

Effects of Postulated DC Power  
Failures on EGCS Availability  
Quad Cities Unit 1  
Prepared for  
Commonwealth Edison Company

Project No. 8192-00

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**EFFECTS OF POSTULATED DC POWER  
FAILURES ON ECCS AVAILABILITY**

**QUAD CITIES - UNIT 1**

**Prepared for: Commonwealth Edison Company**  
**Project No.: 8192-00**  
**8192-01**

**June 8, 1988**  
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## ABSTRACT

The objective of this study report is to identify the effects dc power source failures have on the availability of the Emergency Core Cooling System and its supporting Auxiliary Power System.

- Note:
- 1) This report is strictly an electrical functionality study and does not involve any reviews of the mechanical/structural aspects of the equipment for the evaluated systems.
  - 2) A review of the physical separation of redundant electrical circuits and equipment and their interface with potential hazards (e.g., line breaks, floods, fires, etc.) as well as a review of equipment qualification (e.g., seismic, environmental) suitability is outside the scope of this report.

To accomplish the objective it was necessary to perform the following tasks:

- a) to identify all dc circuits powered from each dc bus
- b) to determine the function(s) of each circuit or load
- c) to analyze the consequences of each circuit being inoperable following a loss-of-offsite power coincident with a loss-of-coolant accident

Once all the circuits were analyzed, the impact of losing individual buses or an entire battery system could be ascertained.

Appendix A, B and C of this report documents this review process for each circuit of the 48/24-Vdc, 125-Vdc, and 250-Vdc battery system, respectively.

EFFECTS OF POSTULATED DC POWER  
FAILURES ON ECCS AVAILABILITY

QUAD CITIES - UNIT 1

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## BACKGROUND

A design weakness has been identified which could prevent the fulfillment of the safety function of the Low-Pressure Coolant Injection (LPCI) mode of the Residual Heat Removal (RHR) system. The LPCI mode operates to restore and if necessary, maintain the coolant inventory in the reactor vessel after a Loss-Of-Coolant-Accident (LOCA) so that the core is sufficiently cooled to preclude fuel clad melting. The LPCI design weakness was identified and documented in a License Event Report #87-045-00 dated October 8, 1987, filed by Detroit Edison for a reportable event that took place at Enrico Fermi Atomic Power Plant, Unit 2.

The LPCI system is only one of several subsystems of the Emergency Core Cooling System (ECCS). The ECCS is designed to protect the reactor core against fuel cladding meltdown across the entire spectrum of line break accidents. The ECCS is automatically placed in operation whenever a LOCA is detected. The ECCS consists of two independent Core Spray subsystems, the LPCI mode of RHR, the High-Pressure Coolant Injection (HPCI) subsystem and the Automatic Pressure Relief subsystem. Each of these subsystems is designed to cover a specific range of accident conditions and collectively provide a redundancy in kind to avoid undetected common mode failures.

The failure scenario identified in the LER is a LOCA coincident with a Loss-Of-Offsite Power (LOOP) and a specific single failure the complete loss of one division of dc power. This scenario could result in the loss of all four RHR pumps to inject water into the vessel (LPCI mode). If you had rapid vessel depressurization, only one core spray pump would be immediately available. Fuel cladding temperature design limits could be exceeded under the above conditions.

Based upon the above scenario the Dresden/Quad Cities LPCI system designs were analyzed and found to possess a similar design weakness. Design modifications have been authorized and are being implemented to correct the system inadequacies.

## PURPOSE

The purpose of this study is to review the other services, fed from each station dc source to determine that sufficient ECCS equipment is available, following a single dc supply failure, such that the fuel cladding temperature design limits (2200°F) are not exceeded.

This study will encompass the following Quad Cities Unit 1 Station dc Power Systems:

- A. 48/24 volt (nominal)
- B. 125 volt (nominal)
- C. 250 volt (nominal)

## III. INITIAL REVIEW ASSUMPTIONS

This analysis assumes a design basis LOCA concurrent with a LOOP and then investigates the effects of a single (dc power) source failure on ECCS availability. (Note - In addition it is assumed that the previously discussed LPCI design inadequacy has been corrected.)

## IV. DESIGN REVIEW PROCESS

To perform a comprehensive review of each dc power system it was necessary to analyze the individual loads or circuits fed from each dc bus. (Figures 1, 2 and 3 of this report are Key Diagrams of the individual buses on each dc power system.)

