECAUTIONS AND LIMITATIONS (Cont)

10.0 Place the DC load on the charger before energizing the AC input. This will protect the chargers internal circuits.

11.0 All sections in this procedure are performed locally on el. 261' in the respective switch gear rooms unless otherwise stated.

12.0 Technical Specification requirements:

Div. I and Div. II 125 VDC System shall be operable in Operational Conditions 1, 2, and 3 with at least one charger per division and the distribution system operable.

Two chargers shall be in operation in the applicable division whenever 2VBA*UPS 2A (2B) is on its backup DC power supply.

Div. I or Div. II 125 VDC System shall be operable during refueling operations.

E. STARTUP

1.0 Placing The Emergency D.C. Distribution System In Service

1.1 Perform the following for DIV I:

1.1.1 Verify open all load breakers at the 2BYS*SWG002A switchgear.

1.1.2 Close Breaker 2BYS*BAT 2A 125 VDC BAT DIV I at 2BYS*SWG002A switchgear.

1.2 Perform the following for DIV II:

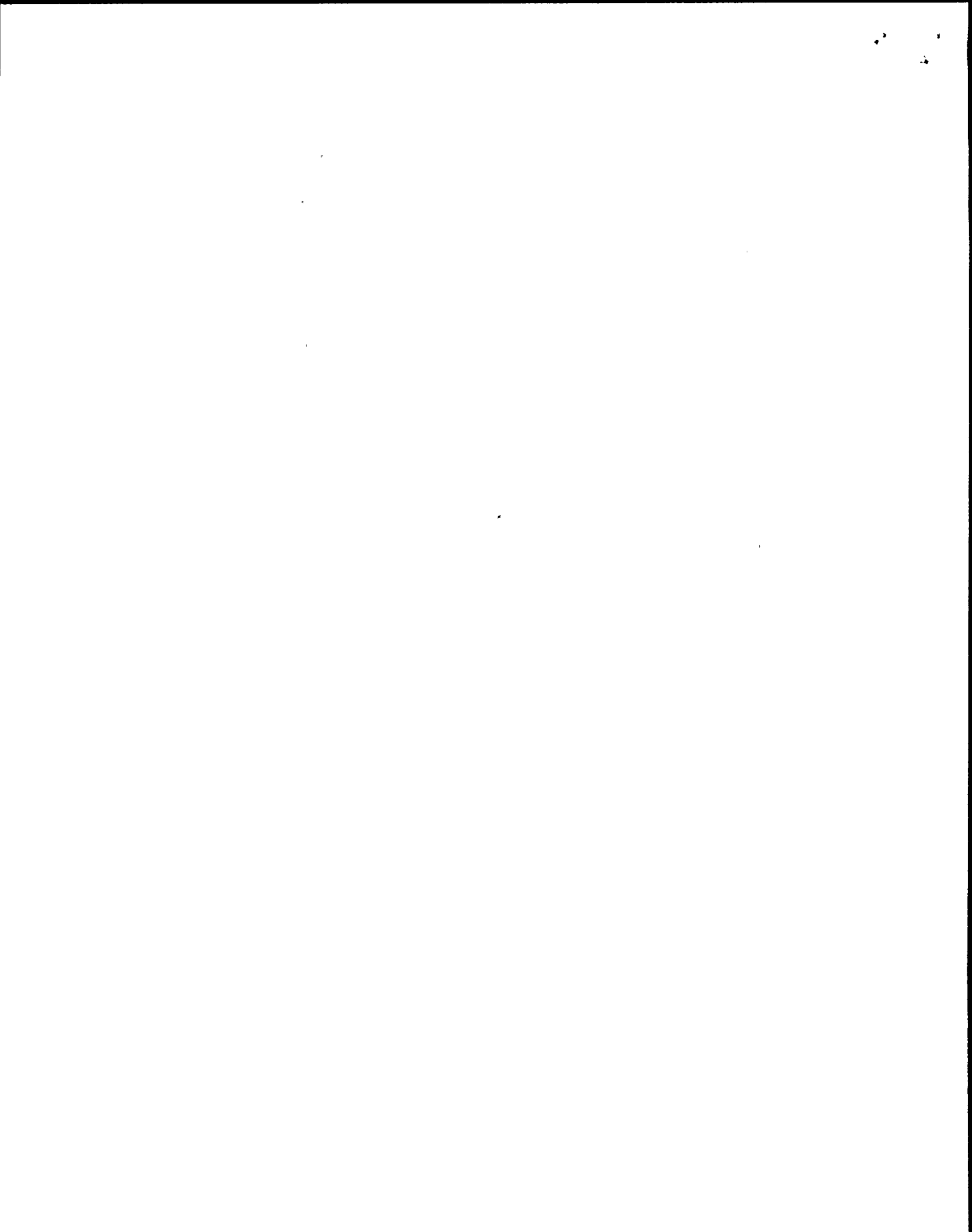
1.2.1 Verify open all load breakers at the 2BYS*SWG002B switchgear.

1.2.2 Close Breaker 2BYS*BAT 2B, 125 VDC ST BY BAT DIV II at 2BYS*SWG002B switchgear.

1.3 Perform electrical lineup in accordance with Attachment 1, Electrical Lineup Sheet

NOTE: The actions in this section are performed on el. 261' in the respective Switchgear Room unless otherwise stated.

1.4 Ensure switchgear load is less than 345 Amps using DC Amperes meter at 2BYS*SWG002A (B) switchgear.



E. STARTUP (Cont)

2.0 Placing the Div. I Battery Charger In Service

- 2.1 Verify the 0-120 hr. Timer is OFF at 2BYS*CHGR 2A1 (2A2), Battery Charger.
- 2.2 Verify the Float/Equalize Toggle Selector Switch is placed in the FLOAT position at 2BYS*CHGR 2A1 (2A2) Battery Charger.
- 2.3 Close the DC POWER breaker at 2BYS*CHGR 2A1 (2A2) Battery Charger.
- 2.4 Observe battery voltage is indicated on the VOLTS meter at the battery charger.

NOTE: When the AC power breaker is closed, the charger may go to the high current limit if the battery is not fully charged.

- 2.5 Close the AC POWER breaker on 2BYS*CHGR 2A1 (2A2) Battery Charger.
- 2.6 Measure the output voltage of 2BYS*CHGR 2A1 (2A2) Battery Charger as follows:

2.6.1 Obtain a calibrated Digital Voltmeter.

2.6.2 Connect the Digital Voltmeter leads to the 2BYS*CHGR2A1 (2A2) DC VOLTS meter terminals on the back of the Charger door.

- 2.7 Establish 135 VDC charger float output voltage on 2BYS*CHGR 2A1(2A2) DIV I Battery Charger by performing the following:

2.7.1 Verify the FLOAT/EQUALIZE toggle selector switch is placed in the FLOAT position at 2BYS*CHGR 2A1(2A2) Battery Charger.

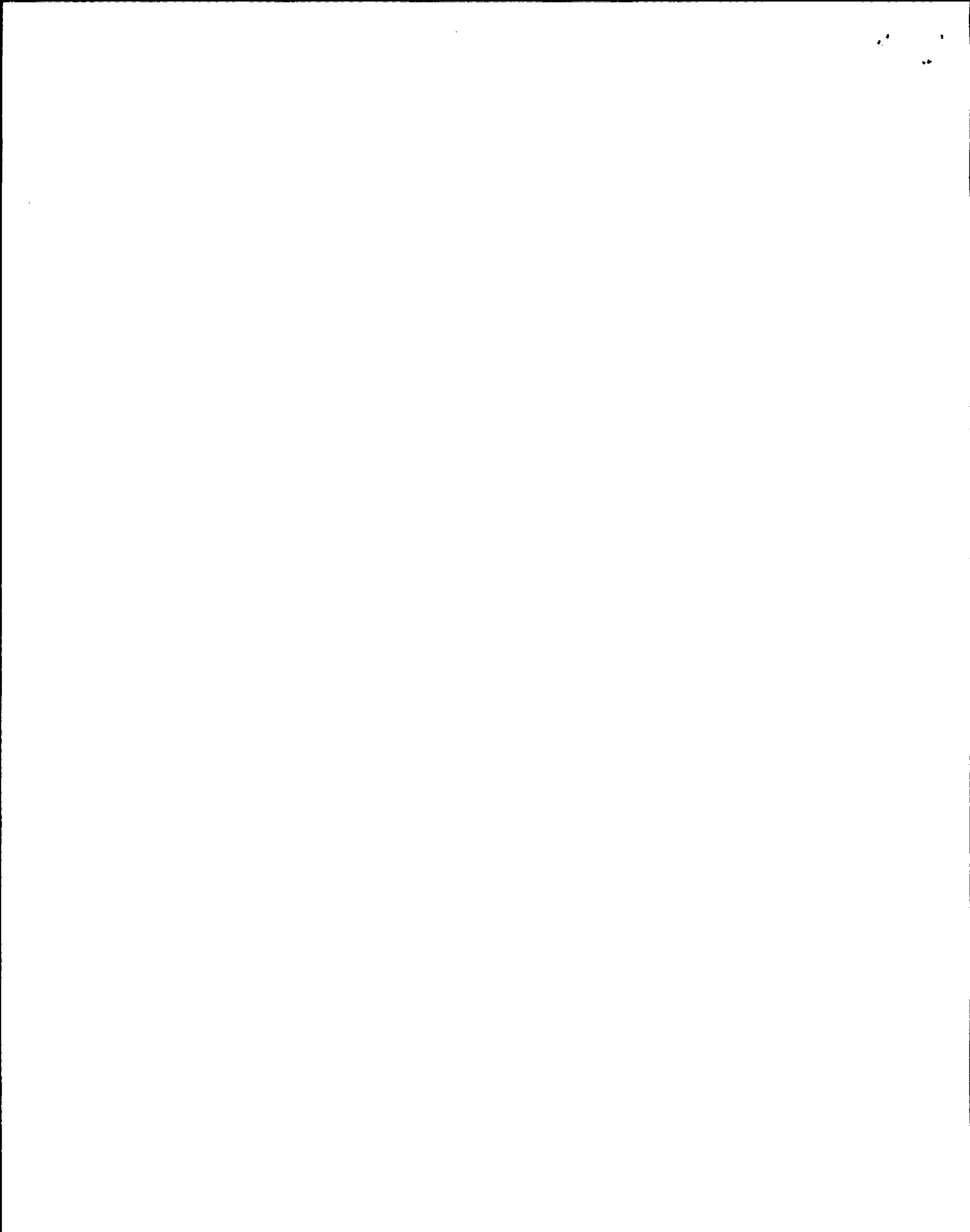
NOTE: Adjustments of a charger output voltage should be made only when the charger output current is less than 345 Amps.

2.7.2 Ensure the Charger output current indication is less than the 345 Amps current limit.

2.7.3 Loosen the FLOAT potentiometer lock nut.

2.7.4 Rotate the charger FLOAT potentiometer until the output voltage indication is 135 VDC on the charger DC VOLTS meter.

2.7.5 Tighten the FLOAT potentiometer lock nut while maintaining the potentiometer setting.



E. STARTUP (Cont)

2.8 Establish 140 VDC charger equalize output voltage on 2BYS*CHGR 2A1(2A2) DIV I Battery Charger by performing the following:

2.8.1 Verify the FLOAT/EQUALIZE toggle selector switch is placed in the EQUALIZE position at 2BYS*CHGR 2A1(2A2) Battery Charger.

NOTE: Adjustments of a charger output voltage should be made only when the charger output current is less than 345 Amps.

2.8.2 Ensure the Charger output current indication is less than the 345 Amps current limit.

2.8.3 Loosen the EQUALIZE potentiometer lock nut.

2.8.4 Rotate the charger EQUALIZE potentiometer until the output voltage indication is 140 VDC on the charger DC VOLTS meter.

2.8.5 Tighten the EQUALIZE potentiometer lock nut while maintaining the potentiometer setting.

2.8.6 Place the FLOAT/EQUALIZE toggle selector switch in the FLOAT position at 2BYS*CHGR 2A1(2A2) Battery Charger.

2.9 Return the Digital Voltmeter.

3.0 Placing The Div. II Battery Charger In Service

3.1 Verify the 0-120 hr. Timer is OFF at 2BYS*CHGR 2B1 (2B2), Battery Charger.

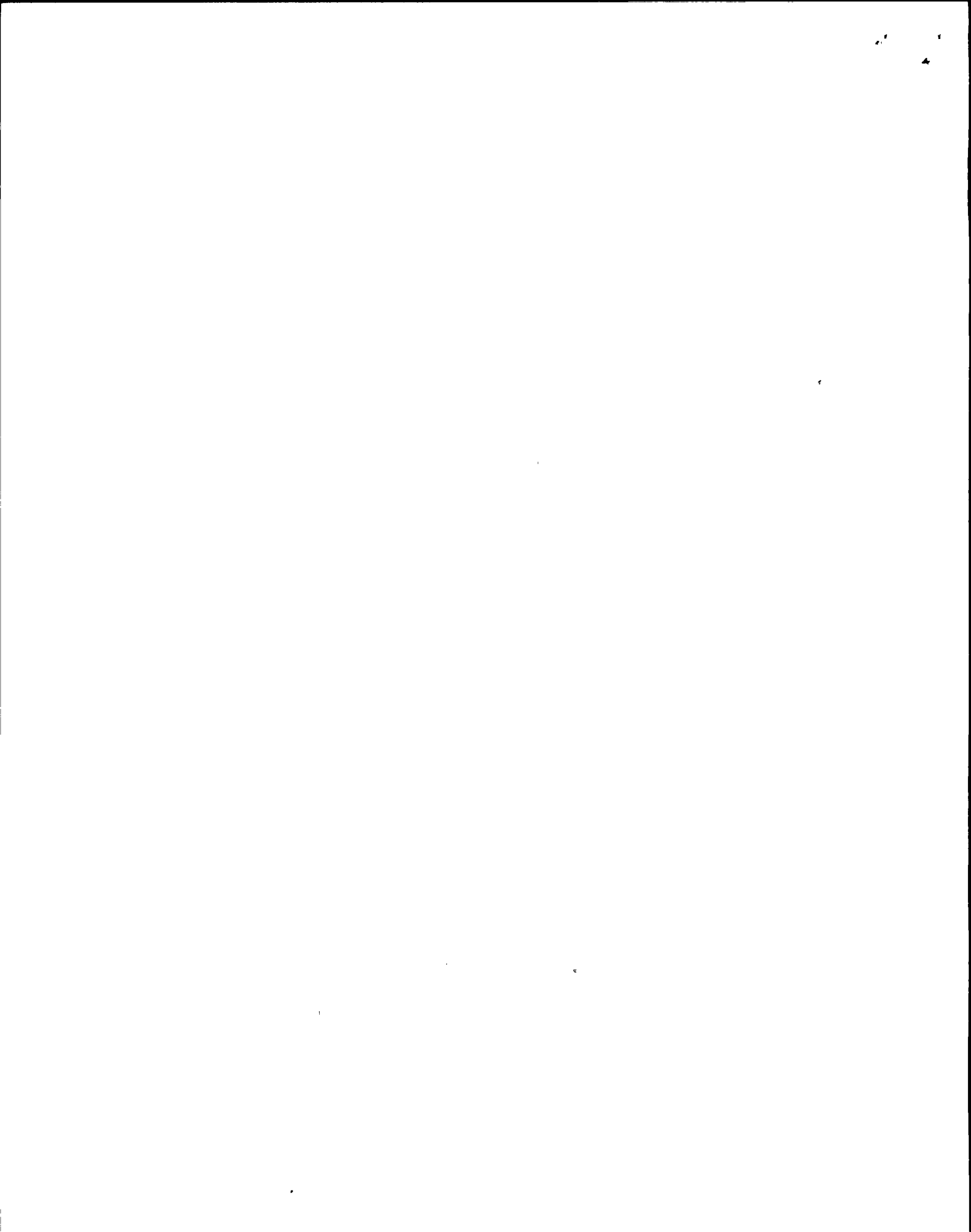
3.2 Verify the Float/Equalize Toggle Selector Switch is placed in the FLOAT position at 2BYS*CHGR 2B1 (2B2) Battery Charger.

3.3 Close the DC POWER breaker on 2BYS*CHGR 2B1 (2B2) Battery Charger.

3.4 Observe Battery voltage is indicated on the DC VOLTS meter at the battery charger.

NOTE: When the AC power breaker is closed, the charger may go to the high current limit if the battery is not fully charged.

3.5 Close the AC POWER breaker on 2BYS*CHGR 2B1 (2B2) Battery Charger.



E. STARTUP (Cont)

3.6 Measure the output voltage of 2BYS*CHGR 2B1 (2B2) Battery Charger as follows:

- 3.6.1 Obtain a calibrated Digital Voltmeter.
- 3.6.2 Connect the Digital Voltmeter leads to the 2BYS*CHGR2B1 (2B2) DC VOLTS meter terminals on the back of the Charger door.

3.7 Establish 135 VDC charger float output voltage on 2BYS*CHGR 2B1(B2) DIV II Battery Charger by performing the following:

- 3.7.1 Verify the FLOAT/EQUALIZE toggle selector switch is placed in the FLOAT position at 2BYS*CHGR 2B1(2B2) Battery Charger.

NOTE: Adjustments of a charger output voltage should be made only when the charger output current is less than 345 Amps.

- 3.7.2 Ensure the Charger output current indication is less than the 345 Amps current limit.
- 3.7.3 Loosen the FLOAT potentiometer lock nut.
- 3.7.4 Rotate the charger FLOAT potentiometer until the output voltage indication is 135 VDC on the charger DC VOLTS meter.
- 3.7.5 Tighten the FLOAT potentiometer lock nut while maintaining the potentiometer setting.

3.8 Establish 140 VDC charger equalize output voltage on 2BYS*CHGR 2B1(2B2) DIV II Battery Charger by performing the following:

- 3.8.1 Verify the FLOAT/EQUALIZE toggle selector switch is placed in the EQUALIZE position at 2BYS*CHGR 2A1(2A2) Battery Charger.

NOTE: Adjustments of a charger output voltage should be made only when the charger output current is less than 345 Amps.

- 3.8.2 Ensure the Charger output current indication is less than the 345 Amps current limit.
- 3.8.3 Loosen the EQUALIZE potentiometer lock nut.
- 3.8.4 Rotate the charger EQUALIZE potentiometer until the output voltage indication is 140 VDC on the charger DC VOLTS meter.

E. STARTUP (Cont)

- 3.8.5 Tighten the EQUALIZE potentiometer lock nut while maintaining the potentiometer setting.
- 3.8.6 Place the FLOAT/EQUALIZE toggle selector switch in the FLOAT position at 2BYS*CHGR 2B1(2B2) Battery Charger.
- 3.9 Return the Digital Voltmeter.

F. NORMAL OPERATION

1.0 Swapping DIV I/DIV II Battery Chargers While in Service

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- 1.1 Verify closed 2BYS*BAT-2A/2B (2BYS*SWG002A-1B/2BYS*SWG-002B-1B)

NOTE: Either Step 1.2 or 1.3 may be omitted.

- 1.2 For DIV I perform the following:

- 1.2.1 Verify the 0-120 hr. timer is off at 2BYS*CHGR 2A2(2A1) Battery Charger.

- 1.2.2 Verify the float/equalize toggle selector switch is placed in the float position at 2BYS*CHGR 2A2(2A1) Battery Charger.

- 1.2.3 Close the DC Power Breaker on 2BYS*CHGR 2A2(2A1) Battery Charger.

- 1.2.4 Observe battery voltage is indicated on the DC volts meter at the Battery Charger.

NOTE: When the AC Power Breaker is closed, the charger may go to the high current limit if the battery is not fully charged.

- 1.2.5 Close the AC Power Breaker on 2BYS*CHGR 2A2(2A1) Battery Charger.

- 1.2.6 Observe the output voltage indication on 2BYS*CHGR 2A1 Battery Charger is approximately the same as the output voltage indication on 2A2 Battery Charger.

- 1.2.7 Observe less than 345 amps output current on 2BYS*CHGR 2A1 Battery Charger.

- 1.2.8 Observe less than 345 amps output current on 2BYS*CHGR 2A2 Battery Charger.

- 1.2.9 Open AC Power Breaker on 2BYS*CHGR 2A1(2A2) Battery Charger.

F. NORMAL OPERATION (Cont)

1.2.10 Open DC Power Breaker on 2BYS*CHGR 2A1(2A2) Battery Charger.

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1.3 For DIV II perform the following:

1.3.1 Verify the 0-120 hr. timer is off at 2BYS*CHGR 2B2(2B1) Battery Charger.

1.3.2 Verify the float/equalize toggle selector switch is placed in the float position at 2BYS*CHGR 2B2(2B1) Battery Charger.

1.3.3 Close the DC Power Breaker on 2BYS*CHGR 2B2(2B1) Battery Charger.

1.3.4 Observe battery voltage is indicated on the DC volts meter at the Battery Charger.

NOTE: When the AC Power Breaker is closed, the charger may go to the high current limit if the battery is not fully charged.

1.3.5 Close the AC Power Breaker on 2BYS*CHGR 2B2(2B1) Battery Charger.

1.3.6 Observe the output voltage indication on 2BYS*CHGR 2B1 Battery Charger is approximately the same as the output voltage indication on 2B2 Battery Charger.