Our review of each load or circuit was documented on a "Power Failure Analysis" (PFA) form which is included in the appendices to this report. Each PFA form contains the following information on a given circuit:

- A. the station and unit,
- B. the dc system, bus, circuit number and assigned division under review,
- C. the equipment name or number and a description of its operation,
- D. the reference drawings utilized and their revision, and
- E. the consequences of each circuit's failure on ECCS availability.

The PFAs were then compiled and indexed on a per bus basis. The dc buses were then analyzed according to their assigned dc battery source.

V. RESULTS

A. 125-VDC SYSTEM

1. Unit 1 Battery - Supplies the following Unit 1 dc buses:

- a. Turb. Bldg. Main Bus 1A
- b. Turb. Bldg. Main Bus 1A-1
- c. Turb. Bldg. Main Bus 1A-2
- d. Reactor Bldg. Panel 1

Upon loss of the above buses the following ECCS equipment/systems are available:

RHR Pump 1C and 1D  
Core Spray Pump 1B  
Auto Depressurization  
HPCI

2. Unit 2 Battery - Supplies the following Unit 1 dc buses:

- a. Turb. Bldg. Reserve Bus 1B
- b. Turb. Bldg. Reserve Bus 1B-1
- c. Turb. Bldg. Reserve Bus 1B-2

Upon loss of the above buses the following ECCS equipment/systems are available:

RHR Pumps 1A and 1B  
Core Spray Pump 1A  
Auto Depressurization  
HPCI

B. 250-VDC SYSTEM

1. Unit 1 Battery - Supplies the following Unit 1 dc buses:

- a. Turb. Bldg. MCC #1
- b. Reactor Bldg. MCC #1A

Upon loss of the above buses the following ECCS equipment/systems are available.

RHR Pumps 1A, 1B, 1C and 1D  
Core Spray Pumps 1A and 1B  
Auto Depressurization

2. Unit 2 Battery - Supplies the following Unit 1 dc bus:

Reactor Bldg. MCC 1B

Upon loss of the above bus, all the ECCS equipment/systems will be available.

C. 48/24-VDC SYSTEM

1. Unit 1 Battery 1A - Supplies the following Unit 1 dc bus:

Distribution Center 1A

2. Unit 1 Battery 1B - Supplies the following Unit 1 dc bus:

Distribution Center 1B

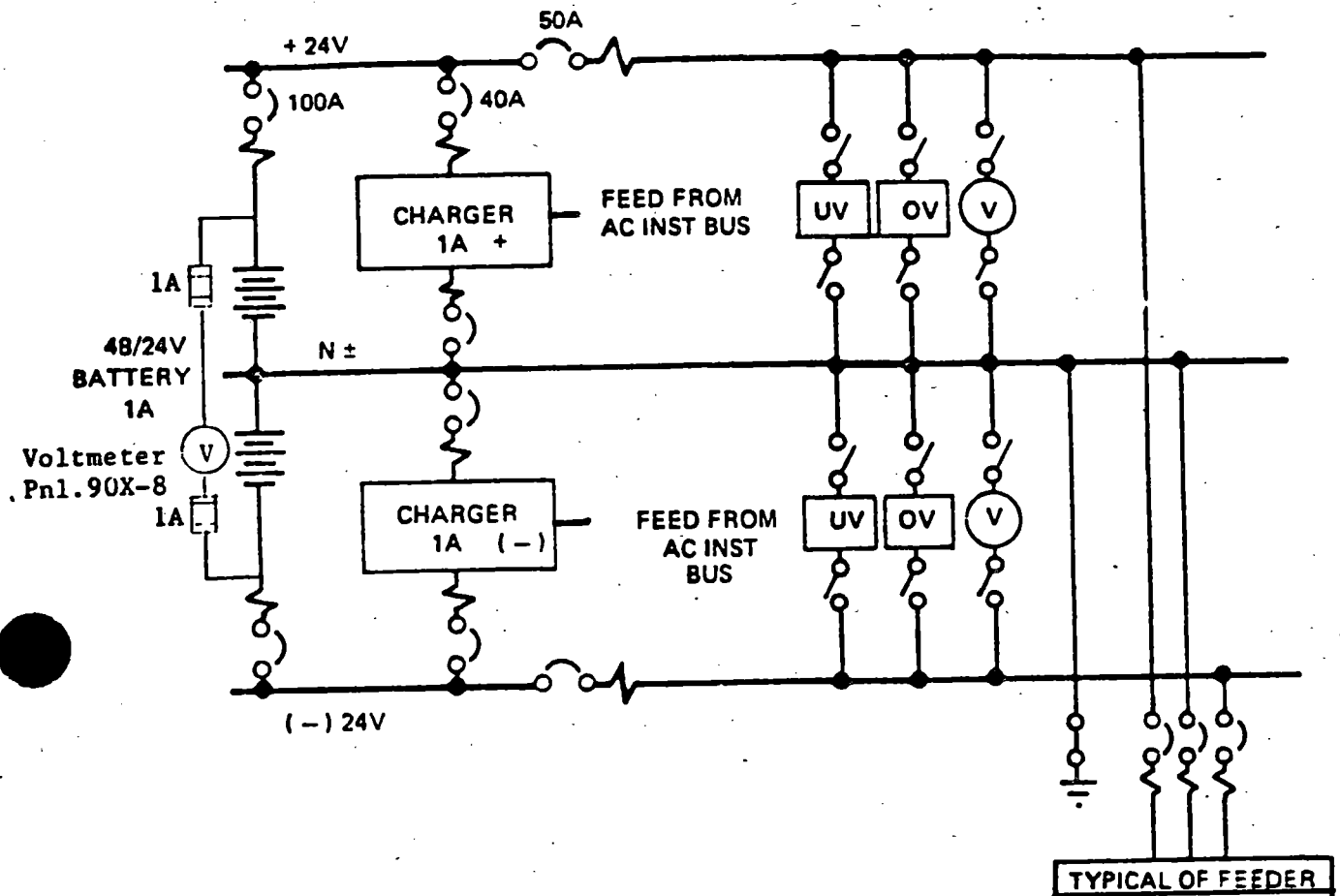
The above distribution centers do not feed any ECCS equipment. Therefore all ECCS equipment is available upon losing these dc power sources.