1.3.7 Observe less than 345 amps output current on 2BYS*CHGR 2B1 Battery Charger.

1.3.8 Observe less than 345 amps output current on 2BYS*CHGR 2B2 Battery Charger.

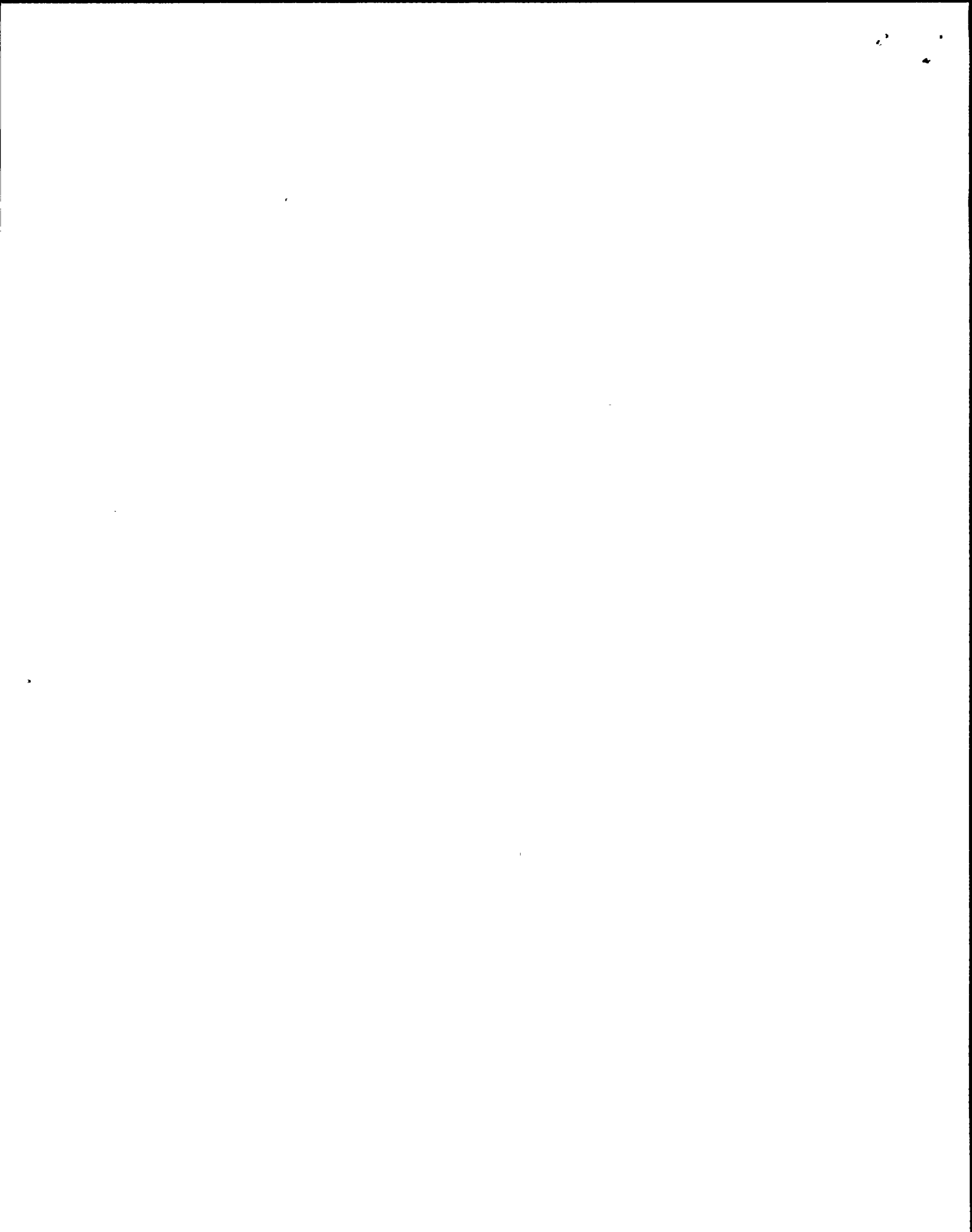
1.3.9 Open AC Power Breaker on 2BYS*CHGR 2B1(2B2) Battery Charger.

1.3.10 Open DC Power Breaker on 2BYS*CHGR 2B1(2B2) Battery Charger.

G. SHUTDOWN

Not Applicable

The Emergency D.C. Distribution system should never require a complete shutdown. Instructions for shutting down portions of the system will be included in work request or as part of a markup.



H. OFF-NORMAL PROCEDURES

1.0 DIV I (DIV II) Operation With Both Battery Chargers In Service

1.1 Verify closed 2BYS*BAT 2A (2B).

NOTE: EITHER Step 1.2 OR Step 1.3 may be omitted.

1.2 For DIV I perform the following:

1.2.1 Verify the 0-120 hr. Timer is OFF at 2BYS*CHGR 2A2(2A1), Battery Charger.

1.2.2 Verify the Float/Equalize Toggle Selector Switch is placed in the FLOAT position at 2BYS*CHGR 2A2(2A1) Battery Charger.

1.2.3 Close the DC POWER breaker on 2BYS*CHGR 2A2(2A1) Battery Charger.

1.2.4 Observe Battery voltage is indicated on the DC VOLTS meter at the battery charger.

NOTE: When the AC power breaker is closed, the charger may go to the high current limit if the battery is not fully charged.

1.2.5 Close the AC POWER breaker on 2BYS*CHGR 2A2(2A1) Battery Charger.

1.2.6 Observe the output voltage indication on 2BYS*CHGR 2A1 Battery Charger is approximately the same as the output voltage indication on 2BYS*CHGR 2A2 Battery Charger.

1.2.7 Observe less than 345 Amps output current on 2BYS*CHGR 2A1 Battery Charger.

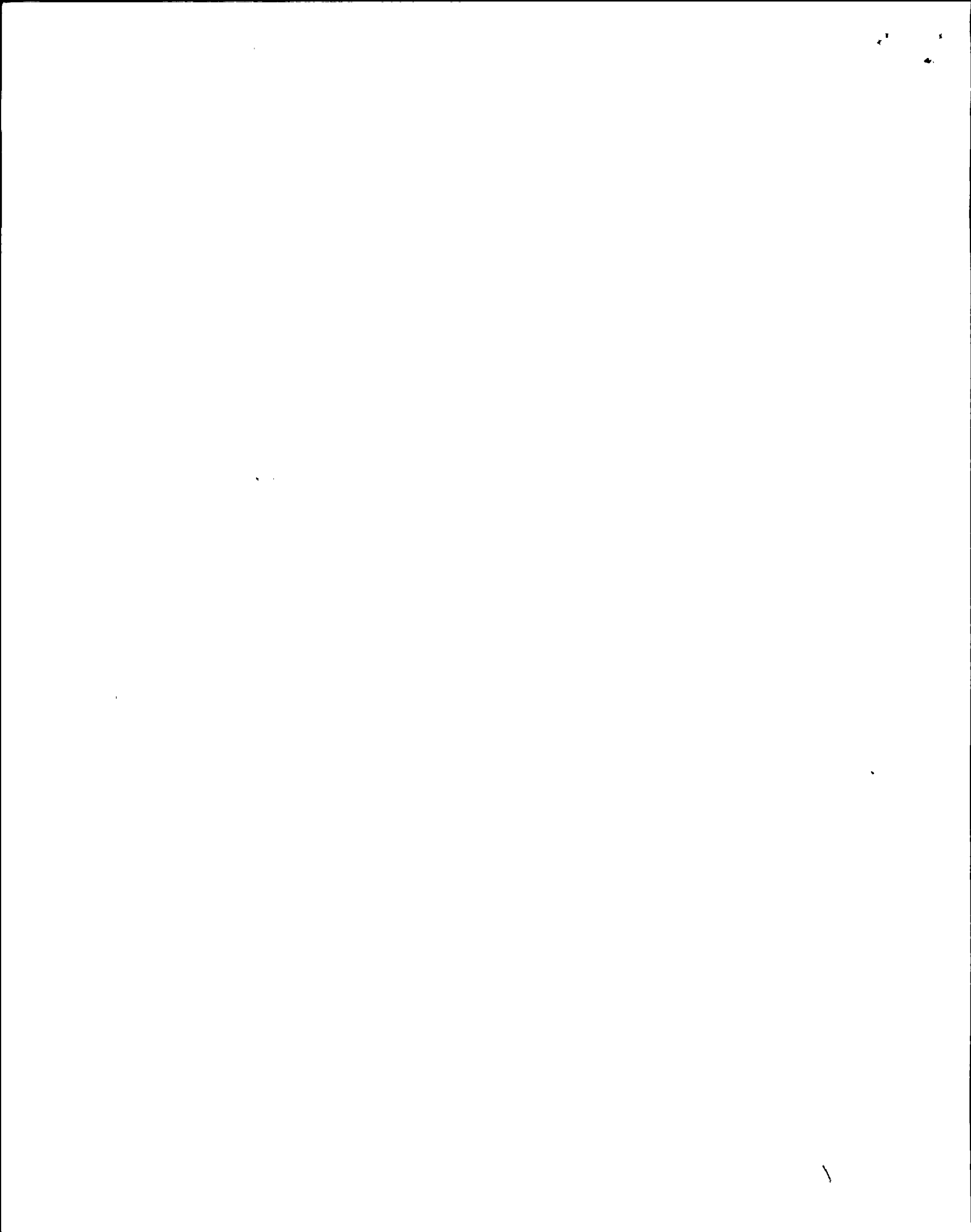
1.2.8 Observe less than 345 Amps output current on 2BYS*CHGR 2A2 Battery Charger.

1.3 For Div. II perform the following:

1.3.1 Verify the 0-120 hr. Timer is OFF at 2BYS*CHGR 2B2 (2B1), Battery Charger

1.3.2 Verify the Float/Equalize Toggle Selector Switch is placed in the FLOAT position at 2BYS*CHGR 2B2 (2B1) Battery Charger.

1.3.3 Close the DC POWER breaker at 2BYS*CHGR 2B2(2B1) Battery Charger.



H. OFF-NORMAL PROCEDURES (Cont)

1.3.4 Observe Battery voltage is indicated on the DC VOLTS meter at the battery charger.

NOTE: When the AC power breaker is closed, the charger may go to the high current limit if the battery is not fully charged.

1.3.5 Close the AC POWER breaker at 2BYS*CHGR 2B2(2B1) Battery Charger.

1.3.6 Observe the output voltage indication on 2BYS*CHGR 2B1 Battery Charger is approximately the same as the output voltage indication on 2BYS*CHGR 2B2 Battery Charger.

1.3.7 Observe less than 345 Amps output current on 2BYS*CHGR 2B1 Battery Charger.

H. OFF-NORMAL PROCEDURES (Cont)

- 1.3.8 Observe less than 345 Amps output current on 2BYS*CHGR 2B2 Battery Charger.

2.0 Removing a DIV I (DIV II) Battery Charger From Service

NOTE: Removing Battery Charger from service may cause a limiting condition of operation.

2.1 For DIV I perform the following:

2.1.1 Verify closed breaker 2BYS*BAT2A, 125 VDC BAT DIV I.

2.1.2 Open AC POWER breaker on 2BYS*CHGR 2A1(2A2) Battery Charger.

2.1.3 Open DC POWER breaker on 2BYS*CHGR 2A1(2A2) Battery Charger.

NOTE: Perform EITHER Step 2.1.4 OR Step 2.1.5 as applicable for the Charger removed from service.

2.1.4 Open #45 breaker, Charger AC Supply at panel 2LAC*PNL 100A.

2.1.5 Open #1 breaker Charger AC Supply at panel 2EJS*PNL 100A.

2.2 For DIV. II perform the following:

2.2.1 Verify closed breaker 2BYS*BAT2B, 125 VDC BAT DIV II.

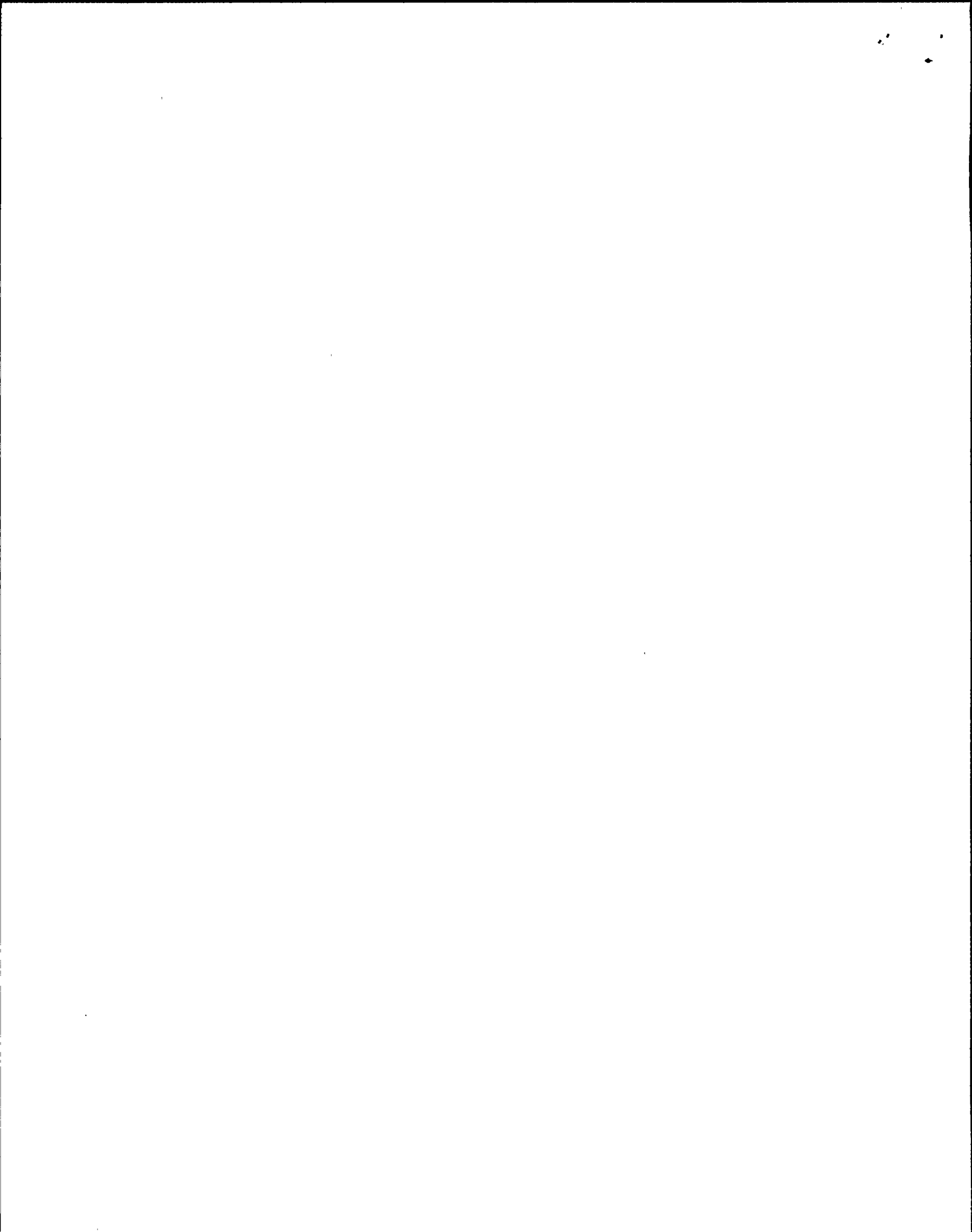
2.2.2 Open AC POWER breaker on 2BYS*CHGR 2B1(2B2) Battery Charger.

2.2.3 Open DC POWER breaker on 2BYS*CHGR 2B1 (2B2) Battery Charger.

NOTE: Perform EITHER Step 2.2.4 OR Step 2.2.5 as applicable for the charger being removed from service.

2.2.4 Open #45 breaker, Charger AC Supply at panel 2LAC*PNL 300B.

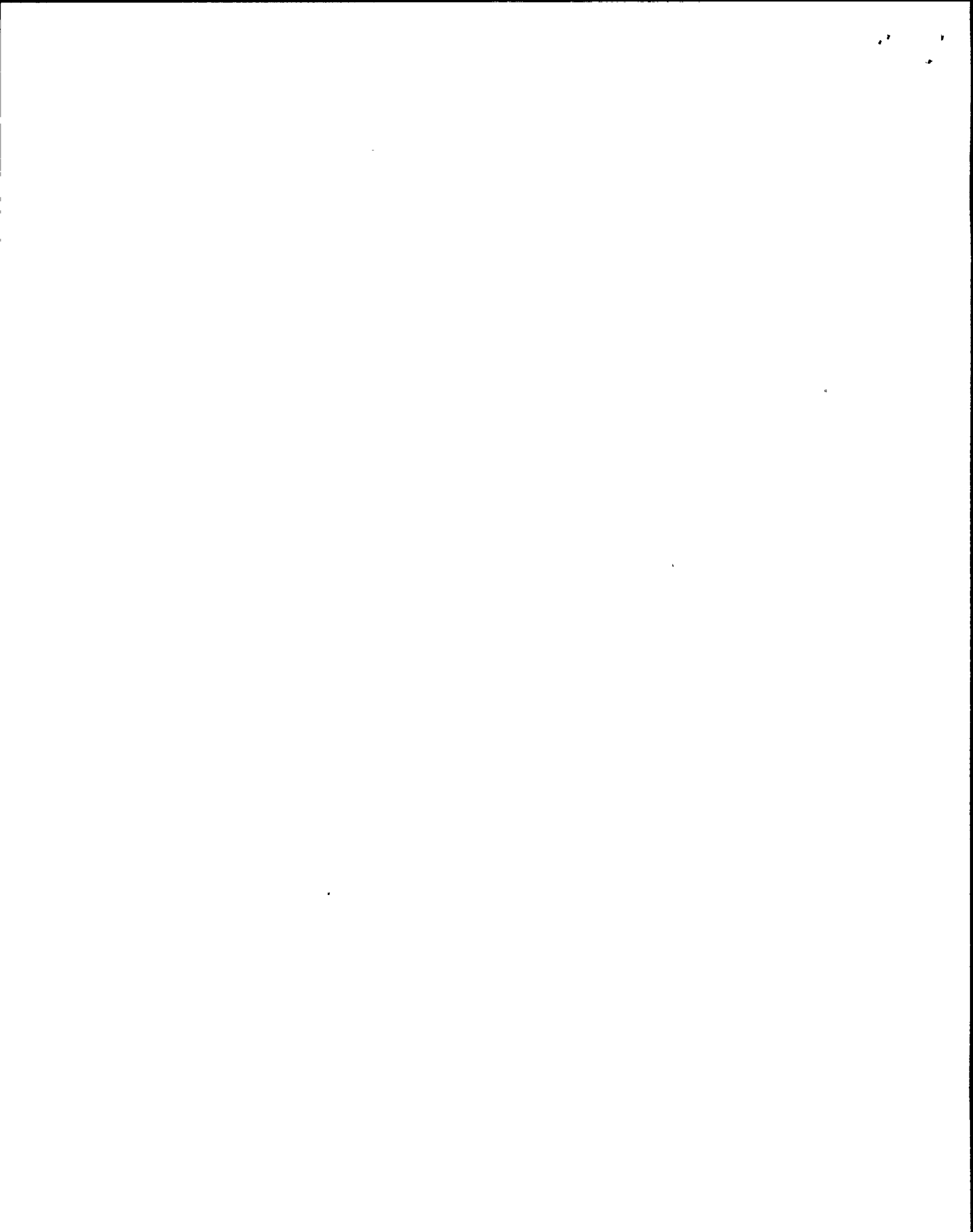
2.2.5 Open #1 breaker, Charger AC Supply at panel 2EJS*PNL 300B.



H. OFF-NORMAL PROCEDURES (Cont)

3.0 Removing Battery From Service

- 3.1 Consult Technical Specifications for conditions limiting operations prior to removing a battery from service.
- 3.2 Observe approximately "0" Amps indication on the DC AMPERES meter at 2BYS*SWG 2A(2B) switchgear.
- 3.3 Ensure battery charger supply to the switchgear having the battery removed from service as follows:
 - 3.3.1 Ensure closed breaker 2BYS*CHGR 2A(2B) at 2BYS*SWG002A(2B) switchgear.
 - 3.3.2 For DIV I ensure the following:
 - a. Closed DC POWER breaker at 2BYS*CHGR 2A1(2A2) Battery Charger.
 - b. Charger output indication less than 300 Amps at 2BYS*CHGR 2A1(2A2) Battery Charger.
 - 3.3.3 For DIV II ensure the following:
 - a. Closed DC POWER breaker at 2BYS*CHGR 2B1(2B2) Battery Charger.
 - b. Charger output indication less than 300 Amps at 2BYS*CHGR 2B1(2B2) Battery Charger.
- NOTE:** Battery Chargers have a limited capacity for supplying starting current. Switchgear loads should remain constant during battery outage.
- 3.4 Open Battery breaker 2BYS*BAT 2A(2B), 125 VDC BAT DIV I (DIV II).
- 3.5 Verify Volts indication is stable at 2BYS*SWG002A(B) switchgear.
- 3.6 IF voltage indication in Step 3.5 above is dropping rapidly THEN reclose Battery breaker 2BYS*BAT 2A(2B).



H. OFF-NORMAL PROCEDURES (Cont)

4.0 Equalize Battery Charge

4.1 Battery equalize charge is required if one of the conditions listed below exist:

- 4.1.1 The battery has not been on charge such that there is a discharge measurable by regularly taken plant data.
- 4.1.2 Notification of unacceptable surveillance test data.
- 4.1.3 Technical Specification limiting conditions for operation.

4.2 Notify Electrical Maintenance to initiate battery equalizing charge procedure for the battery requiring equalize charge.

5.0 Returning Battery to Service

NOTE: When breaker 2BYS*BAT 2A(2B) 125 VDC BAT DIV I (DIV II) is closed the associated battery charger may go to the current limit if the battery is less than fully charged.

- 5.1 Close Breaker 2BYS*BAT 2A(2B) 125 VDC BAT DIV I (DIV II).
- 5.2 Verify Amps indication at the associated charger is less than 345 Amps.
- 5.3 If required perform battery equalize charging in accordance with Section H.4.0 above.

6.0 Loads Affected By Loss Of Div I 125 VDC
(NCTS 1)

6.1 Loss of DIV. I Summary

NOTE: Attachment 3: Loads Affected By Loss of 125 VDC contains a detailed list of affected loads.

ACTION

REFERENCE OP

Recirc Pumps trip to ZERO
if running in high speed

N2-OP-29/N2-OP-101D

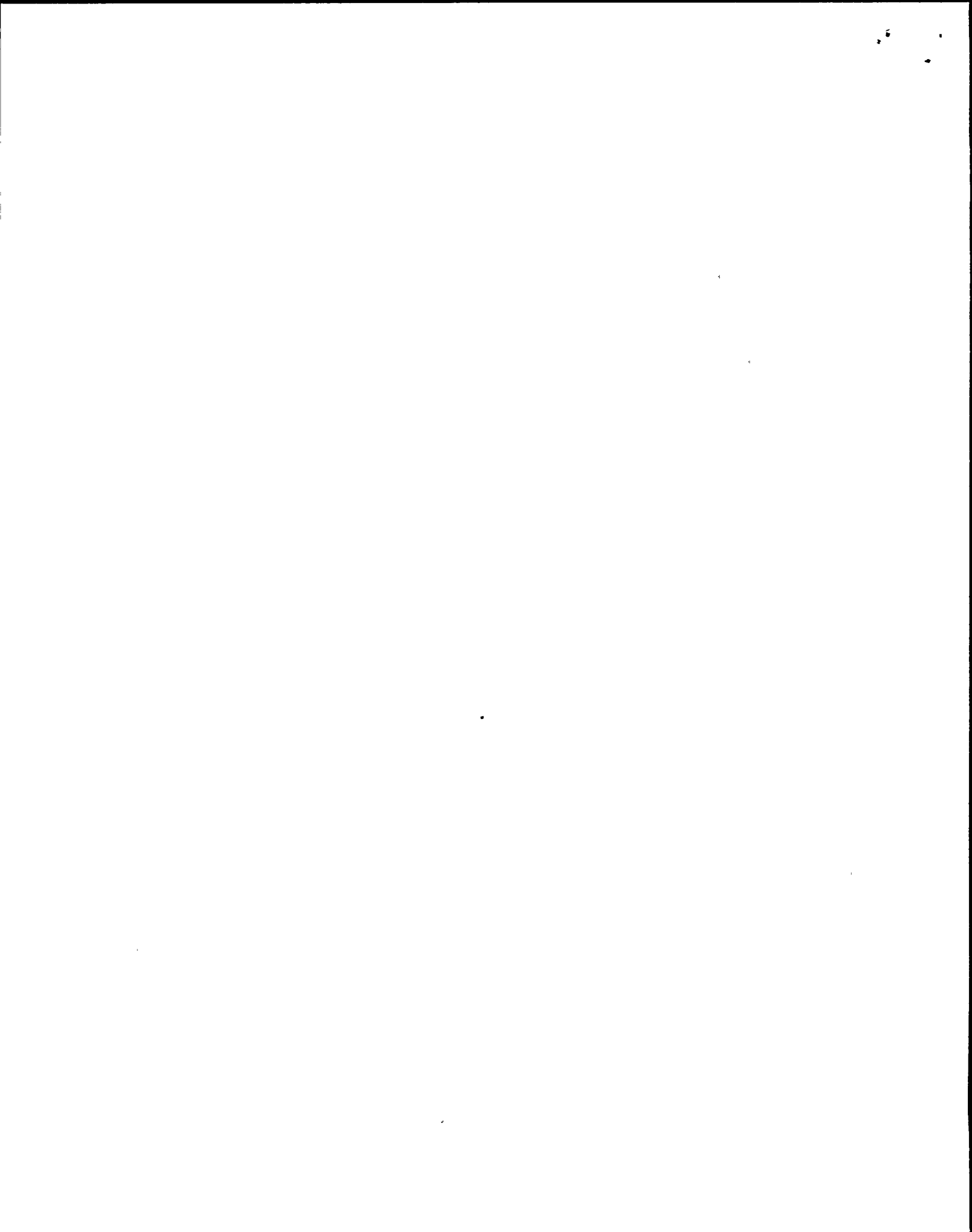
|TCN-1 2

If MODE SWITCH is in run,
a manual SCRAM is required

N2-OP-101C

Group 8 and 9 Outboard Containment
Isolation

N2-OP-83



H. OFF-NORMAL PROCEDURES (Cont)

6.1 (Cont)

DIV I Electrical Distribution Control, Interlock and Protection Load Shedding N2-OP-72

INOP Load Sequencing for the following:

Service Water P1A,C,E N2-OP-11
Spend Fuel Cooling P1A N2-OP-38
RHR P1A N2-OP-31
LPCS P1 N2-OP-32
DIV I Diesel Gen. N2-OP-100A

INOP the following:

A EOC-RPT N2-OP-29
ADS DIV I N2-OP-34
All SRV Relief Mode Function N2-OP-34
RHR A Shutdown Cooling N2-OP-31
RCIC AUTO/MANUAL Initiation N2-OP-35
SGBT A Train N2-OP-61B
Stdbby Liq Cont. P1A N2-OP-36A
DIV I RRCS ARI Valves N2-OP-36B
Rx. Bldg. Emerg Unit Clr. UC413A N2-OP-52
Cont. Bldg. Chiller A N2-OP-53A
Backup Power To UPS2A N2-OP-72
DIV I Annunciators Not Applicable

WCS Pumps trip on isolation N2-OP-37

7.0 Loads Affected By Loss Of DIV II 125 VDC
(NCTS 1)

7.1 Loss of Div II Summary

NOTE: Attachment 3: Loads Affected By Loss Of 125 VDC contains a detailed list of affected loads.

ACTION

REFERENCE OP

Recirc Pumps trip to ZERO if running in high speed

N2-OP-29, N2-OP-101D

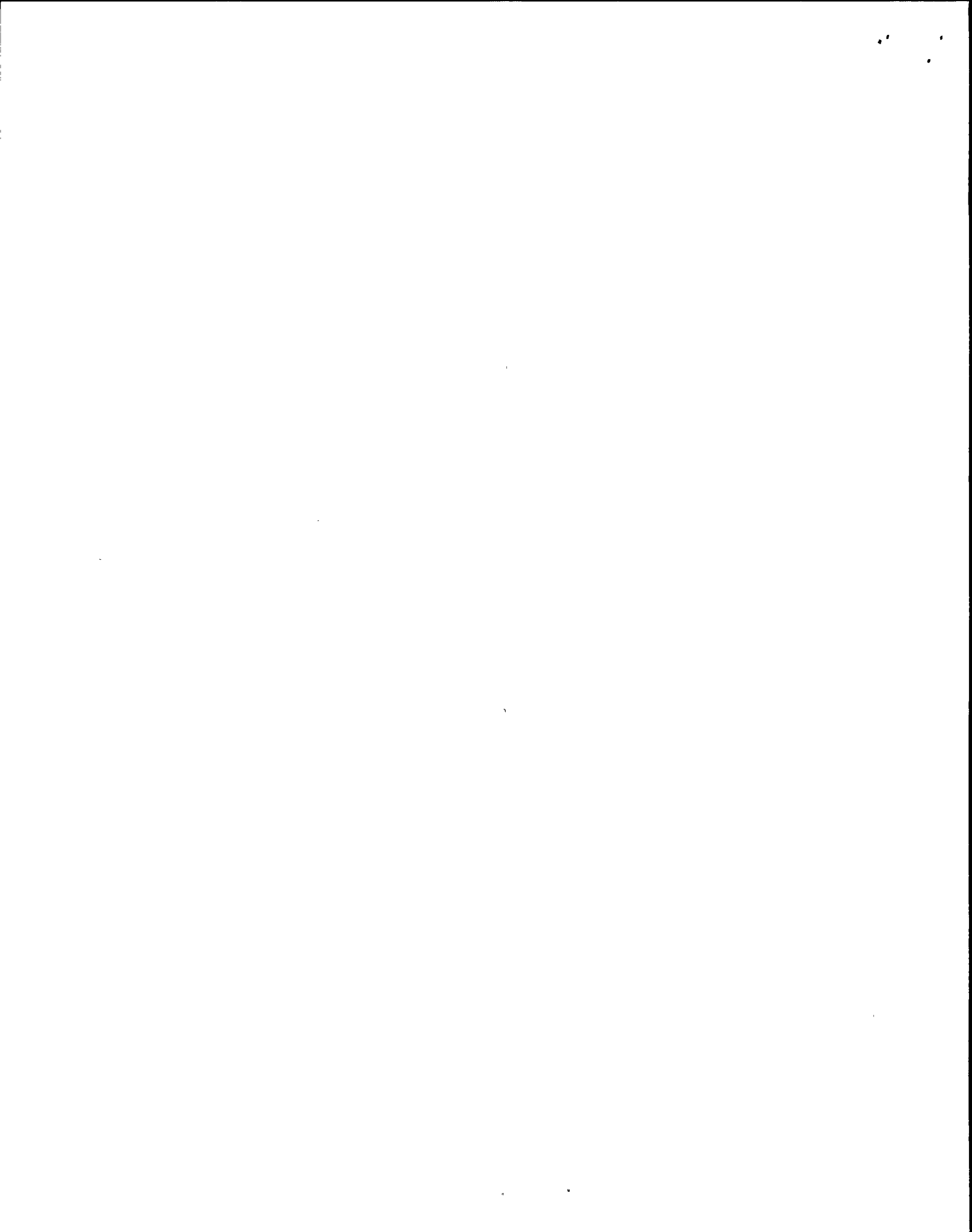
TCN-12

If MODE SWITCH is in run, a manual SCRAM is required

N2-OP-101C

Group 8 and 9 Inboard Containment Isolation

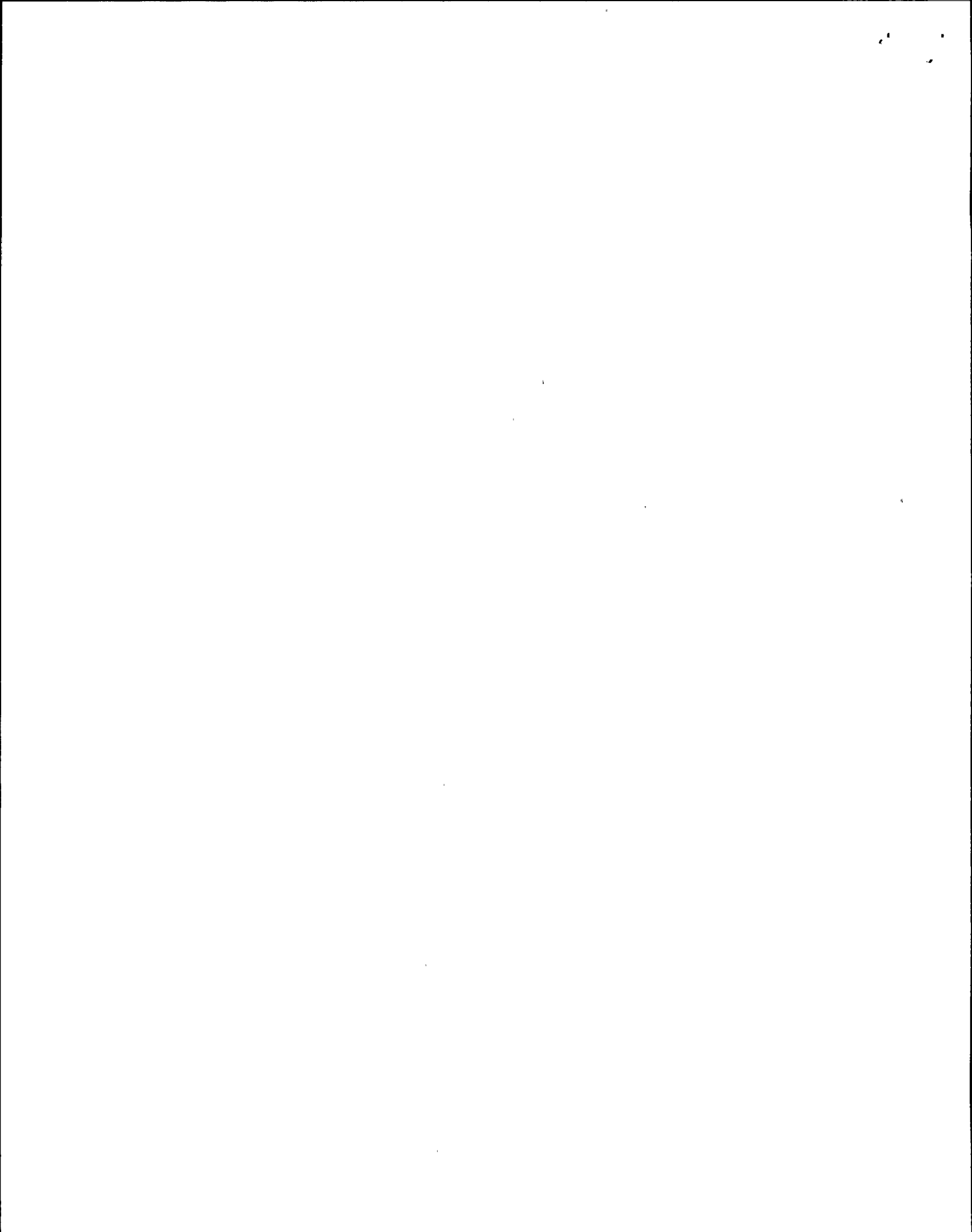
N2-OP-83



H. OFF-NORMAL PROCEDURES (Cont)

7.1 (Cont)

DIV II Electrical Distribution Control, Interlock and Protection Load Shedding	N2-OP-72
INOP Load Sequencing for the following:	
Service Water PIB,D,F	N2-OP-11
Spend Fuel Cooling PIB	N2-OP-38
RHR PIB, P1C	N2-OP-31
DIV II Diesel Gen.	N2-OP-100A
INOP the following:	
A EOC-RPT Inop	N2-OP-29
ADS DIV II	N2-OP-34
RHR A Shutdown Cooling	N2-OP-31
SBGT B Train	N2-OP-61B
Stdby Liq Cont. PIB	N2-OP-36A
DIV II RRCS ARI Valves	N2-OP-36B
Rx. Bldg. Emerg Unit Ctr. UC413B	N2-OP-52
Cont. Bldg. Chiller B	N2-OP-53A
Backup Power To UPS2B	N2-OP-72
DIV II Annunciators	Not Applicable
WCS Pumps trip on isolation	N2-OP-37



I. PROCEDURES FOR CORRECTING ALARM CONDITIONS

Refresh: YES

852108

.DIV I EMER BUS BYS002A 125VDC SYSTEM TROUBLE	108
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<u>Computer Point</u>	<u>Printout</u>	<u>Source</u>	<u>Setpoint</u>
BYCBC01	2BYS*BAT 2A BKR OVCNT	EMER DC SYS DIV I INOP	
BYCBC04	2BYS*CHGR 2A1, 2A2 OVCNT	EMER DC SYS DIV I INOP	
BYSEC11	D1 BUS 2BYS*SWG002A VOLT	27A-2BYS A11 Under Voltage Relay in SWGR Cub. 1A	Trips at 125 VDC
BYSEC12	D1 BUS 2BYS*SWG002A VOLT	27B-2BYS A11 Under Voltage Relay in SWGR Cub. 1A	Trips at 110 VDC
BYSEC17	2BYS*CHGR 2A1/2A2 HI V TRIP	K1-1 Overvoltage Relay In Charger	Trips at 142 VDC
BYSEC05	DIV I DC BUS 2A GRND	64-2BYS A05 Ground Detection Circuit In Pnl 852	Trips at ± 75V

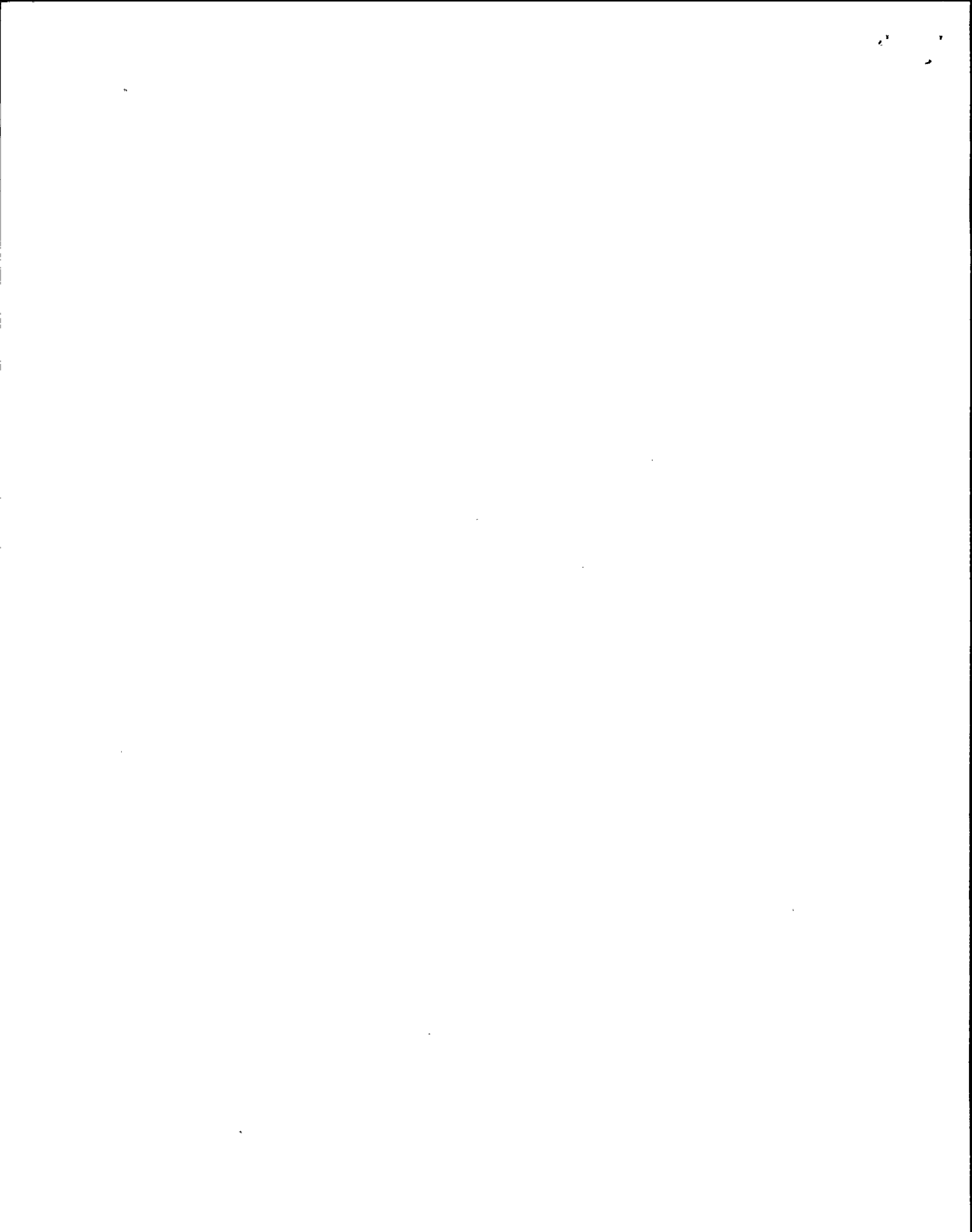
Automatic Response

BYSEC17 only:
Trip AC input breaker in charger.

Low voltage alarm.

Operator Actions

Refer to Computer Point Operator Actions attached.



Operator Actions

852108 (Cont)

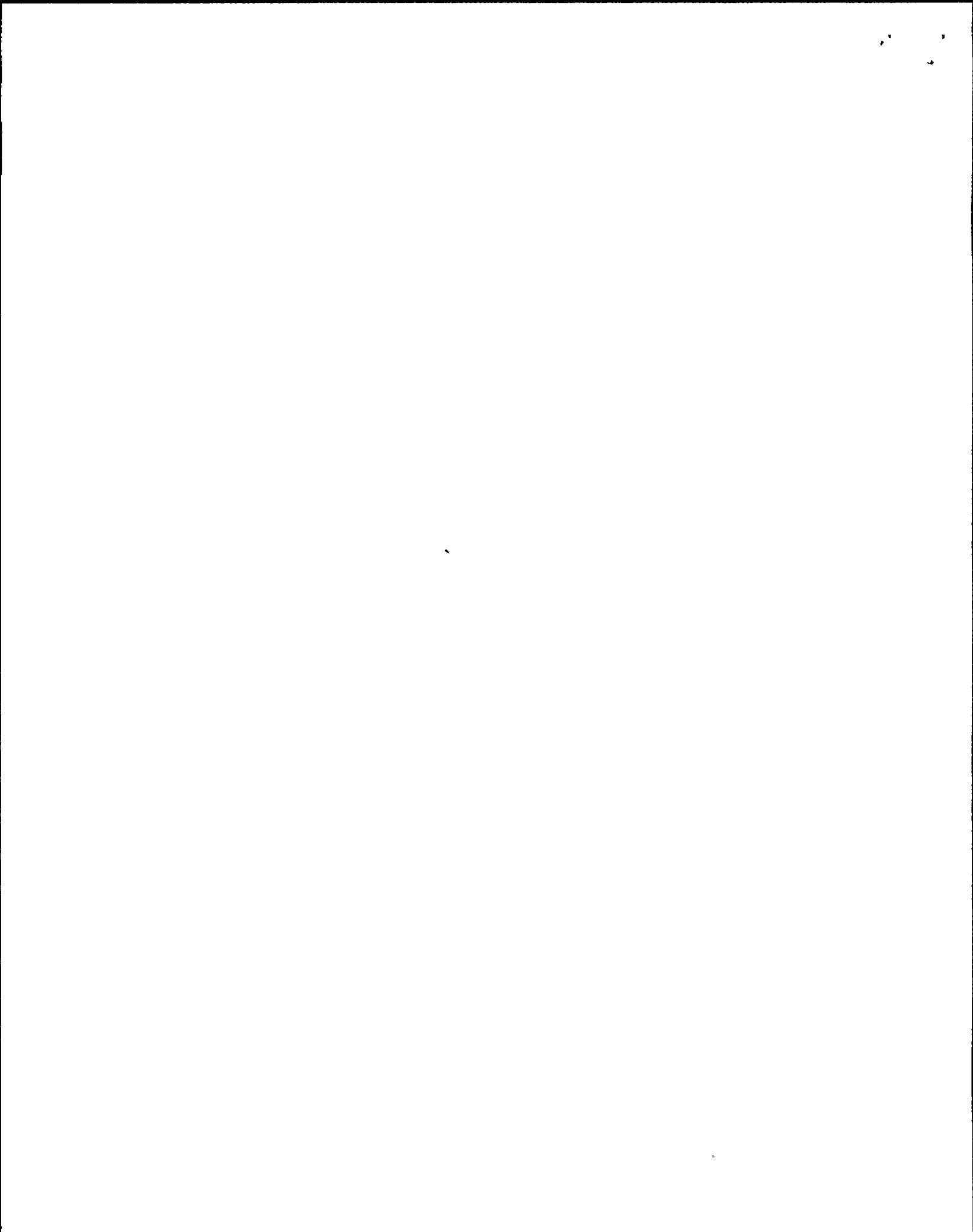
BYSBC01: 2BYS*BAT 2A BKR OVRNT

- a. Refer INOP window

<u>Window</u>	<u>Source</u>	<u>Automatic Response</u>
EMER DC SYS DIV I INOP	720C-2BYS09 Switchgear	SWG002A Breaker 1B trips at 1200A Long Time, 4000A Short Time

NOTE: With the DIV I Battery Breaker open, refer to Technical Specifications for D.C. power sources and Inop Diesel Generator.

- b. Check the DIV I/BAT 2A meters on the rear of control room panel P852.
- c. Meter labeled BATTERY 2A D.C.A. should show 0 amps.
- d. A bus fault is indicated by high amps (375 amps) indicated on BATTERY CHARGER METER 2B1-2B2 D.C.A. and low voltage indicated on BATTERY BUS BYS002B D.C. VOLTS meter.
- e. Check the ground detection circuit, per Ann. 852108, BYSIC 05.
- f. Notify elect. maint. of all meter readings to expedite returning the battery to service.
- g. If the charger ammeter shows less than 300A, and the bus voltage is stable at 133V, and neither bus is grounded, reset the overcurrent device, and reclose the battery breaker, and notify elect. maint. of the spurious trip.
- h. If the meters show a bus fault condition, momentarily isolate selected loads using Attachment 3 until the fault is located, and notify elect. maint. of the fault.
- i. After the faulted load is isolated, return the battery to service in accordance with N2-OP-74A.
- j. If the fault cannot be isolated from the DC switchgear bus, open the AC supply breaker to the in-service charger (See Att. 2 of N2-OP-74A). Notify elect. maint. of the faulted bus.
- NOTE: The 4160 ENS switchgear will not auto trip, nor will it remote trip without DC power. It must be tripped locally at the supply breaker.
- k. If DC control power is not available, de-energize 2ENS-SWG101.