VI. CONCLUSION

It is clear from the above results that Quad Cities Unit 1 can lose any single dc power source (and in some cases more than one) and still have adequate emergency core cooling systems available to safely mitigate the consequences of line break accidents.

Our power failure analysis has thus shown that the aforementioned LPCI design flaw was an isolated case of a dc failure affecting ECCS availability.

## Figures



48V/24-VDC  $\pm$  1A BUS

Typical for 48/24-VDC  $\pm$  1B  
Bus (Not Shown)

FIGURE 1:  
KEY DIAGRAM -  
48/24-VDC SYSTEM

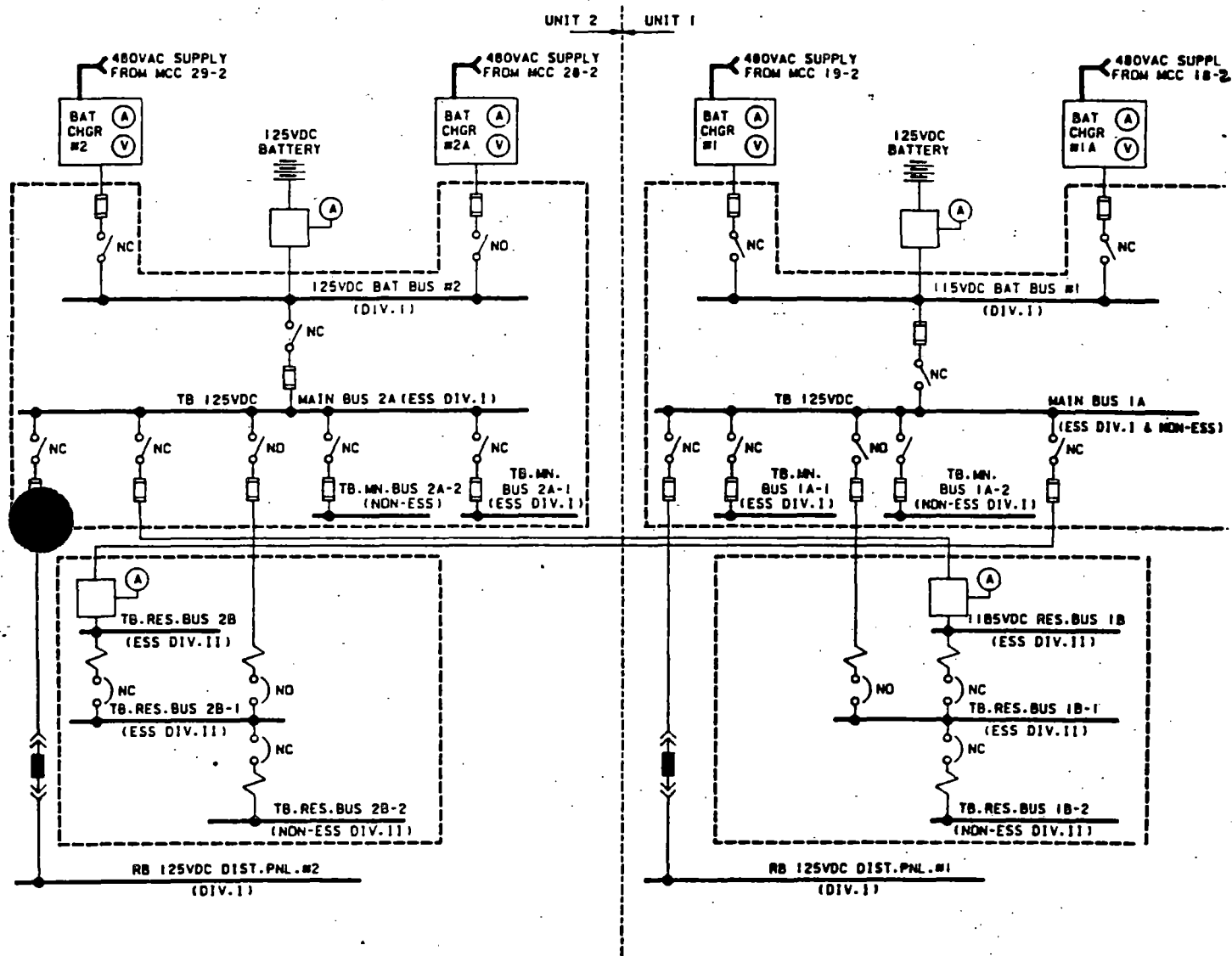


FIGURE 2:  
KEY DIAGRAM -  
125-VDC SYSTEM

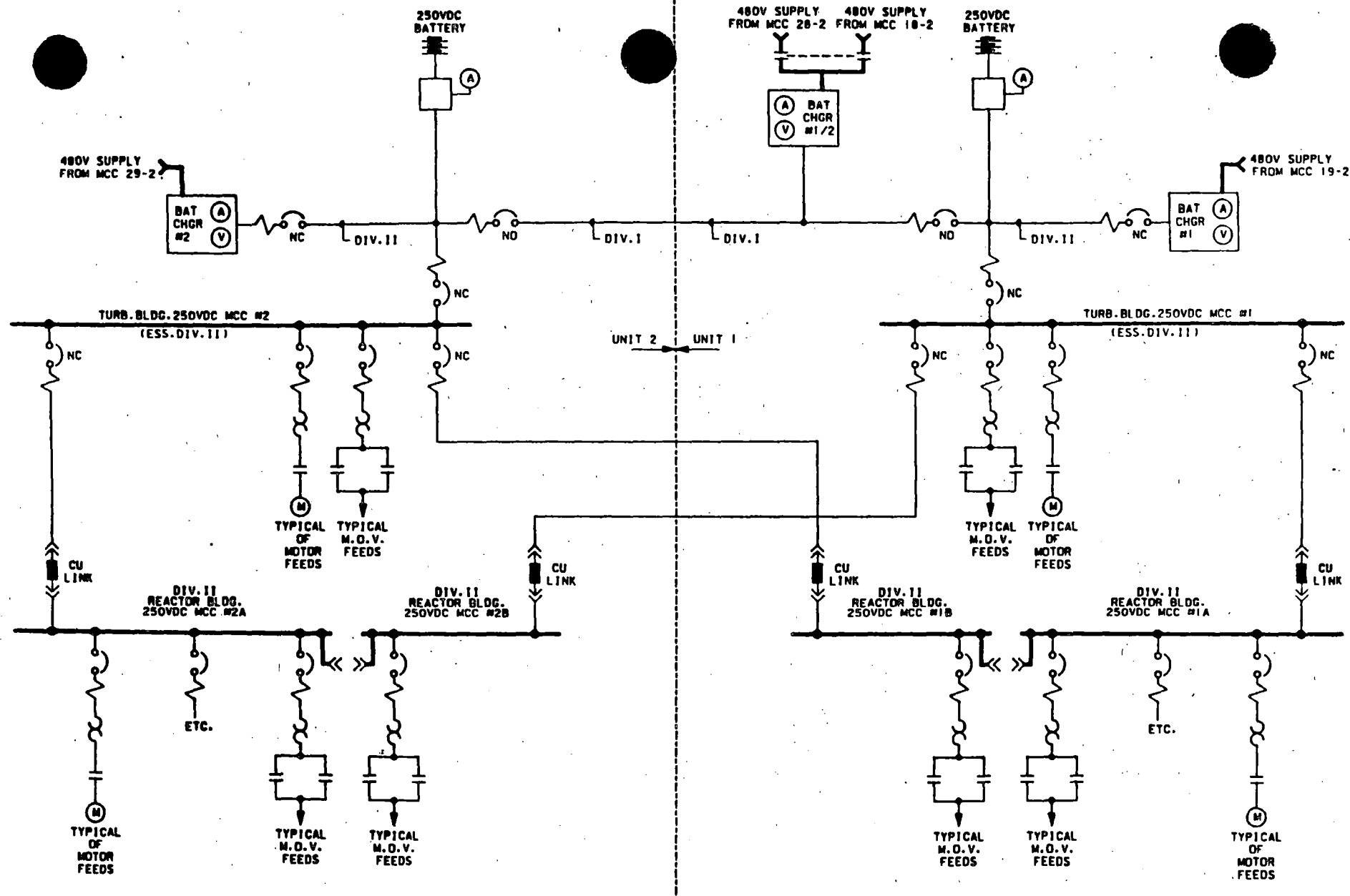


FIGURE 3:  
KEY DIAGRAM -  
250-VDC SYSTEM

48/24 VDC POWER FAILURE  
ANALYSIS INDEX

STATION: QUAD CITIES  
UNIT: 1

BUS: DISTRIBUTION CENTER 1A

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA#</u>
3 (Main)	Battery 1A Feed To Main Bus 1A	QUA-1-024-0001
1 (Main)	Battery Charger 1A Feed (+) To Main Bus 1A	QUA-1-024-0002
2 (Main)	Battery Charger 1A Feed (-) To Main Bus 1A	QUA-1-024-0003
4 (Main)	Main Bus 1A Feed To Dist. Pnl. 1A	QUA-1-024-0004
1 & 3	Intermediate & Source Range Mon. Pnl. 901-36	QUA-1-024-0005
2 & 4	Process & Linear Rad. Monitor Pnl. 901-10	QUA-1-024-0006
5	Unassigned	QUA-1-024-0007
6	Unassigned	QUA-1-024-0008
7	Unassigned	QUA-1-024-0009
8 & 10	Process & Linear Rad. Monitor Pnl. 912-4	QUA-1-024-0010
9	Unassigned	QUA-1-024-0011
11	Unassigned	QUA-1-024-0012
12	Unassigned	QUA-1-024-0013
13	Unassigned	QUA-1-024-0014
14	Unassigned	QUA-1-024-0015
15	Unassigned	QUA-1-024-0016
16	Unassigned	QUA-1-024-0017
17	Unassigned	QUA-1-024-0018
18	Unassigned	QUA-1-024-0019
19	Unassigned	QUA-1-024-0020
20	Unassigned	QUA-1-024-0021
21	Unassigned	QUA-1-024-0022
22	Unassigned	QUA-1-024-0023
23	Unassigned	QUA-1-024-0024
24	Unassigned	QUA-1-024-0025

48/24 VDC POWER FAILURE  
ANALYSIS INDEX

STATION: QUAD CITIES  
UNIT: 1

BUS: DISTRIBUTION CENTER 1B