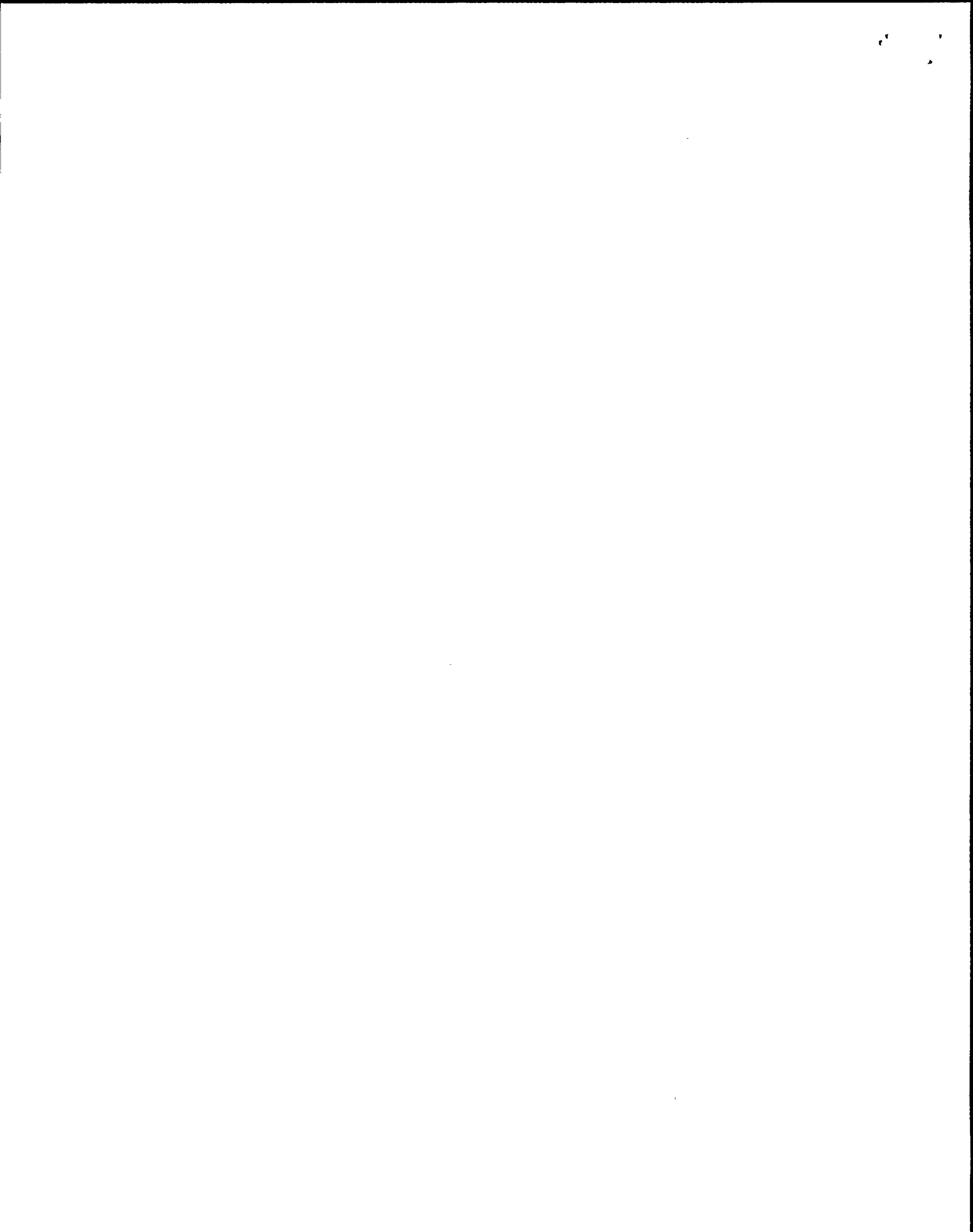


BYSBC04: 2BYS*CHGR 2A1,2A2 OVCRNT

- a. Refer to Tech Specs for Inop Battery ECCS systems.
- b. Refer to Tech Specs for Limiting Conditions of Operation.
- c. Refer to the following INOP window

<u>Window</u>	<u>Source</u>	<u>Automatic Response</u>
EMER DC SYS DIV I INOP	720C-2BYS10 Switchgear	SWG002A Breaker 2B trips at 500A Long Time, 2000A Short Time

- d. Check Bus current on meter BATTERY 2A D.C.A. at the rear of panel P852.
 - e. IF the current is less than 375A and voltage is 0 THEN perform the following:
 - 1. Open the charger AC input breaker
 - 2. Open the charger DC output breaker
 - 3. Close Switchgear Breaker in Cubicle 2B of switchgear SWG002A
 - f. If the breaker in cubicle 2B remains closed, notify Electrical Maintenance to trouble shoot and repair the charger.
 - g. Place the Stand by Charger in service in accordance with N2-OP-74A, Emerg DC Dist.
- NOTE:** If 2VBA*UPS-2A is on D.C. backup supply, Tech Specs require both chargers be in service.
- h. IF the current is greater than 375A, THEN perform the following:
 - 1. Momentarily isolate selected loads on the switchgear using Attachment 3 as plant conditions permit until overload determined.
 - 2. Notify Electrical Maintenance to trouble shoot and repair the defective equipment.
 - i. If DIV I D.C. BUS drops to less than 125 VDC, refer to the actions of Ann. 852108, BYSEC11.
 - j. When the problem has been corrected place a charger in service in accordance with N2-OP-74A, Emerg. DC Dist.
 - k. Request Electrical Maintenance determine need for equalizing charge.



BYSEC11: D1 BUS 2BYS*SWG002A VOLT

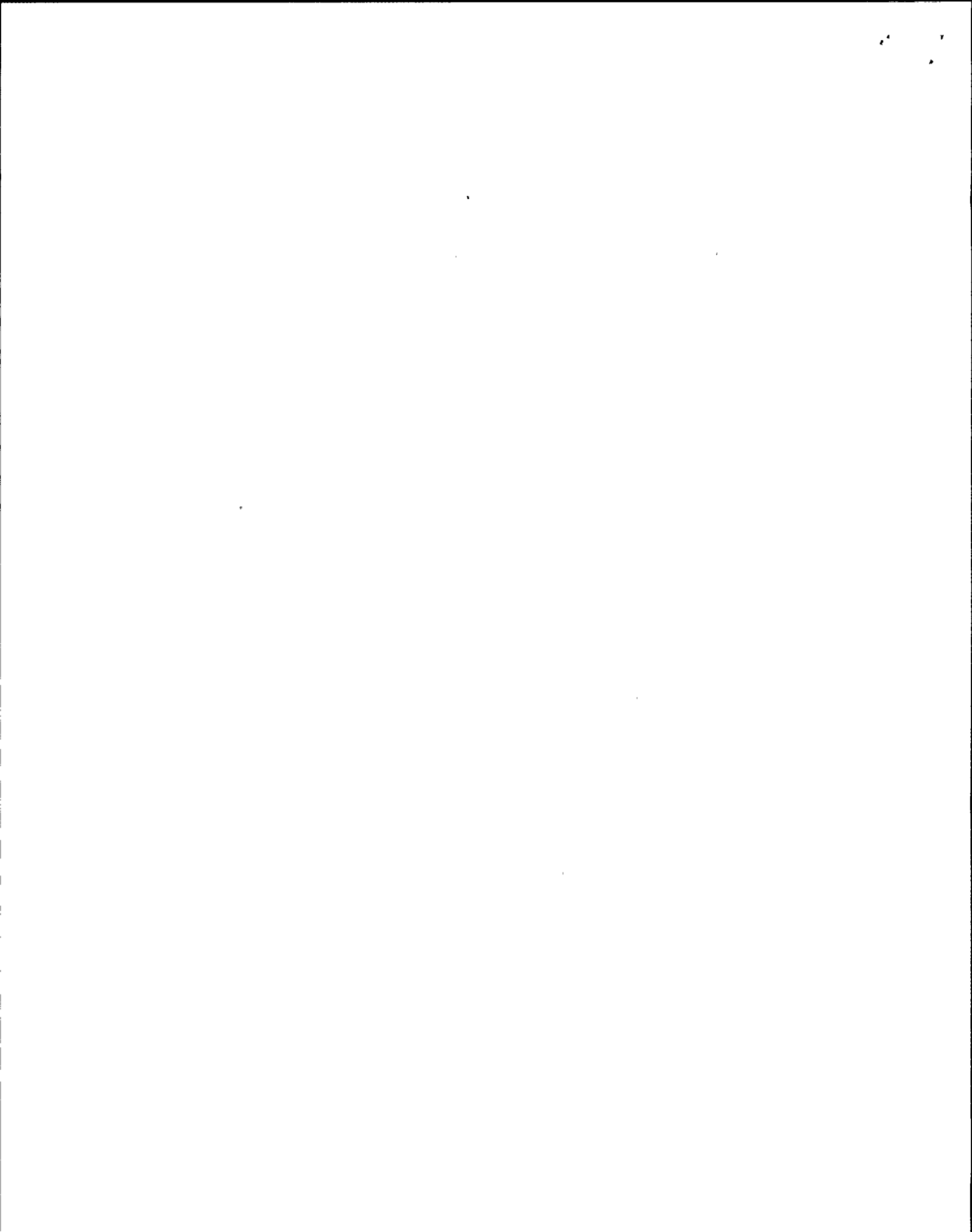
|*

NOTE: Refer to Technical Specifications for applicable L.C.O.

- a. Observe computer printout to determine if high voltage caused 2A1(2A2) Charger trip resulting in a low voltage alarm condition.
- b. Check the voltage on the meter labeled BATTERY BUS BY5 002A D.C. VOLTS, on the rear of control room panel PNL852.
- c. Check the meter labeled BATTERY 2A D.C.A. for discharge (-) current, and the meter labeled BATTERY CHARGER 2A1-2A2 D.C.A. for 0 current. This indicates that the charger has tripped.
- d. If the charger has tripped and battery 2A D.C. ammeter indicates normal current <375 amps, notify Electricians to check the affected charger and place the unaffected charger in service per N2-OP-74A.

NOTE: If 2VBA*UPS2A is on its back-up supply, Tech Specs require both chargers be in service.

- e. If the charger is tripped and the amps are greater than 375A THEN perform the following:
 1. Momentarily isolate selected loads on the switchgear as plant conditions permit until overload determined.
 2. Notify Electrical Maintenance to trouble shoot and repair the defective equipment.
- f. Restore the operating charger per Section E. of this procedure.
- g. If neither charger can be restored or the condition is caused by an A.C. outage, monitor bus voltage and restore at least one charger to operation as soon as a charger or A.C. power is available. See Tech. Specs. and request Electrical Maintenance determine a need for an equalize charge.
- h. If the voltage on the bus drops to ≤ 110 D.C., refer to BYSEC-12 of this procedure.



BYSEC12: D1 BUS 2BYS*SWG002A VOLT

NOTE: Refer to Technical Specifications for applicable L.C.O.

- a. Check the voltage on the meter labeled BATTERY BUS BYS002A D.C. VOLTS, on the rear of control room panel PNL852.
- b. If power is available to either charger, request Electrical Maintenance initiate equalizing charge.
- c. If AC power is not available to the chargers, reduce the load on the DC switchgear bus.

NOTE: 4160V ENS switchgear will not auto trip, nor will it remote trip without D.C. power.

- d. Monitor the Div. I DC bus closely. If a rapid drop of 3-5 volts is seen (indicating cell reversal) immediately de-energize 2ENS*SWG101, trip the Div. I battery breaker and consult Tech. Specs. for Inop battery and loss of Div. I ECCS.
- e. If battery voltage gets to 107VDC, notify electricians to perform N2-ESP-BYS-Q676 to comply with Tech. Spec. 4.8.2.1.b.
- f. When AC power becomes available to either charger, start up the D.C. system, per N2-OP-74A Section E, and notify Electrical Maintenance to initiate equalizing charge.

BYSEC17: 2BYS*CHGR 2A1/2A2 HI V TRIP

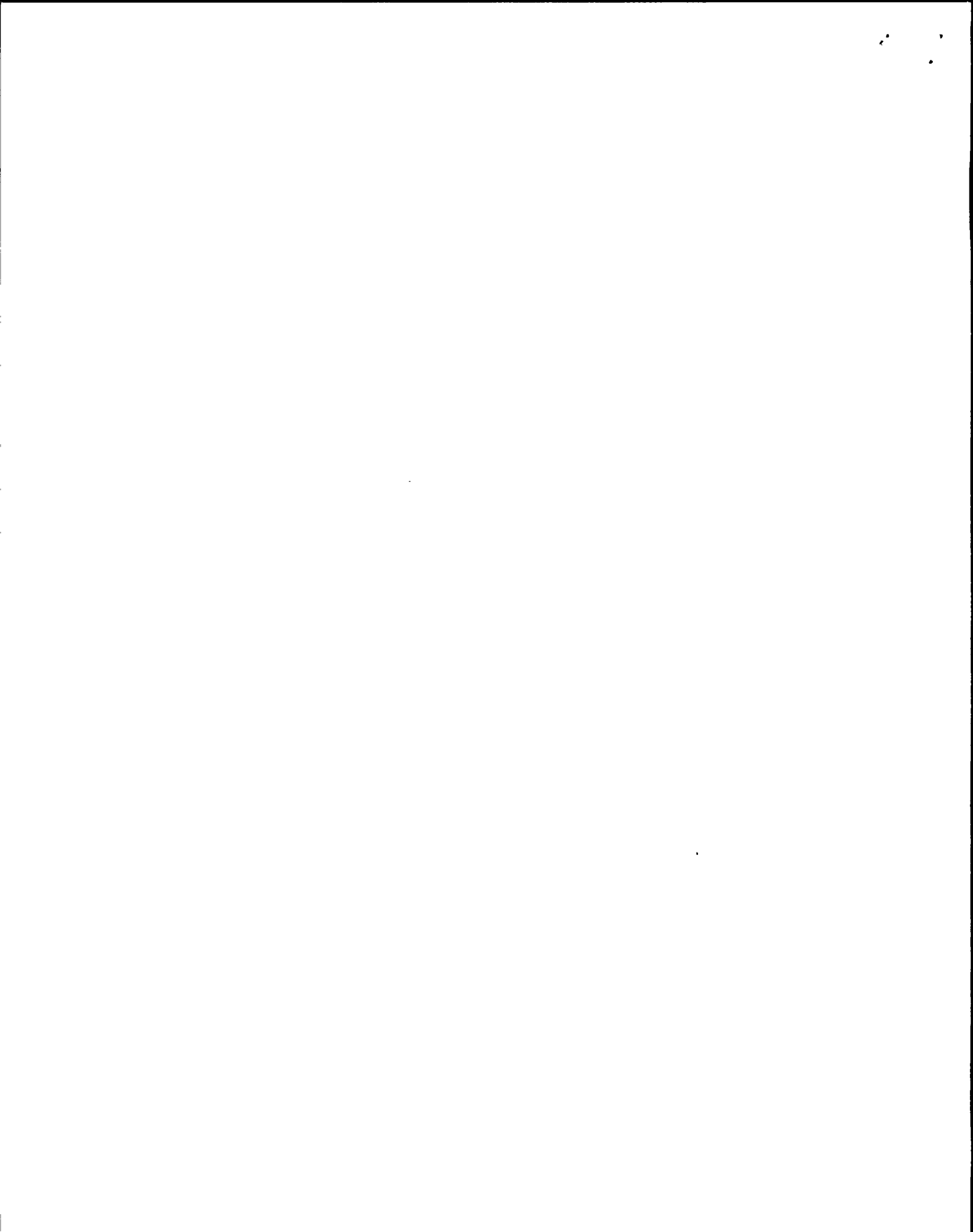
NOTE: Refer to Technical Specifications for applicable L.C.O.

Corrective Action

- a. Check voltage on the meter labeled BATTERY BUS BYS002A D.C. VOLTS on the rear of control room panel PNL852. The meter should show 125VDC. If voltage is ≥ 142 V d.c., immediately trip the A.C. breaker on the in-service charger.
- b. If battery voltage was ≥ 142 VDC, notify electricians to perform N2-ESP-BYS-Q676 to comply with Tech. Spec. 4.8.2.1.b.

NOTE: If 2VBA*UPS2A is on its back-up supply (d.c.) then both chargers are required to be operating by Tech Specs, refer to Tech Specs for L.C.O.

- c. Place the stand by charger in service in accordance with N2-OP-74A.
- d. Notify the Electricians to check the affected charger.



BYSIC05: DIV I DC BUS 2A GRND

- a. Check the ground voltage on the meter labeled BATTERY 2A GND DETECTION, on the rear of control room panel PNL 852.
- b. Press and hold the gnd detection test pushbutton, and the meter will indicate the grounded bus.
- c. Rotate the gnd detection control knob (while holding the test pushbutton in), and observe the meter for the extent of ground current present in each bus.

CAUTION

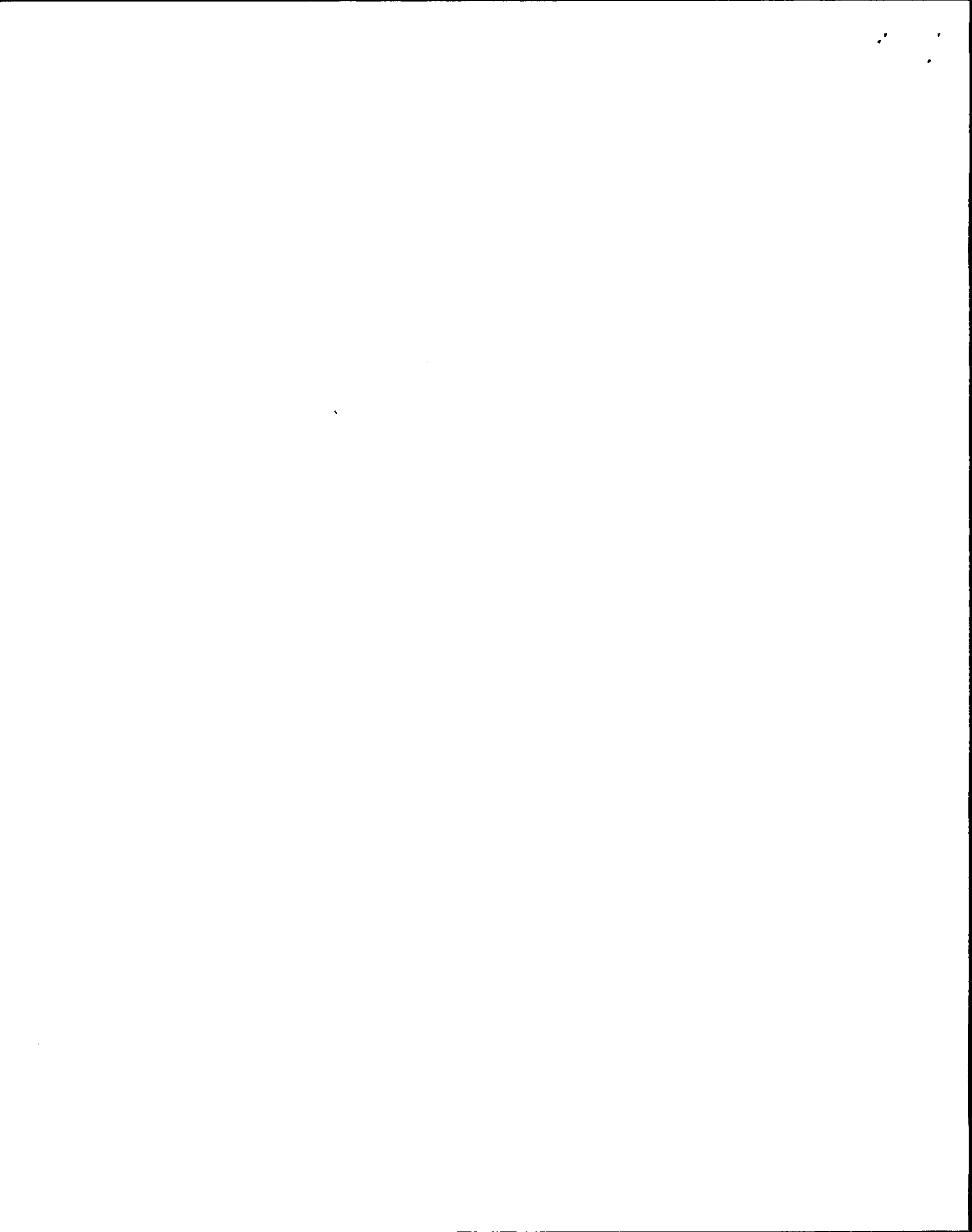
Prior to opening battery breaker, verify loads within capability of charger.

- NOTES:
- 1. The following steps may involve de-energizing safety related equipment, refer to Technical Specifications for applicable L.C.O.
 - 2. Do not open the battery breaker unless the charger is energized and connected to the switchgear bus.
- d. At the battery switchgear SWG002A, verify that breakers 1B and 2B are closed, and momentarily open breaker 1B to see if the ground condition clears. This will indicate a ground on the battery, or on the bus.
 - e. If the ground signal clears, the battery is in ground fault. Notify elect. maint. of the battery condition.
 - f. If the ground alarm does not clear, the bus is in ground fault. Selectively momentarily isolate loads listed in Attachment 3 until the faulted branch is found. Notify elect. maint. of the fault source.

Possible Causes

References

N2-OP-74A, EMER DC DIST SYS



I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (Cont)

Refresh: YES

852208

·DIV II EMER BUS BYS002B 125VDC SYSTEM TROUBLE	208
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<u>Computer Point</u>	<u>Printout</u>	<u>Source</u>	<u>Setpoint</u>
BYCBC02	2BYS*BAT 2B BKR OVCRT	EMER DC SYS DIV II INOP	
BYCBC05	2BYS*CHGR 2B1, 2B2 OVCRT	EMER DC SYS DIV II INOP	
BYSEC13	D2 BUS 2BYS*SWG002B VOLT	27A-2BYSB11 Under- voltage Relay in SWGR Cub. 1A	Trips at 125 VDC *
BYSEC14	D2 BUS 2BYS*SWG002B VOLT	27B-2BYSB11 Under- voltage Relay in SWGR Cub. 1A	Trips at 110 VDC *
BYSEC18	2BYS*CHGR 2B1/2B2 HI V TRIP	K1-1 Overvoltage Relay In Charger	Trips at 142 VDC
BYSIC06	DIV II DC BUS 2B GRND	64-2BYSB05 Ground Detection Circuit In Pnl 852	Trips at ± 75V

Automatic Response

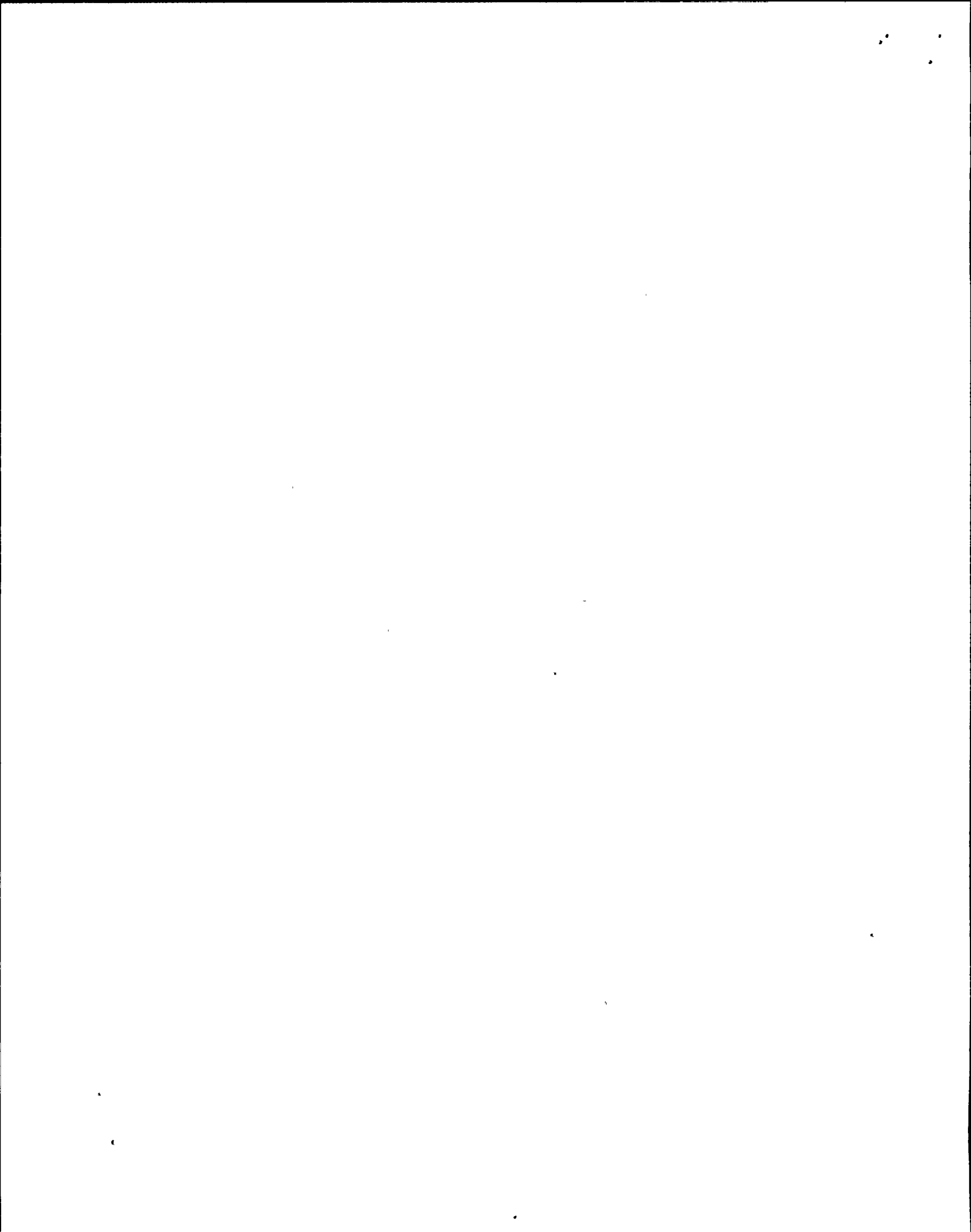
BYSEC18 Only:

Trip AC input breaker in charger.