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA#</u>
3 (Main)	Battery 1B Feed to Main Bus 1B	QUA-1-024-0026
2 (Main)	Battery Charger 1B Feed (+) To Main Bus 1B	QUA-1-024-0027
1 (Main)	Battery Charger 1B Feed (-) To Main Bus 1B	QUA-1-024-0028
4 (Main)	Main Bus 1B Feed to Dist. Pnl. 1B	QUA-1-024-0029
1 & 3	Intermediate & Source Range Mon. Pnl. 901-36	QUA-1-024-0030
2 & 4	Process & Linear Rad. Monitor Pnl. 901-10	QUA-1-024-0031
5	Unassigned	QUA-1-024-0032
6	Unassigned	QUA-1-024-0033
7	Unassigned	QUA-1-024-0034
8 & 10	Process & Linear Rad. Monitor Pnl. 912-4	QUA-1-024-0035
9	Unassigned	QUA-1-024-0036
11	Unassigned	QUA-1-024-0037
12 & 14	Unassigned	QUA-1-024-0038
13	Unassigned	QUA-1-024-0039
15	Unassigned	QUA-1-024-0040
16	Unassigned	QUA-1-024-0041
17	Unassigned	QUA-1-024-0042
18	Unassigned	QUA-1-024-0043
19	Unassigned	QUA-1-024-0044
20	Unassigned	QUA-1-024-0045
21	Unassigned	QUA-1-024-0046
22	Unassigned	QUA-1-024-0047
23	Unassigned	QUA-1-024-0048
24	Unassigned	QUA-1-024-0049

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 024 V BUS ± 1A DIST. PNL. CKT. 3 DIV. N/A
- C. ACTUATED EQUIPMENT 48/24 VDC PNL ± 1A BUS

DESCRIPTION: 48/24 VDC feed from battery 1A to panel number 1A.

- D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. The 48/24 VDC system is used to power neutron monitoring equipment. Neutron monitoring equipment plays no role in actuating ECCS equipment. ECCS equipment is actuated by low water level in reactor or high drywell pressure. There are two 48/24 VDC redundant systems. Neutron monitoring equipment does actuate the Reactor Protection System. Loss of power on Bus A will cause a half scram condition on RPS Channel 1A.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: S. P. Perryman Date 2-16-88 Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ± 1A CKT. 1 DIV. N/AC. ACTUATED EQUIPMENT Positive Polarity BUS 1A

DESCRIPTION: Positive polarity feed from battery charger 1A(+) to panel #1A.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. The battery supplies power when the charger fails.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. Perriney Date 2-16-88 Reviewer Rayeldaudi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ± 1A CKT. 2 DIV. N/AC. ACTUATED EQUIPMENT Negative Polarity BUS 1A

DESCRIPTION: Negative polarity feed from battery charger 1A(-) to panel #1A.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. The battery supplies power when the charger fails.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Paragney Date 2-12-88 Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ± 1A CKT. 4 DIV. N/AC. ACTUATED EQUIPMENT 48/24 VDC DIST. PNL ± 1A

DESCRIPTION: Main feed from 48/24 VDC BUS ± 1A to 48/24 VDC distribution panel ± 1A.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. Battery 1B supplies a redundant 48/24 VDC system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

D.P. PerneyDate 2-16-88

Reviewer

RayeldandiDate 3-4-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 024 V BUS ± 1A CKT. 1 & 3 DIV. N/A
- C. ACTUATED EQUIPMENT INTERMEDIATE & SOURCE RANGE MONITORS  
PNL. 901-36

DESCRIPTION: The source range monitoring system (SRM) displays and records the core neutron flux during shutdown conditions, refueling operations, and during startups from subcritical until the intermediate range monitors (IRM) are firmly on scale. The IRM system monitors and records the core neutron flux levels between the startup range and the power range during reactor startup and shutdown.

- D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M  
4E-1452 Rev. H
- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. Battery 1B supplies a redundant 48/24 VDC system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: D.P. Perry Date 2-16-88 Reviewer Rajeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 2 & 4 DIV. N/AC. ACTUATED EQUIPMENT PROCESS & LINEAR RADIATION MONITORING  
SYSTEM PNL. 901-10

DESCRIPTION: Process and linear radiation monitors for "Off Gas Discharge from Charcoal Absorbers No. 2."

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M  
4E-1487 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. These radiation monitors do not activate ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

D.P. PerrigneyDate 2-16-88

Reviewer

RayeldandiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 5 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Perry Date 2-16-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 6 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Perry Date 2-16-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 7 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. Penney Date 2-16-88Reviewer Rayelaudi Date 3-4-88

DC POWER FAILURE ANALYSIS

A. STATION Quad Cities

UNIT 1

B. DC SYSTEM 024 V BUS ±1A CKT. 8 & 10 DIV. N/A

C. ACTUATED EQUIPMENT PROCESS & LINEAR RADIATION MONITORING  
SYSTEM PNL. 912-4

DESCRIPTION: Process and linear radiation monitors for "Stack Gas #1" and "Stack Gas #2."