Low voltage alarm.

Operator Actions

Refer to applicable computer point Operator Actions attached.



Operator Actions

852208 (Cont)

BYSBC02: 2BYS*BAT 2B BKR OVCRNT

- a. Refer to following INOP window for response:

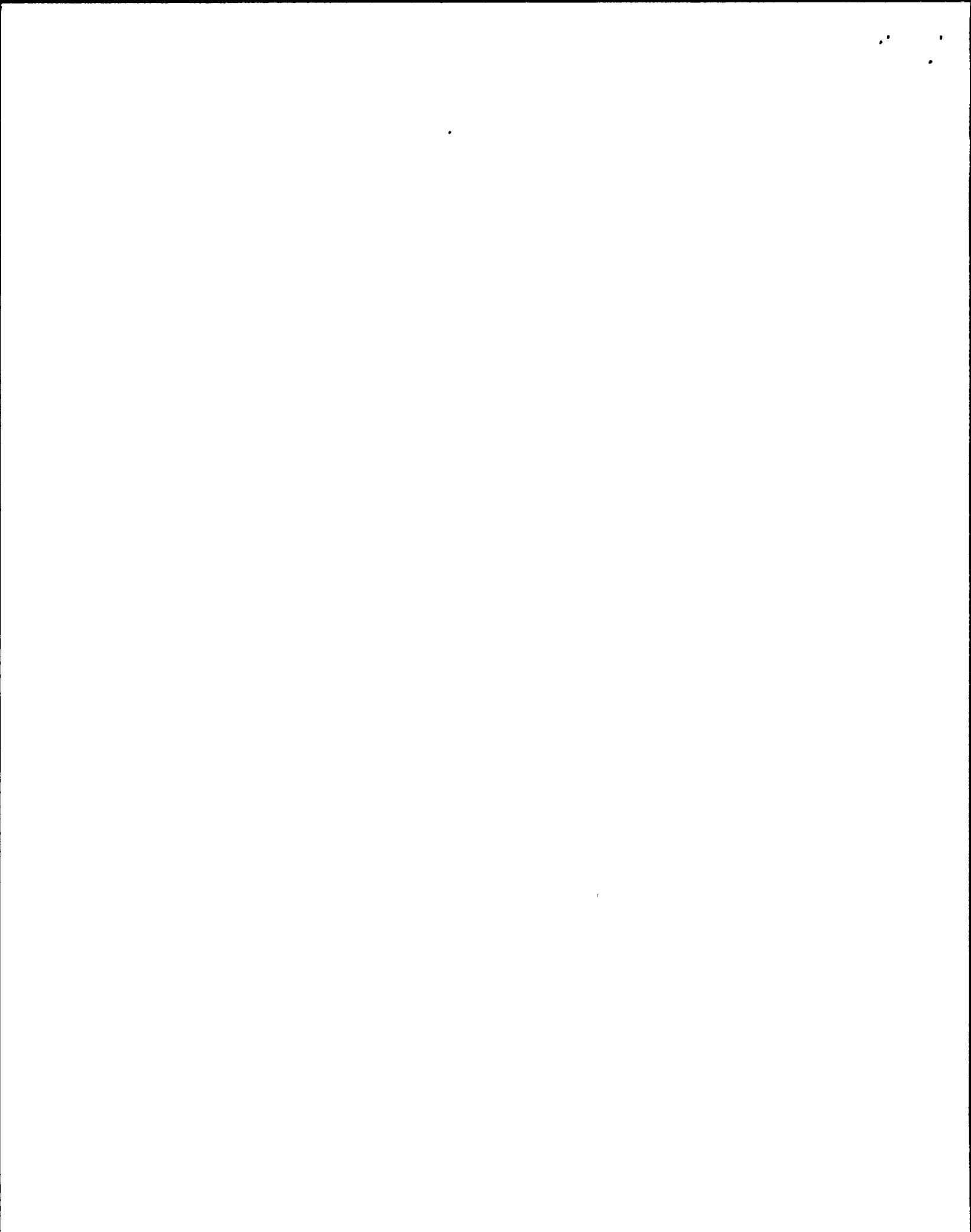
<u>Window</u>	<u>Source</u>	<u>Automatic Response</u>
EMER DC SYS DIV II INOP	720C-2BYSB09 Switchgear	SWG002B Breaker 1B Trips at 1200A Long Time, 4000A Short Time

NOTE: With the DIV II battery breaker open, refer to Technical Specifications for D.C. power sources and inop diesel generator.

- b. Check the DIV II/BAT 2B meters on the rear of control room panel PNL852.
- c. Meter labeled BATTERY 2B D.C.A. should show 0 amps.
- d. A bus fault is indicated by high amps (375 amps) indicated on BATTERY CHARGER METER 2B1-2B2 D.C.A. and low voltage indicated on BATTERY BUS BYS002B D.C. VOLTS meter.
- e. Check the ground detection circuit, per Ann. 852208, BYSIC06.
- f. Notify elect. maint. of all meter readings to expedite returning the battery to service.
- g. If the charger ammeter shows less than 300A, and the bus voltage is stable at 133V, and neither bus is grounded, reset the overcurrent device, and reclose the battery breaker, and notify elect. maint. of the spurious trip.
- h. If the meters show a bus fault condition, momentarily isolate selected loads using Attachment 3 until the fault is located, and notify elect. maint. of the fault, and meter readings.
- i. After the faulted load is isolated, return the battery to service in accordance with N2-OP-74A.
- j. If the fault cannot be isolated from the DC switchgear bus, open the AC supply breaker to the in-service charger (See Table II). Notify elect. maint. of the faulted bus.

NOTE: The 4160 ENS switchgear will not auto trip, nor will it remote trip without DC power. It must be tripped locally at the supply breaker.

- k. If DC control power is not available, de-energize 2ENS-SWG-103. Refer to Tech. Specs. for Inop battery ECCS systems.



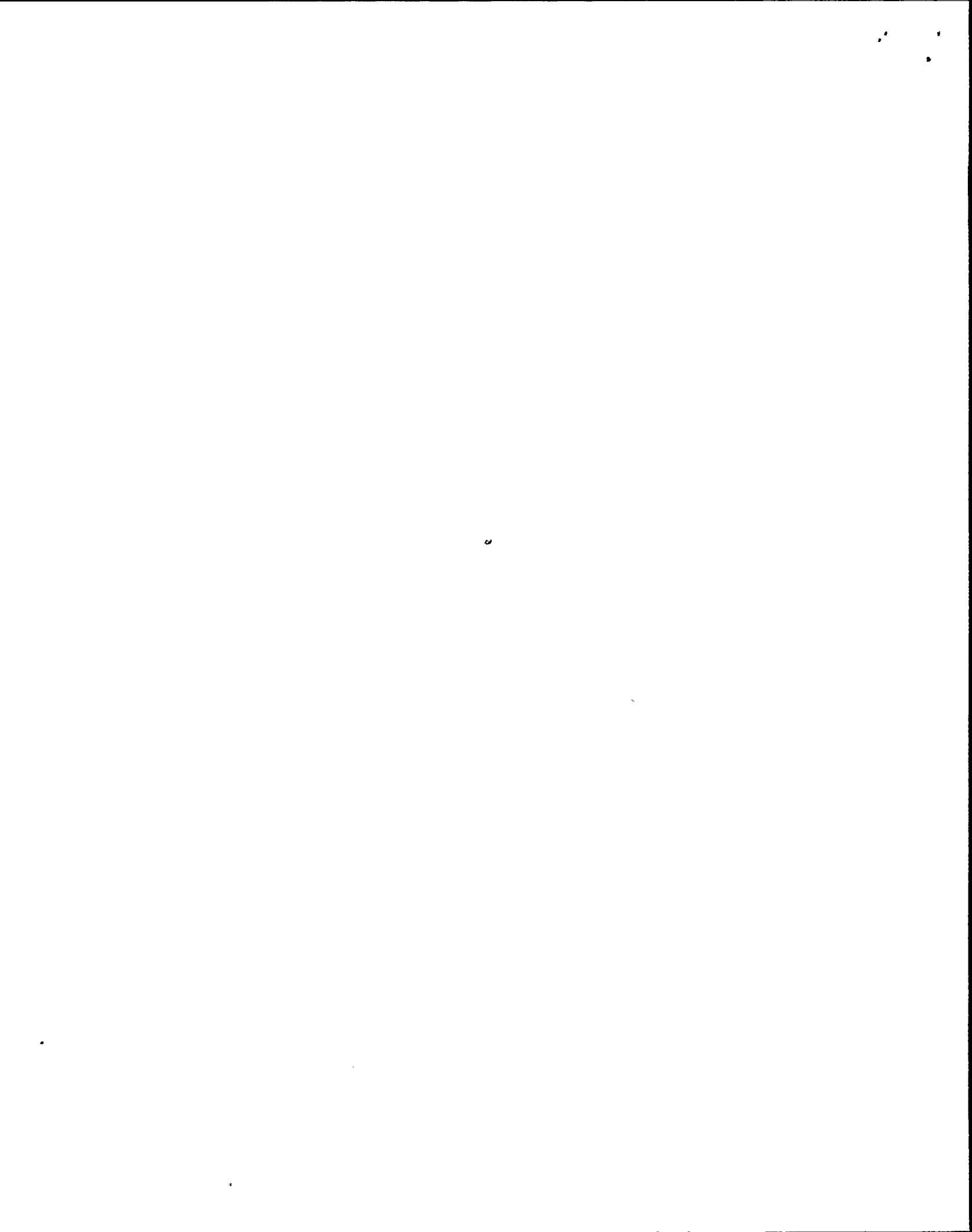
BYSBC05: 2BYS*CHGR 2B1, 2B2 OVCRNT

- a. Refer to Tech Specs for Inop Battery ECCS systems.
- b. Refer to Tech Specs for Limiting Conditions of Operation.
- c. Refer to the following INOP window

Window	Source	Automatic Response
EMER DC SYS DIV II INOP	720C-2BYSB10 Switchgear	SWG002B Breaker 2B trips at 500A Long Time, or 2000A Inst.

- d. Check Bus current on meter BATTERY 2B D.C.A. at the rear of panel P852.
- e. IF the current is less than 375A and voltage is 0 THEN perform the following:
 1. Open the charger AC input breaker
 2. Open the charger DC output breaker
 3. Close Switchgear Breaker in Cubicle 2B of switchgear SWG002B
- f. If the breaker in cubicle 2B remains closed, notify Electrical Maintenance to trouble shoot and repair the charger.
- g. Place the Stand by Charger in service in accordance with N2-OP-74A, Emerg DC Dist.

NOTE: If 2VBA*UPS-2B is on D.C. backup supply, Tech Specs require both chargers be in service.
- h. IF the current is greater than 375A, THEN perform the following:
 1. Momentarily isolate selected loads on the switchgear using Attachment 3 as plant conditions permit until overload determined.
 2. Notify Electrical Maintenance to trouble shoot and repair the defective equipment.
- i. If DIV II D.C. BUS drops to less than 125 VDC, refer to the actions of Ann. 852108, BYSEC11.
- j. When the problem has been corrected place a charger in service in accordance with N2-OP-74A, Emer. DC Dist.
- k. Request Electrical Maintenance determine need for equalizing charge.



BYSEC13: D2 BUS 2BYS*SWG002B VOLT

|*

NOTE: Refer to Technical Specifications for applicable L.C.O.

- a. Observe computer printout to determine if high voltage caused 2B1(2B2) Charger trip resulting in a low voltage alarm condition.
- b. Check the voltage on the meter labeled BATTERY BUS BYS002B D.C. VOLTS, on the rear of control room panel PNL852.
- c. Check the meter labeled BATTERY 2B D.C.A. for discharge (-) current, and the meter labeled BATTERY CHARGER 2B1-2B2 D.C.A. for 0 current. This indicates that the charger has tripped.
- d. If the charger has tripped and battery 2B D.C. ammeter indicated normal current <375 amps, notify Electricians to check the affected charger. Place the unaffected charger in service per N2-OP-74A.

NOTE: If 2VBA*UPS2B is on its back-up supply (d.c.) then both chargers are required to be operating by Tech. Spec., refer to Tech. Spec. for L.C.O.

- e. If the charger has tripped and the battery ammeter shows an abnormally high current >375 amps then selectively isolate loads until the overload is located. Notify Electrical Maintenance and restore the operating charger per N2-OP-74A.
- f. If neither charger can be restored or the condition is caused by an A.C. outage, monitor bus voltage and restore at least one charger to operation as soon as a charger or A.C. power is available. See Tech. Specs. for determining a need for an equalize charge.
- g. If the voltage on the bus drops to ≤ 110 VDC, refer to Ann. 852108, BYSEC12.



BYSEC14: D2 BUS 2BYS*SWG002B VOLT

NOTE: Refer to Technical Specifications for applicable L.C.O.

- a. Check the voltage on the meter labeled BATTERY BUS BYS002B D.C. VOLTS, on the rear of control room panel PNL852.
- b. If power is available to either charger, request Electrical Maintenance initiate equalizing charge.
- c. If AC power is not available to the chargers, reduce the load on the DC switchgear bus.

NOTE: 4160V ENS switchgear will not auto trip, nor will it remote trip without D.C. power.

- d. Monitor the Div. II DC bus closely. If a rapid drop of 3-5 volts is seen (indicating cell reversal) immediately de-energize 2ENS-SWG-103, trip the Div. II battery breaker and consult Tech. Specs. for Inop battery and loss of Div. II ECCS.
- e. If battery voltage gets to 107VDC, notify electricians to perform N2-ESP-BYS-Q676 to comply with Tech. Spec. 4.8.2.1.b.

When AC power becomes available to either charger, start up the D.C. system, per N2-OP-74A Section E, and notify Electrical Maintenance initiate equalizing charge.



BYSEC18: 2BYS*CHGR 2B1/2B2 HI V TRIP

NOTE: Refer to Technical Specification for applicable L.C.O.

Corrective Action

- a. Check voltage on the meter labeled BATTERY BUS BYS002B D.C. VOLTS on the rear of control room panel PNL852. The meter should show 125VDC. If voltage is ≥ 142 VDC, immediately trip the A.C. breaker on the in-service charger.
- b. If battery voltage was ≥ 142 VDC, notify electricians to perform N2-ESP-8YS-Q676 to comply with Tech Spec 4.8.2.1.b.

NOTE: If 2VBA*UPS2B is on its back-up supply (d.c.) then both chargers are required to be operating by Tech. Specs, refer to Tech Specs for L.C.O.

- c. Place the alternate charger in service in accordance with N2-OP-74A.
- d. Notify the Electricians to check the affected charger.

BYSIC06: DIV II DC BUS 2B GRND

- a. Check the ground voltage on the meter labeled BATTERY 2B GND DETECTION, on the rear of control room panel PNL 852.
- b. Press and hold the gnd detection test pushbutton, and the meter will indicate the grounded bus.
- c. Rotate the gnd detection control knob (while holding the test pushbutton in), and observe the meter for the extent of ground current present in each bus.

CAUTION

Prior to opening battery breaker, verify loads within capability of charger.

NOTES:

- 1. The following steps may involve de-energizing safety-related equipment, refer to Technical Specifications for applicable L.C.O.
- 2. Do not open the battery breaker unless the charger is energized, and connected to the switchgear bus.

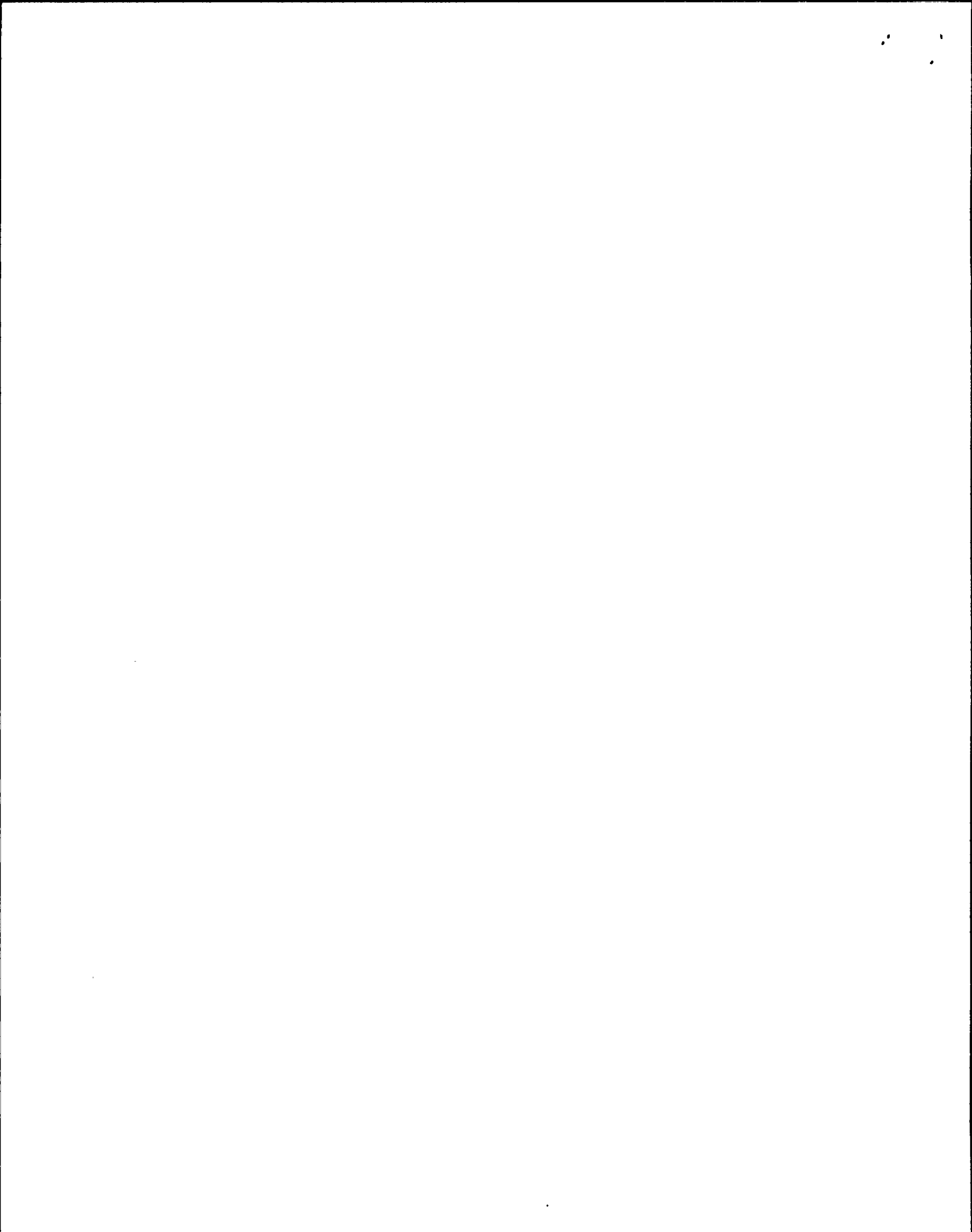
- d. At the battery switchgear SWG002B, verify that breakers 1B and 2B are closed, and momentarily open breaker 1B to see if the ground condition clears. This will indicate a ground on the battery, or on the bus.
- e. If the ground signal clears, the battery is in ground fault. Notify elect. maint. of the battery condition..

If the ground alarm does not clear, the bus is in ground fault. Selectively momentarily isolate loads listed in Attachment 3 until the faulted branch is found. Notify elect. maint. of the fault source.