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M  
4E-1487 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. These radiation monitors do not activate ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: S.P. Leininger Date 2-16-88 Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 9 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. Perry Date 2-16-88

Reviewer

Rayeldandi Date 3-4-88

DC POWER FAILURE ANALYSIS

A. STATION Quad Cities

UNIT 1

B. DC SYSTEM 024 V BUS ±1A CKT. 11 DIV. N/A

C. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: S.P. Perry Date 2-16-88 Reviewer Rayel Landi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 12 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S. P. Perryman Date 2-16-88 Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 13 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Perryman Date 2-16-88 Reviewer Rayelaudi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 14 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. Bergney Date 2-16-88 Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 15 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. Perry Date 2-16-88Reviewer Ray J. Dawdi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 16 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. Perry Date 2-16-88Reviewer Ray Idandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 17 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

D. PerryDate 2-16-88

Reviewer

Rayel davisDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 18 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. Perry Date 2-16-88Reviewer Royelaudi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 19 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

J.P. PerryDate 2-16-88

Reviewer

RajeldandiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 20 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

J.P. PerryDate 2-16-88

Reviewer

RayeldandiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 21 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

D.P. PerryDate 2-16-88

Reviewer

RayelaudiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 22 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. HE. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit  
does not affect the availability of ECCS equipment.REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

S. P. PerrymanDate 2-17-88

Reviewer

Ray EldandiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 23 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. Perry Date 2-17-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1A CKT. 24 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

D.P. PerinDate 2-17-88

Reviewer

RayelaudiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 3 DIV. N/AC. ACTUATED EQUIPMENT 48/24 VDC PNL ±1B BUS

DESCRIPTION: 48/24 VDC feed from battery 1B to panel number 1B.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. The 48/24 VDC system is used to power neutron monitoring equipment. Neutron monitoring equipment plays no role in actuating ECCS equipment. ECCS equipment is actuated by low water level in reactor or high drywell pressure. There are two 48/24 VDC redundant systems. Neutron monitoring equipment does actuate the Reactor Protection System. Loss of power on Bus B will cause a half scram condition on RPS Channel B.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. Penney Date 2-17-88

Reviewer

Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 2 DIV. N/AC. ACTUATED EQUIPMENT Positive Polarity Bus 1B

DESCRIPTION: Positive polarity feed from battery charger 1B(+) to panel #1B.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. The battery supplies power when the charger fails.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S. P. Brigney Date 2-17-88Reviewer Layeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 1 DIV. N/AC. ACTUATED EQUIPMENT Negative Polarity Bus 1B

DESCRIPTION: Negative polarity feed from battery charger 1B(-) to panel #1B.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. The battery supplies power when the charger fails.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. PerrymanDate 2-17-88

Reviewer

Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 4 DIV. N/AC. ACTUATED EQUIPMENT 48/24 VDC DIST. PNL. ±1B

DESCRIPTION: Main feed from 48/24 VDC Bus ±1B to 48/24 VDC distribution panel ±1B.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. Battery 1A supplies a redundant 48/24 VDC system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Perry Date 2-17-88

Reviewer

Rayelaudi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 1 & 3 DIV. N/AC. ACTUATED EQUIPMENT Intermediate & Source Range Monitors PNL. 901-36

DESCRIPTION: The source range monitoring system (SRM) displays and records the core neutron flux during shutdown conditions, refueling operations, and during startups from subcritical until the intermediate range monitors (IRM) are firmly on scale. The IRM system monitors and records the core neutron flux levels between the startup range and the power range during reactor startup and shutdown.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M  
4E-1452 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. Battery 1A supplies a redundant 48/24 VDC system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. Perry Date 2-17-88Reviewer Rayelaudi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 2 & 4 DIV. N/AC. ACTUATED EQUIPMENT PROCESS & LINEAR RADIATION MONITORING  
SYSTEM PNL. 901-10

DESCRIPTION: Process and linear radiation monitors for "Reactor Building Closed Cooling Water" and "Off Gas Discharge from Charcoal Absorbers No. 1."

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M  
4E-1487 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment. These radiation monitors do not activate ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerryDate 2-17-88

Reviewer

Rayelaudi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 5 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

S.P. PerrineyDate 2-17-88

Reviewer

RayeldandDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 6 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. P. Sweeney Date 2-17-88

Reviewer

Rayeldand Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 7 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

S. P. PerryDate 2-17-88

Reviewer

RayelaudeDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 8 & 10 DIV. N/AC. ACTUATED EQUIPMENT PROCESS & LINEAR RADIATION MONITORING  
SYSTEM PNL. 912-4

DESCRIPTION: This was the feed for the process and linear radiation monitor for the "Radioactive Waste Effluent," this is no longer in service, reference schematic diagram 4E-1487.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H  
4E-1687 Rev. M  
4E-1487 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. Carrigan Date 2-17-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 9 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Perry Date 2-17-88

Reviewer

Rayelaudi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 11 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S. P. Perry Date 2-17-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 12 & 14 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit  
does not affect the availability of ECCS equipment.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerryDate 2-17-88