Possible Causes

References

N2-OP-74A, EMER DC DIST SYS



I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (Cont)

TCN-11

Refresh: YES

852345

<p>·DIV I/II/III 125 VDC BATTERY BREAKER OPEN</p>	<p>345</p>
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<u>Computer Point</u>	<u>Printout</u>	<u>Source</u>	<u>Setpoint</u>
BYSBC06	2BYS*BAT2A BKR POSN OPEN	2BYS*SWG002A BKR 1B OPEN	
BYSBC07	2BYS*BAT2B BKR POSN OPEN	2BYS*SWG002B BKR 1B OPEN	
BYSBC08	2BYS*BAT2C BKR POSN OPEN	2CES*IPNL414 CB-6 OPEN	

Automatic Response

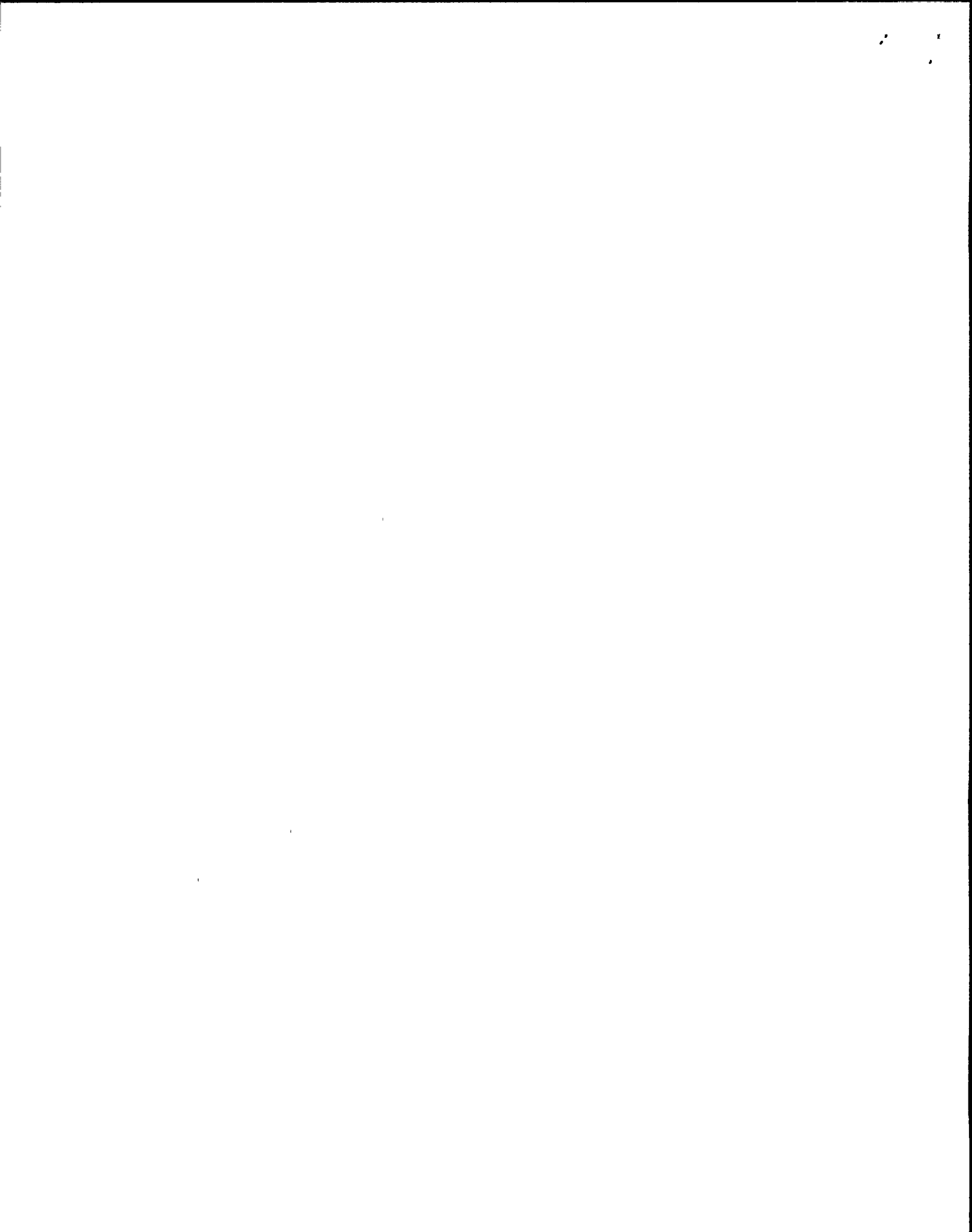
None

Operator Actions

Refer to following INOP windows for response:

<u>Window</u>	<u>Source</u>
EMER DC SYS DIV I INOP	72B-2BYSA09 DC Switchgear 2A BKR1B Open
EMER DC SYS DIV II INOP	72B-2BYSB09 DC Switchgear 2B BKR1B Open

NOTE: Battery 2C does not have an INOP window, annunciator 852308 will alarm if CB-6 is open. Refer to Section I of N2-OP-74B for DIV III response.



BYSBC06: 2BYS*BAT2A BKR POSN OPEN.

Refer to Technical Specifications for applicable L.C.O.

- a. Verify the operating battery charger is maintaining voltage on the bus.
- b. If annunciator 852108 and computer point BYSB01 are in alarm then refer to Ann. 852108 for corrective action.
- c. If annunciator 852108 and computer point BYSB01 are not in alarm, attempt to reclose battery 2A circuit breaker.
- d. If the breaker remains closed, verify battery voltage and current is normal.
- e. If the battery breaker does not close or trips, notify Electrical Maintenance to replace or repair the defective breaker.

BYSBC07: 2BYS*BAT2B BKR POSN OPEN

NOTE: Refer to Technical Specifications for applicable L.C.O.

- a. Verify the operating battery charger is maintaining voltage on the bus.
- b. If annunciator 852208 and computer point BYSB02 are in alarm refer to Ann. 852208 for corrective action.
- c. If annunciator 852208 and computer point BYSB02 are not in alarm, attempt to reclose battery breaker 2B.
- d. If the breaker remains closed, verify battery voltage and current is normal.
- e. If the battery breaker does not close or trips, notify Electrical Maintenance to replace or repair the defective breaker.

BYSBC08: 2BYS*BAT2C BKR POSN OPEN

NOTES: 1. Refer to technical Specification for possible L.C.O.

2. Refer to N2-OP-74B for DIV III response.

- a. If Charger is still supplying the bus, i.e. has not tripped, then attempt to reclose the breaker.
- b. If breaker will not close, notify elect. maint. to troubleshoot the breaker.

c. If the charger has also tripped, notify the electricians to check for a shorted bus and follow the steps below:

1. Bus Shorted -
2. Open Charger AC Input Breaker CB-1 on affected charger(s).
3. Verify 2BYS*CHGR 2C1/2C2 DC Isolation Breaker CB-9/CB-10 2CES*IPNL414 opened. (852308 in alarm)
4. At DC Metering Panel, rear of P852, or locally, verify DC volts-zero, chgr amps-zero and battery amps-zero.
5. Markup the bus and charger(s) as required.
6. After either the bus fault or battery breaker is repaired as applicable, clear the markup and place DIV III switchgear back in service per N2-OP-74B.
7. If the battery has been significantly discharged, request Electrical Maintenance initiate equalizing charge.

NOTE: If battery voltage dropped to \leq 107 volts, notify the Electrical Department to perform N2-ESP-BYS-Q676.

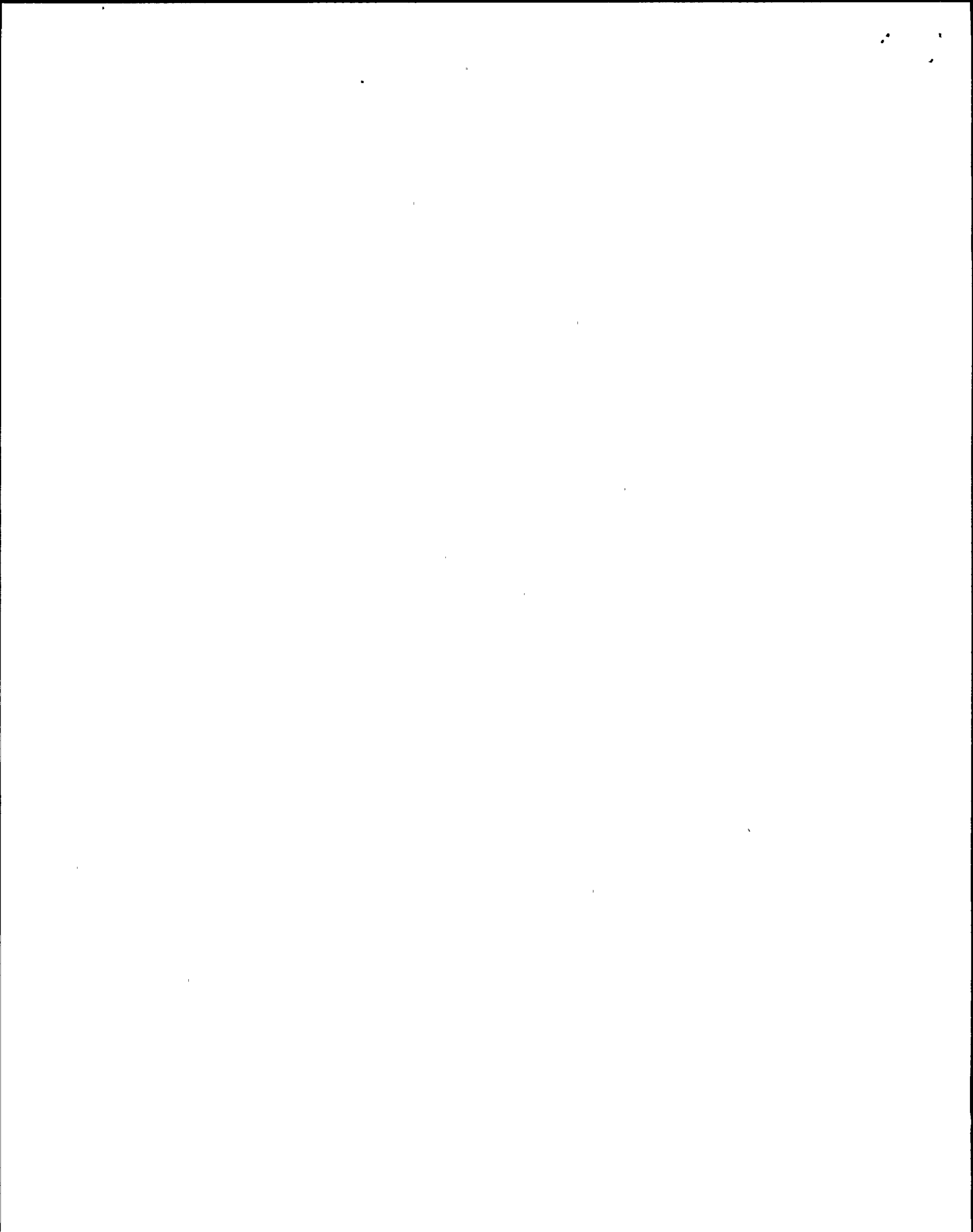
8. Submit a WR to have the Electricians check the affected charger for damage.

Possible Causes

References

N2-OP-74A, EMER DC DIST SYS

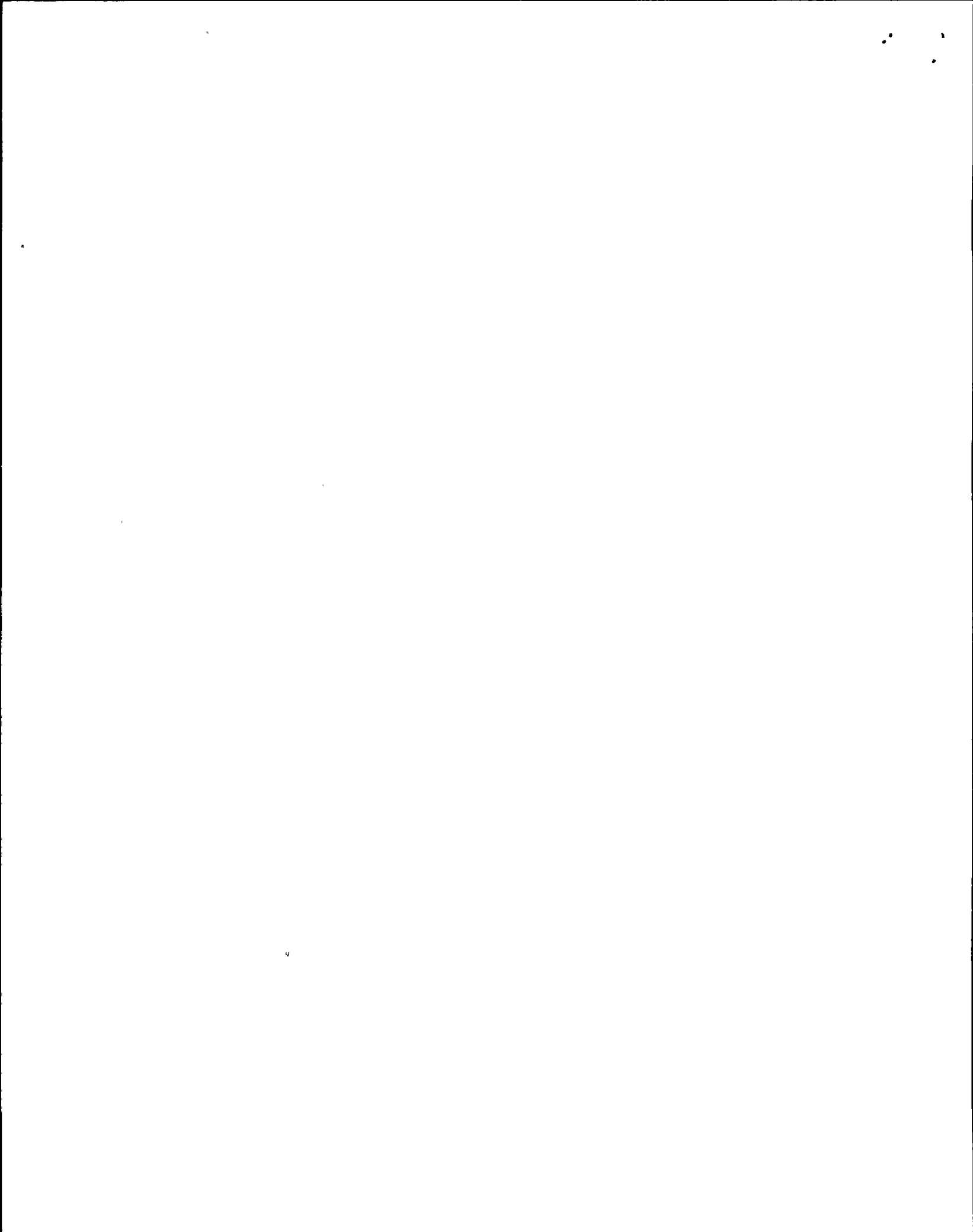
NOTE: Battery 2C does not have an INOP window, however, annunciator 852308 will alarm if CB-6 is open. Refer to Section I.2.0 of N2-OP-74B.



ATTACHMENT 1

N/A

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ATTACHMENT 2
ELECTRICAL LINEUP

NOTE: Independent verification is required for Safety-Related components designated by a * in the Component Number

COMPONENT NUMBERS	COMPONENT DESCRIPTION	POWER SUPPLY BUS NUMBER	CUBICLE/BREAKER	REQUIRED POSITION	INITIALS & DATE	Indep. Verif. Initial & Date	REMARKS
2BYS*BAT-2A	Division I Battery	2BYS*SWG002A	1B	Closed			
2BYS*CHGR-2A1/2A2	Division I, Battery Chargers	2BYS*SWG002A	2B	Closed			
2BYS*PNL-201A	125V DC Distribution Panel	2BYS*SWG002A	3A	Closed			
2VBA*UPS-2A	Div. 1A Control UPS (Backup Supply)	2BYS*SWG002A	3C	Closed			
2DMS*MCCA1	125V DC MCC	2BYS*SWG002A	3D	Closed			
2BYS-A11	Div I DC Metering & Relays	2BYS*SWG002A	1A	Fuses Installed			
2BYS-A05	Div I Batt Ground Detection Circuit	2BYS*SWG002A	1A	Fuses Installed			
2ENS*SWG101	DC Control Power	2BYS*SWG002A	2D	Closed			
2EJS*US1	DC Control Power	2BYS*SWG002A	4C	Closed			
2BYS*PNL-202A	125VDC Distribution Panel	2BYS*SWG002A	4D	Closed			
	Test Load	2BYS*SWG002A	1C	Open			Store Test Breaker Here
2BYS*PNL 204A	125 VDC Distribution Panel	2BYS*SWG002A	3B	Closed			
CB2	Charger Output Breaker	2BYS*CHGR2A2	CB2	Off			NOTE 1
CB1	Charger Input Breaker	2BYS*CHGR2A2	CB1	Off			NOTE 1
2BYS*CHGR 2A1	DIV I Battery Charger AC Supply	2LAC*PNL100A	45	On			

NOTE 1: May be "ON" if 2BYS*CHGR2A2 is in service.

ATTACHMENT 2 (Cont)

COMPONENT NUMBERS	COMPONENT DESCRIPTION	POWER SUPPLY BUS NUMBER	CUBICLE/BREAKER	REQUIRED POSITION	INITIALS & DATE	Indep. Verif. Initial & Date	REMARKS
2BYS*CHGR 2A2	DIV I Battery Charger AC Supply	2EJS*PNL100A	1	On			
2BYS*BAT2B	Division II Battery Breaker	2BYS*SWG002B	1B	Closed			
2BYS*CHGR 2B1/2B2	Division II Battery Charger Breaker	2BYS*SWG002B	2B	Closed			
2VBA*UPS-2B	Division II A Control UPS (Backup Supply)	2BYS*SWG002B	3C	Closed			
2BYS*PNL201B	125VDC Distribution Panel	2BYS*SWG002B	3A	Closed			
2BYS-B11	Division II DC Metering & Relays	2BYS*SWG002B	1A	Fuses Installed			
2BYS-B05	Division II Battery Ground Detection Ckt.	2BYS*SWG002B	1A	Fuses Installed			
2EJS*US3	DC Control Power	2BYS*SWG002B	4C	Closed			
2ENS*SWG103	DC Control Power	2BYS*SWG002B	2D	Closed			
2BYS*PNL202B	125VDC Distribution Panel	2BYS*SWG002B	4D	Closed			
	Test Load	2BYS*SWG002B	1C	Cubicle Empty			Test Breaker Stored in 2BYS*SWG002A
2BYS*PNL 204B	125 VDC Distribution Panel	2BYS*SWG002B	3B	Closed			
CB2	Charger Output Breaker	2BYS*CHGR2B2	CB2	Off			NOTE 1
CB1	Charger Input Breaker	2BYS*CHGR2B2	CB1	Off			NOTE 1
2BYS*CHGR2B1	DIV II Battery Charger AC Supply	2LAC*PNL-300B	45	On			
2BYS*CHGR2B2	DIV II Battery Charger AC Supply	2EJS*PNL-300B	1	On			
2DMS*MCCB1	125 VDC MCC	2BYS*SWG002B	3D	Closed			

NOTE 1: May be "ON" if 2BYS*CHGR2B2 is in service.

TCN-14

1

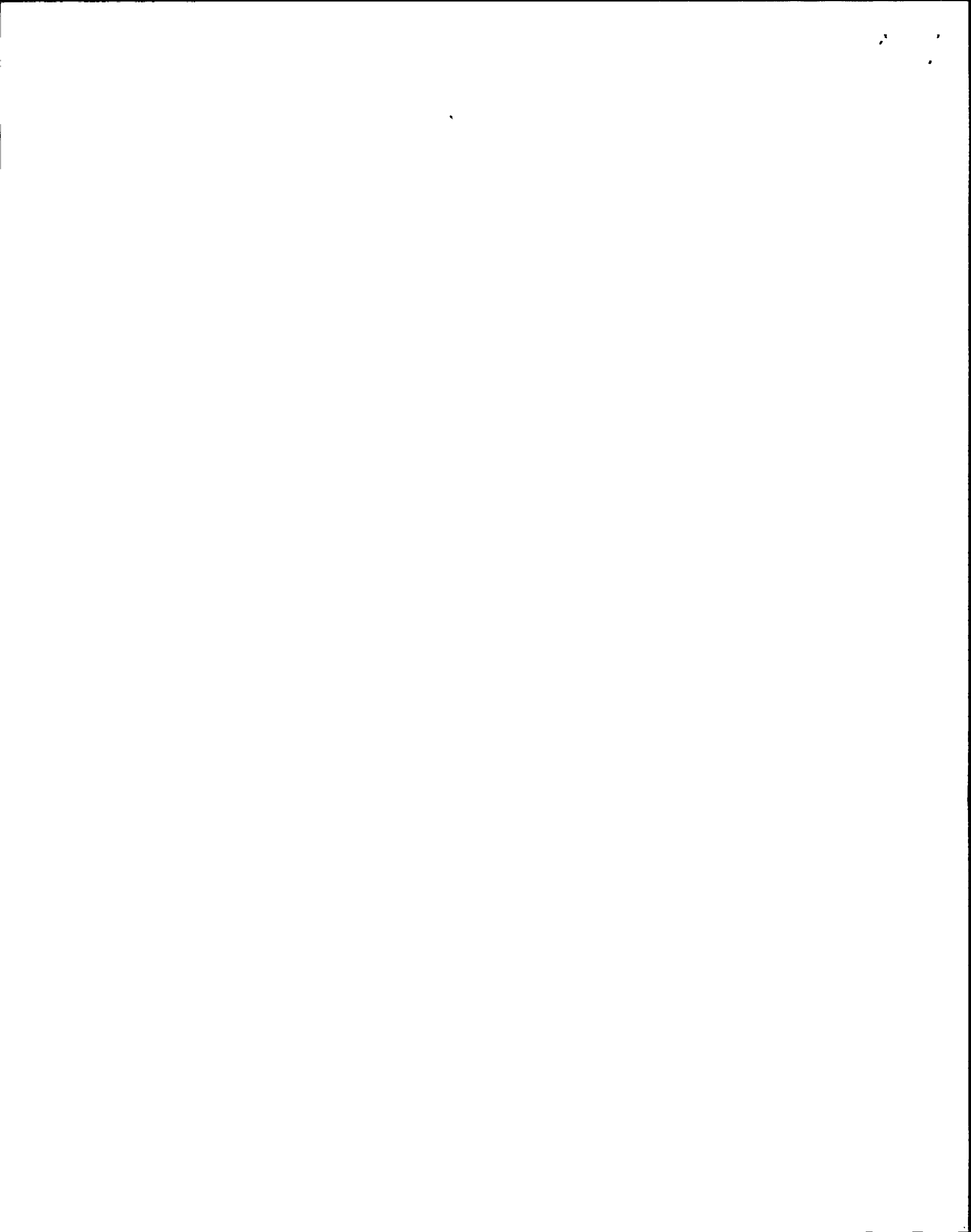
ATTACHMENT-2 (Cont)

COMPONENT NUMBERS	COMPONENT DESCRIPTION	POWER SUPPLY BUS NUMBER	CUBICLE/BREAKER	REQUIRED POSITION	INITIALS & DATE	Indep. Verif. Initial & Date	REMARKS
CB2	Charger Output Breaker	2BYS*CHGR2A1	CB2	ON			NOTE 1
CB1	Charger Input Breaker	2BYS*CHGR2A1	CB1	ON			NOTE 1
CB2	Charger Output Breaker	2BYS*CHGR2B1	CB2	ON			NOTE 2
CB1	Charger Input Breaker	2BYS*CHGR2B1	CB1	ON			NOTE 2

NOTE 1: May be "OFF" if 2BYS*CHGR2A2 is in service.

NOTE 2: May be "OFF" if 2BYS*CHGR2B2 is in service.

TCN-14



ATTACHMENT 3
LOADS AFFECTED BY LOSS OF 125 VDC
2BYS*SWG002A

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
1A	Metering Cubicle	2BYS A11	8BYS12	Alarms 3876, 3877, Window 852108 "Div I Emer. Bus BYS 002A 125 VDC Trouble ON".
1B	Battery Breaker	2BYS A09	8BYS12	No effect provided battery charger is supplying the bus and loads are within capacity of charger.
1C	Battery Test Breaker	N/A	8BYS12	NONE
2B	Battery Charger (2A1-2A2) Output Breaker	2BYS A10	8BYS12	Provided battery breaker is closed, no immediate effect. However, if opened for an extended period of time battery voltage will drop and low voltage alarm will come in.
2D	ENS*SWG101 Control Power	N/A	EE-1CM	Loss control power to Div I Bus Brkrs, Div I Inop.
3A	BYS*PNL201A	N/A	EE-1CM	See page for BYS*PNL201A Loads.
3B	BYS*PNL204A	N/A	EE-1CM	See page for BYS*PNL204A Loads.
3C	VBA*UPS2A	N/A	EE-1CA	Loss of Backup Power Annunciator "852116" Div I UPS2A System Trouble ON.
3D	DMS*MCCA1	N/A	EE-1CP	Loss of GTS "A" Train, RCIC Inop Recirc. pumps trip if in high speed.

ATTACHMENT 3 (Cont)
2BYS*SWG002A

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
4C	EJS*US1	N/A	EE-ICM	See action EJS*US1 control bus.
4D	2BYS*PNL202A	N/A	EE-ICM	See action for 2BYS*PNL202A (RRCS Div I Lost, Loss GTS OBD Isolation.)

ATTACHMENT 3 (Cont)
ENS*SWG101 CONTROL BUS

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F Cu 1	EDG1 Brkr	EGPX01	5EGP01	Loss of EDG1 Control Breaker Interlocks Break Protection, Loss of Load Shedding ANN 852103 "EDG1 System Inoperable." ON ANN 852112 "Bkr 101-1 Auto Trip/Fail to close" defeated.
F Cu 1	EG1 Generator Protection	EGPX02	8EGP06	Loss of generator protection ANN 852119 "EDG 1 DC CONT POWER FAILURE" ON.
F Cu N1	EG1 Ground Breaker	EGPX06	5EGP05	Loss of Control Indicating Lights and Protection ANN 852103 "EDG1 System Inop" ON.
F Cu 2	XFMR EJS**1B Feedwater Breaker ACB 101-2	EJSX04	5EJS02	Loss of Control, Indicating Lights, Interlock and Protection.
F Cu 2	EGS EG1 Differential current protection	EGPX01	8EGP05	Protection defected ANN 852119 "EDG1 DC Control Power Failure" ON.
F Cu 3	RHS*P1A	RHSA01	5RHS01	Loss of Pump Brkr Control Interlock and Protection. ANN 601431 "RHRA System Inop. If running ANN 601443" RHR Pump 1A Auto Trip defeated.

ATTACHMENT 3 (Cont)
ENS*SWG101 CONTROL BUS

CUB/ FUUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F Cu 4	SWP*P1A	SWPA01	5SWP01	Loss of Control, Interlock, Indicating Lights and Protection "SWP PMP Inoperable" Light ON.
F Cu 5	SFC*P1A	SFCA01	5SFC01	Loss of Control, Indicating Lights, and Protection. ANN 873306 "Div I fuel cooling system inoperable " ON. Inop. Light "SFG pump P1A Inop." ON.
F Cu 6	SWP*PIC	SWPC01	5SWP03	Loss of Control, Interlock, Indicating Lights and Protection. Inop. Light "SWP Pump PIC Inoperable" ON.
F Cu 7	CSL*P1	CSLN01	5CSL01	Loss of Control, Indicating Lights, Interlock, and Protection 601401 Div I LPGS System
F Cu 8	SWP*PIE	SWPE01	5SWP05	Loss of Control, Indicating Lights, Interlock and Protection. Inop. Light "SWP Pump PIE Inop." ON.

ATTACHMENT 3 (Cont)
ENS*SWG101 CONTROL BUS

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F Cu 10	NNS-SWG-018 ACB 101-10	ENSX11	5ENS05	Loss of Control, Interlock, and Protection Inop. Light "SWP Pump PIE Inoperable" ON.
F Cu 10	ENS*SWG101	2ENSX02	5ENS12	Loss of Protection. ANN 851123 "4KV. BUS 101 DC Control Power Failure" ON.
F Cu 11	NNS-SWG014 For Breaker ACB 101-11	2ENSX12	5ENS02	Loss of Control, Interlock, Protection, and Indicating Lights. "Loss of ACB 101-11 Cont Volt Det Inop." ON.
F Cu 11	ENS-SWG101	2ENSX03	5ENS13	Loss of Protection. ANN 852123 "4KV Bus 101 DC Cont. Power Failure" ON.
F Cu 12	ENS*SWG101	2ENSX05	5ENS14	Loss of Load Sequence Capability on "Loss of Voltage ANN 852103" EDG1 System Inop. ON. Inop. Lights "ENS, Div I Loss of Bus Voltage Detection Inop. ON.
F Cu 12	ENS*SWG101	2ENSX06	5ENS14	Loss of Load Sequencing on Degraded Voltage. ANN 852103 "EDG1 System Inop." Inop. Light "ENS Div I Loss of Bus Voltage Detection". ON.
F Cu 12	ENS*SWG101	2ENSX13	5ENS19	Loss of underfrequency protection.

ATTACHMENT 3 (Cont)
ENS*SWG101 CONTROL BUS

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F C 12	ENS*SWG101	2ENSX04	5ENS21	Loss of Load Shed and Load Sequencing for Div I.
F Cu 13	ENS*SWG101	2ENSX01	5ENS11	Loss of Bus Protection. ANN 852123 "4KV Bus 101 DC Control Power Failure" ON.
F Cu 13	NNS-SWG016 for Brkr ACB 101-13	2ENSX10	5ENS08	Loss of Control, Interlock, Protection, and Indicating Lights. "Loss of ACB 101-13 Cont Volt Det Inop." ON.
F Cu 14	EJSX*1A for Brkr ACB 101-44	2EJSX03	5EJS01	Loss of Control, Interlock, Protection, and Indicating Lights. Inop. Light "Loss of ACB 101-11 Cont Volt Detection Inop." ON.

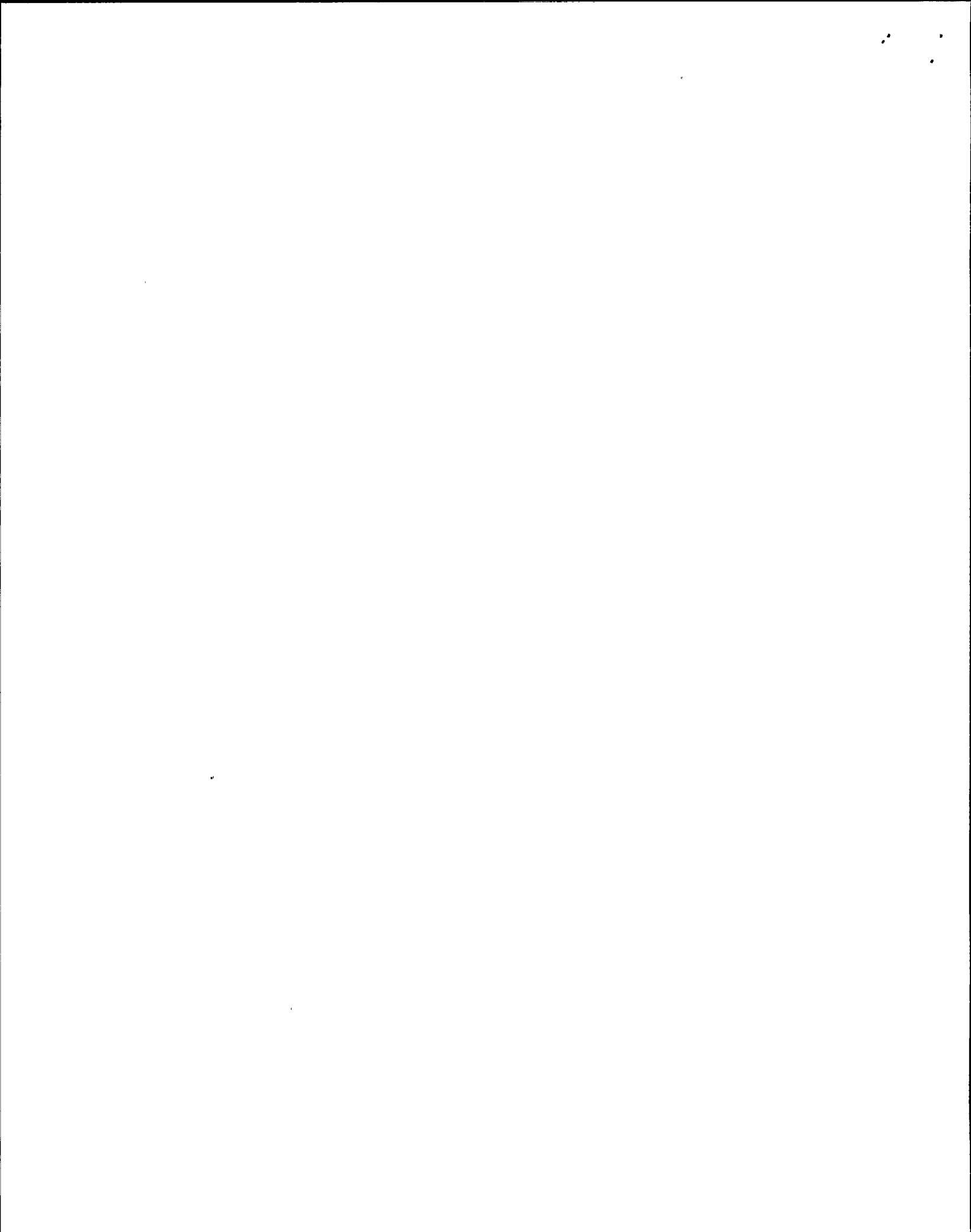
ATTACHMENT 3 (Cont)
BYS*PNL201A

CUB/ FUZE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F1	Div I Annunciators	IHAA01	10IHA10	Loss of Div I Annunciators
F2	LPCS System	2CSLN07	807171TY SH2	LPCS System Man/Auto Initiations Defected ANN. 601401 "Div I LPCS System Inop.
F3	SWP*MOV95A Supply to EDG2	2SWPA43	7SWP15	Loss of Auto Closure on Low Pressure
F4	Service Water System	SHPA44	7SWP17	Loss of SWP Pump Trip, Non-Essential Load Isolation and Divisional Separation (SWPMOV50B) on LOP ANN. 601124 "Service Water System Trouble" ON.
F5	RCIC System RCIC Steam Line Drain RCIC Turbine Exhaust Line Drain (Outboard) Supervisory Lights for RCIC Governor & Trip & Throttle Valve	ICSN17	807E173TY SH9	Loss of Supervisor Lights for Turbine Governor and Trip/Throttle. Loss of Control and Indication for Steam Line Drain Isolation ICS*SOV130 and Turbine Exh. Drain Isol. ICS*SOV110. Valves close if operable.
F6	RCIC System	ICSN16	807E173TY SH3	Loss of Auto/Manual Initiation/Isolation ANN. 601305 "RCIC System Inop." ON.



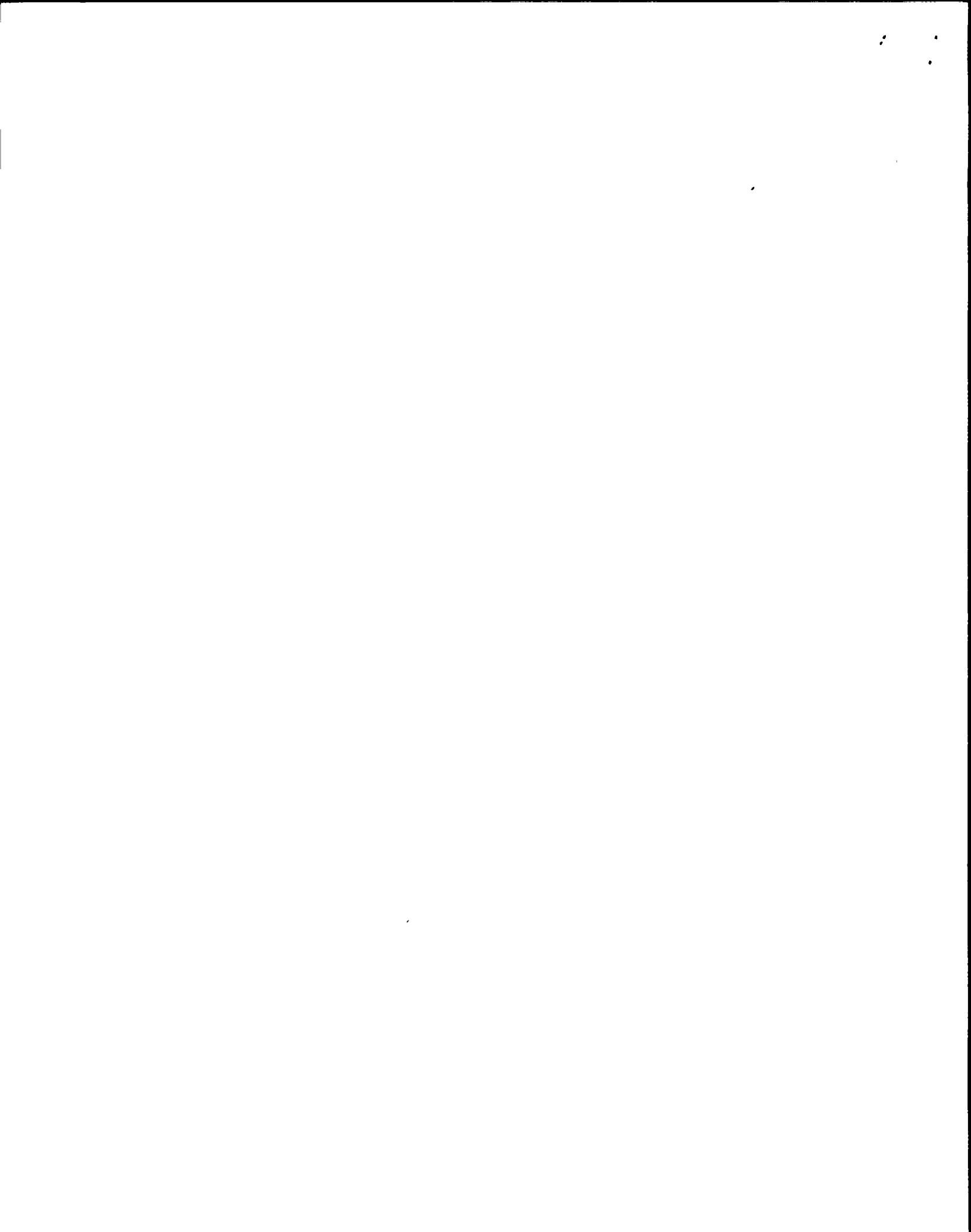
ATTACHMENT 3 (Cont)
BYS*PNL201A

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F7	NSSSS	ISCA02	11ISC01	Group 8 and 9 Outboard Containment Isolation.
F8	RCIC System (Rmt s/d)	RSSN07	11RSS07	Loss of RCIC Control at Remote Shutdown Panel.
F10	RHR System	RHSA32	807E170TY SH6	Loss of Div I Auto/Manual Initiation ANN. 6014
F11	HVR chiller compressor and pump	HUKA08	7HVK03	Prevents Control Bldg Chiller Compressor and Chill Water Auto Start on Computer Room ACO Start.
F9	WCS Pumps	HCSA05		Trips clean up pumps.
F12	EGA-C1A, C2A	EGAA04	11EGA01	Auto Start of Compressors Defeated ANN. 852103 "EGS 1 System Inop. "ON ANN 852101 "EGS 1 Start Sys Inop." ON.
F13	RHR 'A' Hx vents pos ind	RHSA33	807E170TY SH6	Loss of position indication.
F14	ADS 'A'	ADSA01	807E155TY SH3	Loss of Auto/Manual Initiation loss of relief mode of all PSV's ('C' solenoids) ANN. 601503" Div I ADS.



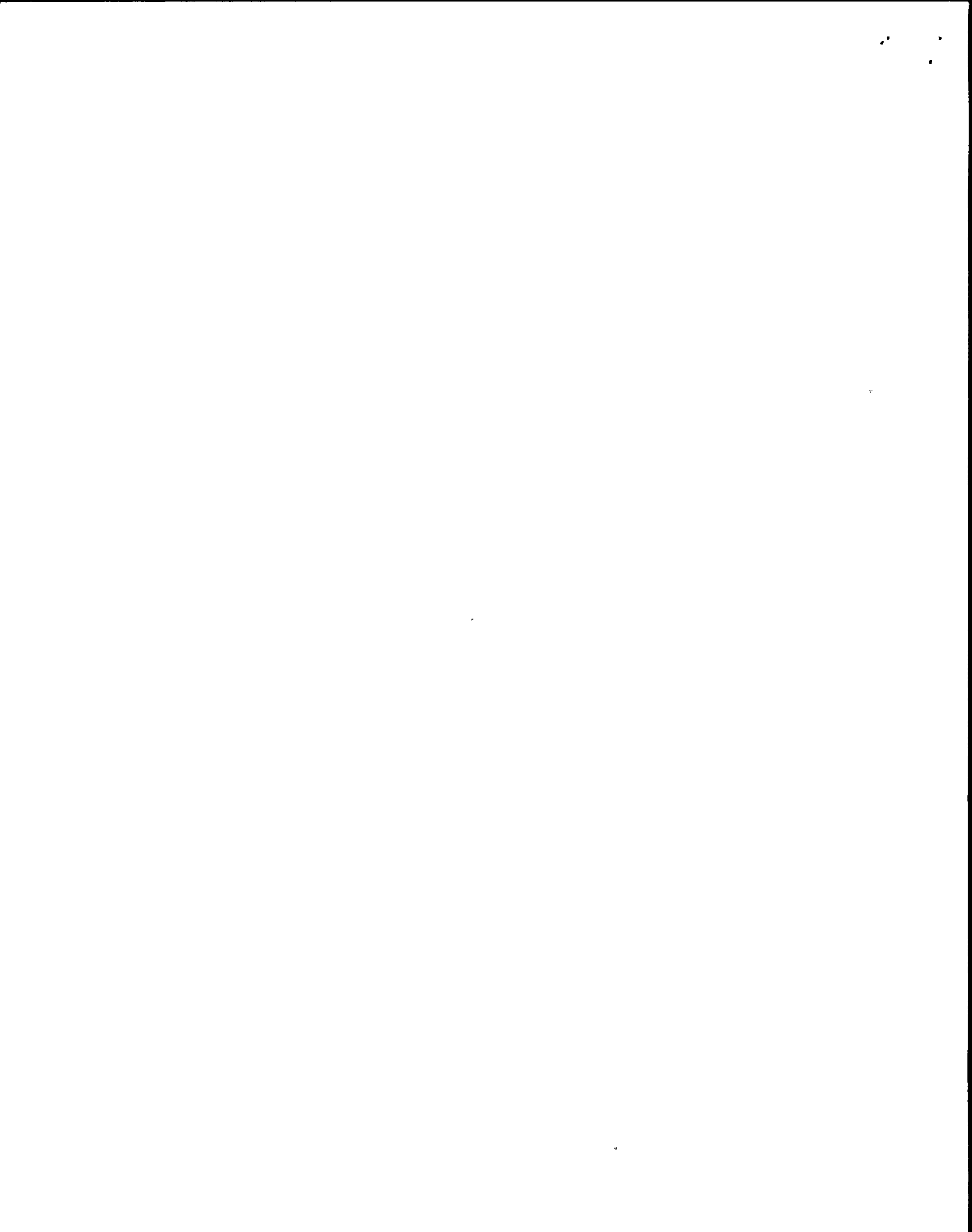
ATTACHMENT 3 (Cont)
BYS*PNL201A

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F15	ADS 'A' Remote S/D Pnl	RSSA03	11RSS01	Loss of Div I ADS Valves Control and Indication at Remote Shutdown Panel
F16	RCIC indication and trip	RSSN04	11RSS11	Loss of Turbine Supervisory Lights and Turbine Trip at Remote Shutdown Panel
F17	RPS 'A' backup scram valve, A EDC-RPT Trip	RPSA04	807E166TYSH4A	Backup Scram Valve will not open and 'A' EOC RPT lost.
F18	HVG smoke removal	HVCA46	7HVC22	Smoke Removal Damper/Control Bldg. ACU1A 2A interlock defeated.
F19	Off normal status lights	2SCIA11	7SCI01	None
F20	HVC Interlocks	2HVCA48	7HVC26	Div I Control Bldg. A/C Smoke Removal/Damper fan interlocks defeated.
F21	ADS Alarms	2IASA04	11IAS01	ADS Div I Inop Alarm Defeated.



ATTACHMENT 3 (Cont)
BYS*PNL204A

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F2	Div I Diesel	1	001.040-209-10	Loss of field flushing power ANN 852103 "EDH System Inop." ON.
F5	Div I Diesel	2EGSA11	001.040-209-010	Inhibits Cooldown Mode, incomplete start sequence, test mode, start system checks and and L.O. pump alarms. If running in test mode, diesel will trip.
F7	Div I Diesel Primary Control and Start Circuit	2EGSA04	001.040-209-014	No effect on emergency mode provided secondary start circuit remains energized. Engine trips won't start in maintenance mode. ANN 852103 "EDG1 System Inop." ON.
F8	Div I Diesel Secondary Control and Start Circuit	2EGSA06	001.040-209-015	No effect on emergency mode provided primary start/control circuit remains energized.



ATTACHMENT 3 (Cont)
2DMS*MCCA1

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
1BL	RCIC Lube Oil Cooler PCV ICS*PCV115		0607.166-906-019	Valve Fails Open.
1BR	SBGT 'A'	2GTSA18	11GTS02	GTS*MOV 2A, 3A, 28A. Receive close signal SBGT 'A' Inop.
2B	RCIC Test Return to CST ICS*MOV124	2ICSN07	11ICS03	Loss of Control and Indication ANN 601305 "RCIC System Inoperable" ON ANN 601319 "RCIC Valve Motor Overload" ON.
2C	RCIC Turbine Exh. ICS*MOV122	2ICSN04	11ICS10	Loss of Control and Indication ANN 601305 "RCIC System Inoperable" ON. ANN 601319 "RCIC Valve Motor Overload" ON.
3A	RCIC Suction from CST ICS*MOV129	2ICSN14	11ICS06	Loss of control and indication ANN 601305 "RCIC System Inoperable" ON. ANN 601319 "RCIC Valve Motor Overload" ON.
3B	RCIC Suction from Supp. Pool ICS*MOV 136	2ICSN05	11ICS02	Loss of Control and Indication ANN 601305 "RCIC System Inoperable" ON. ANN 601319 "RCIC Valve Motor Overload" ON.

ATTACHMENT 3 (Cont)
2DMS*MCCA1

CUB/ FUUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
3C	RCIC Min. Flow Valve ICS*MOV143	2ICSN06	11ICS11	Loss of Control and Indication ANN 601305 "RCIC System Inoperable" ON. ANN 601319 "RCIC Valve Motor Overload" ON.
3D	RCIC Trip and Throttle ICS*MOV150	2ICSN15	11ICS07	Loss of Control and Indication ANN 601305 "RCIC System Inoperable" ON. ANN 601319 "RCIC Valve Motor Overload" ON.
4A	RCIC STM Admission Valve ICS*MOV120	2ICSN03	11ICS01	Loss of Control and Indication ANN 601305 "RCIC System Inoperable" ON. ANN 601319 "RCIC Valve Motor Overload" ON.
5A	RCIC CST Return Flow Control Valve ICS*FV108	2ICSN09	11ICS04	Loss of Control and Indication ANN 601305 "RCIC System Inoperable" ON. ANN 601319 "RCIC Valve Motor Overload" ON.
5B	RCIC Turbine Cooling Valve ICS*MOV116	ICSN10	11ICS09	Loss of Control and Indication ANN 601305 "RCIC System Inoperable" ON. ANN 601319 "RCIC Valve Motor Overload" ON.
5C	RCIC Vac Breaker ICS*MOV164	ICSN08	11ICS13	Loss of Control and Indication ANN 601305 "RCIC System Inoperable" ON. ANN 601319 "RCIC Valve Motor Overload" ON.

ATTACHMENT 3 (Cont)
2DMS*MCCA1

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
5D	RCIC Steam Supply Bypass ICS*MOV159	ICSN30	11ICS17	Loss of Control and Indication ANN 601305 "RCIC System Inoperable" ON. ANN 601319 "RCIC Valve Motor Overload" ON.
6AL/FL	EPS*SWG-001 Recirc. Pump 'A'	2RCSA14	EE-ICP/ESK 5RCS11	Loss of Control, Interlocks, Indication, and Protection, Pump Trips if running in high speed.
6AR/FL	EPS*SWG-003 Recirc. Pump 'B'	2RCSB14	EE-ICP/ESK 5RCS13	Loss of Control, Interlocks, Indication, and Protection, Pump Trips if running in high speed.
6C	RCIC Injection Valve ICS*MOV126	2ICSN12	11ICS05	Loss of Control, Interlocks, and Indication ANN 601305 "RCIC System Inop." ON. ANN 601319 "RCIC Valve Motor Overload" ON.

ATTACHMENT 3 (Cont)
EJS*US1 CONTROL BUS

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
3A	EJS*US1	EJSX08	6EJS05	Loss of Bus Undervoltage Protection ANN 852114 "Load Center EJS US1 Trouble" ON.
3B	Normal Supply Brkr EJS*US1	EJSX05	6ESS01	Loss of Control, Interlocks, and Indication
4C	Rx Bldg. Emer. Recirc. Unit UC 413	2HVRA03	6HVR01	Loss of Control, Indication, Alarm, and Protection. If running Interlock with Test Damp AOD034 defeated. ANN 870105 "Div I Rx Bldg. Ventilation Inop."
4D	Control Bldg. Chiller Compressor 1A	2HVKA03	6HVK02	Loss of Control, Indication, Alarm, and Indication. ANN 807203 "Div I Chilled Water System Inoperable."
9B	EJS*US1 Alternate Supply Brkr.	EJSX06	6EJS02	Loss of Control, Indication, Alarm, and Indication.

ATTACHMENT 3 (Cont)
2BYS*PNL202A

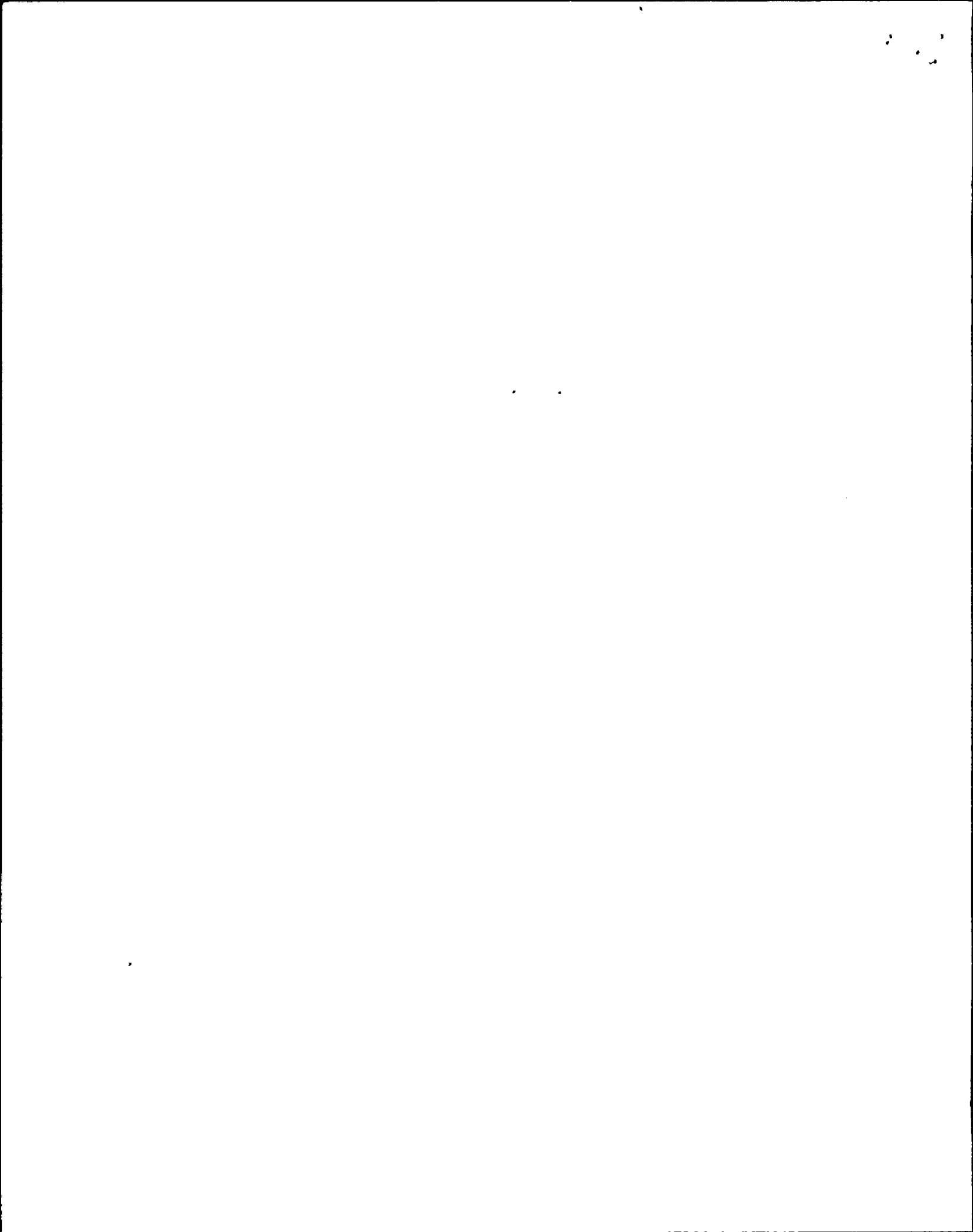
CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
1	RRCS Div I Channel A	2RRSA02	944E309TY Sh 3	Loss of Div I ARI Valves, Loss of RRCS Div I Channel A, Loss of ATWS' 1050 RCS Pump Trip and Level 2 Pump Trip.
				If lost in conjunction with Breaker #2, then Manual Operation of 'A' SLS Pump is also lost.
2	RRCS Div I Channel B	2RRSC02	944E309TY Sh 3	Loss of RRCS Div I Channel B Logic.
3	SWP Strainer and Backwash Valves	2SWPA61	11SWP02	Prevents Strainer onto Backwash on Timer Circuit and Pump Start.
4	2MSS*MOV189 RCIC Stm Line Drain Valve	2MSSA06	11MSS05	Prevents Valve from Auto Opening on RCIC Steam Supply Isolation.
5	RCS Hydraulic Line Isolations RCS SOV 79A, 80A, 81A, 82A	2RCSA32	7RCS10	Loss of Inop. Status Indication.
6	RCS Hydraulic Line Isolations RCS SOV 79B, 80B, 81B, 82B	2RCSA33	7RCS10	Loss.
7	SBG T Primary Containment Isolation	2GTSA17	7GTS04	Defeats Isolation on Hi/Hi Radiation.

ATTACHMENT 3 (Cont)
BYS*SWG002B

CUB/ FUZE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
Fuse Cu 1A	Metering Cubicle	2BYSB11	8BYS13	ANN. 852208 "Div II Emer. Bus BYS002B 125 VDC System Trouble" ON.
1B	Battery Brkr	2BYS09	8BYS13	No effect provided battery charger is supplying the Bus and loads are with capacity of charge.
2B	Battery Charger 2B1 and 2B2	2BYSB10	8BYS13	If Battery Breaker is closed, no immediate effect, however, if open for extended period of time, battery voltage will drop and low voltage alarm will come in.
2D	ENS*SWG 103 Control Bus	N/A	EE-1CN	Loss of Control Power to Div I Load Breakers Div I Inop.
3A	2BYS*PNL201B	N/A	EE-1CN	See actions for BYS*PNL201B.
3B	2BYS*PNL204B	N/A	EE-1CN	See actions for BYS*PNL204D.
3C	UPS 2B	N/A	EE-1CA	Loss of Backup Power. ANN 852216 "Div II System Trouble" ON.

ATTACHMENT 3 (Cont)
BYS*SWG002B

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
3D	DMS*BACCB1	N/A	EE-1CN	See actions for DMS*MCCB1 RCIC Inop., RCS Pumps Trip if running in High Speed.
4C	EJS*US3	N/A	EE-1CN	Loss of EJS*US3 Control Power (See Actions for EJS*US3).
4D	BYS*PNL202D	N/A	EE-1CN	See actions BYS*PNL202B.

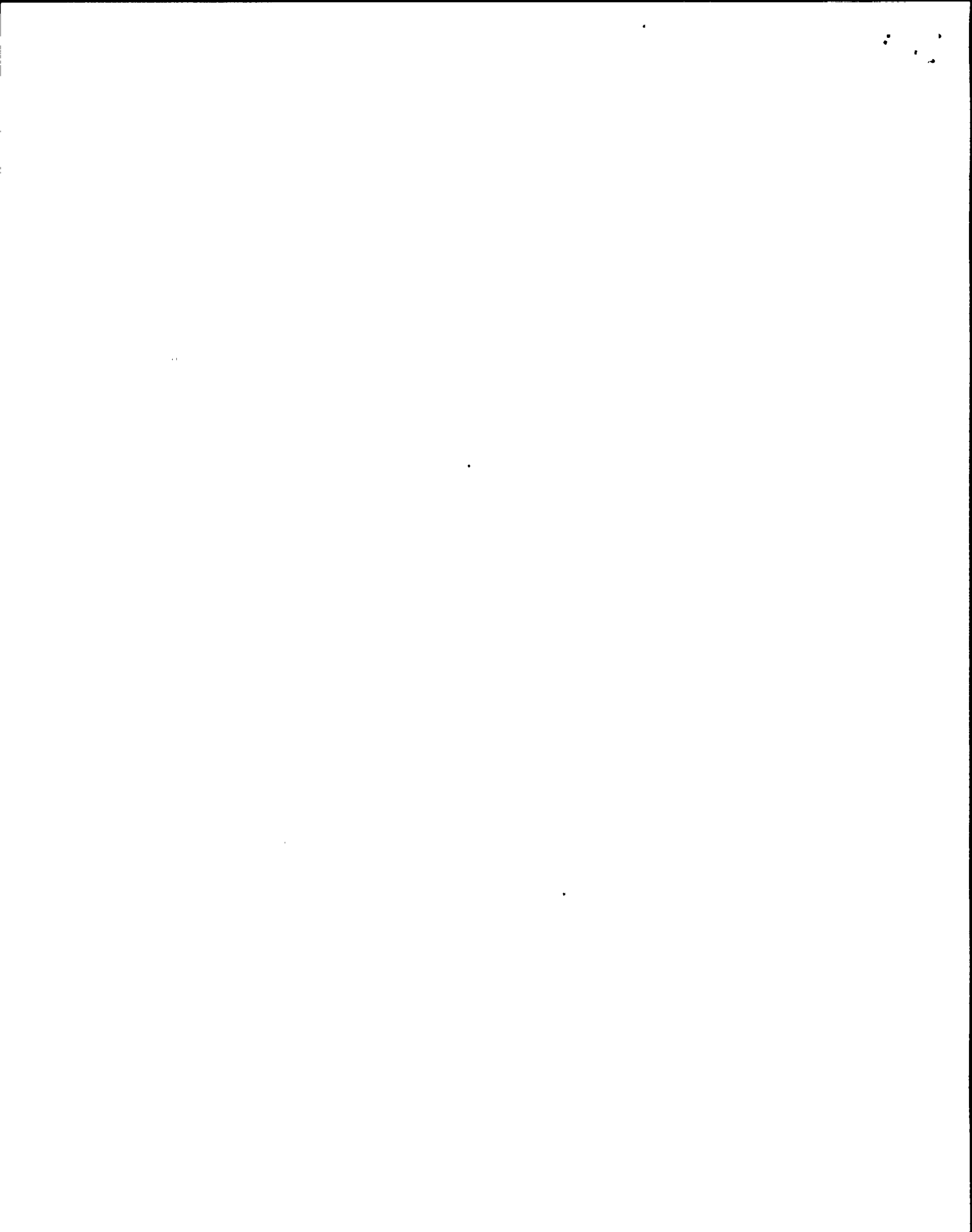


ATTACHMENT 3 (Cont)
ENS*SWG103 CONTROL BUS

CUB/ FUZE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F Cu 1	XFMR EJS3A for Brkr	EJSY03	5EJS03	Loss of Control, Indication.
F Cu N1	Div II Diesel Ground Brkr	EGPY06	5EGP06	Loss of Control, Indication, and Protection.
F Cu 2	NNS-SWG018 Brkr ACB 103-2	2ENSY11	5ENS07	Loss of Control, Indication, Interlocks, and Protection. No Impact unless Feeding Div II from NNS-SWG018.
F Cu 1	ENS*SWG103	2ENSY02	5ENS16	Loss of Overcurrent Protection ANN 852223 "4KV Bus 103 DC Control Power Failure" ON.
F Cu 3	ENS*SWG103	2ENSY05	5ENS18	Loss of Load Shed on Loss of Bus Voltage. ANN 852203 "EDG3 System Inop." ON.
F Cu 3	ENS*SWG103	2ENSY06	5ENS18	Loss of Load Sequence on Degraded Voltage. ANN 852203 "EDG3 System Inop".
F Cu 3	ENS*SWG103	2ENSY13	5ENS20	Loss of Underfrequency Protection.

ATTACHMENT 3 (Cont)
ENS*SWG103 CONTROL BUS

CUB/ FUZE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F Cu 3	ENS*SWG103	2ENSY04	5ENS22	Loss of Load Shed and Load Sequencing.
F Cu 4	ENS*SWG103	2ENSY01	5ENS15	Loss of Overcurrent Protection ANN 852223 "4KV Bus 103 DC Control Power Failure" ON.
F Cu 4	ENS*SWG103 Brkr ACB 103-4	2ENSY10	5ENS09	Loss of Control, Indication, Interlocks, and Protection.
F Cu 5	RHS*PIC	2RHSC01	5RHS03	Loss of Control, Interlock, and Protection ANN.601601 "RHR C System Inop." If running ANN 601613 "RHR PIC Auto Trip" defeated.
F Cu 7	SWP*PIF	2SWPF01	5SWP06	Loss of Control, Interlock, Indication, and Protection.
F Cu 8	ENS*SWG103	2ENSY03	5ENS17	Loss of Protection. ANN 851223 "4KV Bus 103 DC Cont Power Failure" ON.
F Cu 8	NNS-SWG015 Brkr ACB 103-8	2ENSY12	5ENS03	Loss of Control, Interlocks, Protection, and Indication.
F Cu 9	SWP*PID	2SWPD01	5SWP04	Loss of Control, Interlocks, Protection, and Indication.



ATTACHMENT 3 (Cont)
ENS*SWG103 CONTROL BUS

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F Cu 10	SFC*P1B	2SFCB01	5SFC02	Loss of Control, Interlock, Protection, and Indication. ANN 875106 "Div II Fuel Pool Cooling System Inop." On.
F Cu 11	SWP*P1B	2SWPB01	5SWP02	Loss of Control, Interlock, Protection, and Indication.
F Cu 12	RHS*P1B	2RHSB01	5RHS02	Loss of Control, Interlock, Protection, and Indication. ANN 601631 "RHR B System Inop. If running ANN 601643 RHR P1B Auto Trip" defeated.
F Cu 13	EJS**3B For Brkr	EJSY04	5EJS04	Loss of Control, Interlock, Protection, and Indication.
F Cu 13	Div II Diesel Generator	EGPY01	8EGP07	Generator differential current protection. ANN 852219 "ED3 Control Power Failure".
F Cu 14	Div II Diesel Brkr	EGPY07	5EGP03	Loss of SWP Load Sequence, DG Brkr 101-14 Loss of Control Protection and Interlocks, Defeats Load Sequencing for LPC1 B, C. ANN 852203 "EDG3 System Inop." ON. ANN 852212 "Brkr 103-14 Auto/Fail to Close" Defeated.

ATTACHMENT 3 (Cont)
ENS*SWG103 CONTROL BUS

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
F Cu 14	Div II Diesel Generator	EGPY02	8EGP08	Generator Protection Defeated. ANN 852219 "EDG3 DC Cont Power Failure" ON.

ATTACHMENT 3 (Cont)
2BYS*PNL201B

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
1	Div II Annunciators	IHAB01	10IHA20	Loss of Div I Annunciators.
2	RCIC Steam Line Drain and Turbine exhaust drains ICS* SOV 131, ICS*SOV109 (Inboard)	ICSN18	807E173TY, Sh 3	Loss of Control and Indication and valves fail closed.
3	Service Wtr Supply to Div III Diesel SWPMOV95B	2SWPB43	7SWP15	Auto Closure or Low Pressure Defeated.
4	SWP System Load Sequence	2SWPB44	7SWG17	For LOP: Loss of SWP Pump Trip, Non-essential load isolation and divisional separation (MOV50A). ANN 601124 "Service Water System". ON.
5	RCIC System	2ICSN19	807E173TY Sh 3	RCIC Lose Div II Isolation.
6	RHR System	2RHSB32	807E170TY Sh 5	RHR Auto/Manual Initiation Defeated. ANN 601631 "RHR B System Inoperable" ANN 606601 "RHR C System Inoperable".

ATTACHMENT 3 (Cont)
2BYS*PNL201B

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
7	NSSSS	2ISCB02	1IISC03	Group 8 and Group 9 Isolation (Inboard).
8	RCIC/RHR System	RSSN08	1IRSS06	RCIC INBD Isolation and RHR Shutdown cooling Cooling and RW Discharge RHS MOV149 Isolation with Control at Remove S/W pan.
9	RHR Hx 'B' Vent Position Indication	RHSB33	807E170TY Sh 6	Loss of Position Indication.
10	ADS Div II Channel 'B'	2ADSB01	807E15STY Sh 4	Loss of Auto/Manual Initiation ANN 601504 "Div II ADS System Inop". ON.
11	Div II Control Bldg Chillers and Pumps	2HVKB08	7HVK03	Prevents Pumps and Chillers from Auto Starting on Computer Room ACU Start.
12	RHR Pump Suction Interlock with RHS*MOV113	2CSLN11	807E171TY Sh 2	Interlock defeated.

ATTACHMENT 3 (Cont)
2BYS*PNL201B

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
13	Div II Diesel Air Start Compressors	2EGAB04	11EGA02	Compressor Auto Start Defeated.
14	RWCU Pumps	2WCSB02	807175TY Sh 2	Pumps Trip.
15	ADS Alarm	2IASB04	11IAS01	ADS Div II Inop. Alarm Defeated.
16	ADS Div II Remote Shutdown	2RSSB03	11RSS03	Loss of ADS Div II Control at Remote S/D Panel
17	RPS Backup Scram Valve 'B' EOC-RPT	2RPSB04	807E166TY Sh 4a	Backup Scram Valve will not open. Loss of 'B' EOC-RPT.
18	Control Bldg HVAC Smoke Removal Fan/ Damper Interlocks	2HVCB48	7HVC27	Interlock Defeated.
21	Off Normal Status Display	2SCIB05	7SCI12	None

ATTACHMENT 3 (Cont)
BYS*PN6204B

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
2	Div II Diesel Field Flashing		0001-040-209-010	Loss of Field Flash. ANN 852203 "EDG3 System Inoperable".
5	Div II Diesel Control Circuit	2EGSB11	0001-040-209-010	Inhibits Cooldown Mode, Incomplete start Sequence, Test Mode, Start System Checks and L.O. Pump Alarms. If running in Test Mode, Diesel will Trip.
7	Div II Diesel Start Circuit	2EGSB04	0001-040-209-014	No effect on Emergency Mode provided Secondary Start Circuit remains powered. Engine Trips/won't start in Maintenance Mode.
8	Div II Diesel Secondary Start Circuit	2EGSB06	0001-040-209-015	No effect on Emergency Mode provided Primary Start Circuit remains powered. Engine Trips/won't start in Maintenance Mode.

ATTACHMENT 3 (Cont)
2DMS*MCCB1

CUB/ FUZE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
2L	RCS P1A EPS*SWG002	2RCSA16	EE ICP 5 RCS15	Loss of Breaker Control, Interlock and Indication. If running in High Speed Pump Trips.
2R	RCSP1B EPS*SWG004	2RCSB16	EE ICP 5 RCS17	Loss of Breaker Control, Interlock and Indication. if running in High Speed Pump Trips.
2B	RCIC Inboard Vacuum Brkr Isolation ICS*MOV148	2ICSN13	11ICS13	Loss of Control, Interlocks, Protection and Indication. Loss of Isolation capability. ANN 601305 "RCIC System Inoperable" 601319 RCIC Valve Motor Overload."

ATTACHMENT 3
EJS*U53 CONTROL BUS

(Cont)

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
3A	EJS*U53 Undervoltage Protection	2EJSY08	6EJS05	Loss of Undervoltage Protection. ANN 852214 "Load Center EJS*U53 Trouble".
3B	EJS*U53 Normal Supply Brkr	2EJSY05	6EJS03	Loss of Control, Interlock, Indicating and Protection.
4C	Rx Bldg Emer Recirc Unit UC413D	2HVRB03	6HVR02	Loss of Control, Interlock, Indication and Protection ANN 871105 "Div II Reactor Bldg. Ventilation Inoperable". ON. If running, Interlock with Test Damper HVR*AOD 34B Defeated.
4D	Control Bldg. Chiller Compressor 'B' HVK*CHL1B	2HVKB03	6HVK03	Loss of Control, Interlocks, Protection, and Indication. ANN 871203 "Div II Chilled Water System Inoperable"
9B	EJS*U53 Alt: Supply Brkr	2EJSY06	6EJS04	Loss of Control, Interlock, Protection and Indication.

ATTACHMENT 3 (Cont)
2BYS*PNL202B

CUB/ FUSE	LOAD	CKT #	ESK/VENDOR PRINT	ACTION ON LOSS OF POWER
1	RRCS Div II Channel A	2RRSB02	944E309TY Sh 4	Loss of Div II ARI Valves. Loss of Div II RRCS Auto/Manual Initiation (Channel A). Loss of ATWS 1050 RCS Pump Trip and Level 2 Pump Trip. ID lost in conjunction with Brkr #2 then Manual Operation of "B" SLS pump is also lost.
2	RRCS Div II Channel B	RRSD02	944E309TY Sh 4	RRCS Div II Channel B Lost.
3	SWP Strainers and Backwash Valves	2SWPA61	11SWP02	Prevents Auto Backwash on Timer Circuit and Pump Start.
4	RCIC Inboard Steam Line Drain Isolation	2MSSB06	11MSS05	Auto Opening on RCIC Steam Isolation inhibited.
5	SBGT 'B' Train	2GTSB17	7GTS04	Div II Inboard Primary Containment Isolation on Hi/Hi Radiation Defeated.
6	SBGT 'B' Train	2GTSB18	11GTS02	'B' Train Inoperable. Valves GTS*MOV2B,3B, and 28B receive close signal.