Reviewer

Rayel dandiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 13 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Perry Date 2-17-88 Reviewer Rayelaudi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 15 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. CernyDate 2-17-88

Reviewer

RayeldandiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 16 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

D. P. PerryDate 2-17-88

Reviewer

RayeldandrDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 17 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Bourque Date 2-17-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 18 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

D.P. RiquoyDate 2-17-88

Reviewer

Ray E. DauderDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 19 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

D. P. BenigneyDate 2-17-88

Reviewer

Kayeldand Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 20 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J.P. Perry Date 2-17-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 21 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Perry Date 2-17-88

Reviewer

RayeldandiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 22 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H.

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

D.P. PerryDate 2-17-88

Reviewer

RaymondDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 23 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

D.P. PerryDate 2-17-88

Reviewer

RayeldandiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 024 V BUS ±1B CKT. 24 DIV. N/AC. ACTUATED EQUIPMENT Spare

DESCRIPTION: Unassigned spare.

D. REFERENCE DRAWINGS: 4E-1319 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

J. P. PerryDate 2-17-88

Reviewer

RayeldandiDate 3-4-88

125-VDC POWER FAILURE  
ANALYSIS INDEX

STATION: Quad Cities

UNIT: 1

BUS: TURBINE BLDG. MAIN BUS 1A-1

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA No.</u>
1	4-kV Swgr Bus 13 ( Main) Feed	QUA-1-125-0001 (Shts. 1-14)
2	4-kV Swgr Bus 14 (Reserve) Feed	QUA-1-125-0002
3	Auto Blowdown Sys. Pnl. 901-32 (Main) Feed	QUA-1-125-0003 (Shts. 1-2)
4	Unassigned	QUA-1-125-0004
5	RHR Sys. Pnl. 901-32 & 901-46	QUA-1-125-0005 (Shts. 1-4)
6	HPCI System Panel 901-39	QUA-1-125-0006
7	Core Spray Inj. Vlv. #1402-6A Ind. Ltes.	QUA-1-125-0007
8	Channel "A" Back-up Scram Vlv. (Pnl. 901-15)	QUA-1-125-0008
9	Unassigned	QUA-1-125-0009
10	Unassigned	QUA-1-125-0010
11	PCI System Inboard Pilot Solenoids - Main Steam Valves (Panel 901-40)	QUA-1-125-0011
12	Unassigned	QUA-1-125-0012
13	Unassigned	QUA-1-125-0013
14	Unassigned	QUA-1-125-0014
15	Unassigned	QUA-1-125-0015
16	Unassigned	QUA-1-125-0016
17	Unassigned	QUA-1-125-0017
18	Unassigned	QUA-1-125-0018
19	Unassigned	QUA-1-125-0019
20	Unassigned	QUA-1-125-0020
21	Unassigned	QUA-1-125-0021
22	Unassigned	QUA-1-125-0022
23	Unassigned	QUA-1-125-0023
24	Unassigned	QUA-1-125-0024

125-VDC POWER FAILURE  
ANALYSIS INDEX

STATION: Quad Cities

UNIT: 1

BUS: REACTOR BLDG. DIST. PANEL 1

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA No.</u>
1	4-kV Swgr. Bus 13-1 (Main) Feed	QUA-1-125-0025 (shts. 1-10)
2	4-kV Swgr. Bus 14-1 (Reserve) Feed	QUA-1-125-0026
3	480-V Swgr. Bus 18 (Main) Feed	QUA-1-125-0027 (shts. 1-19)
4	480-V Swgr. Bus 19 (Reserve) Feed	QUA-1-125-0028
5	Reactor Bldg. Escape Lighting - (CAB. #29)	QUA-1-125-0029
6	Water Spray Fire Prot. Sys. - HPCI Vault	QUA-1-125-0030
7	Dist. Panel Heater	QUA-1-125-0031
8	HPCI Vault Fire Prot. Sys. - Pnl. 2251-47	QUA-1-125-0032
9	Unassigned	QUA-1-125-0033
10	Auto Blowdown Sys. - Pnl. 2201-32	QUA-1-125-0034
11	Unassigned	QUA-1-125-0035
12	CAM/ACAD - Pnl. 901-55	QUA-1-125-0036
13	Standby Diesel Gen. 1/2 - Pnl. 2212-46	QUA-1-125-0037
14	Space	QUA-1-125-0038
15	ATWS-Recirc. Pump Trip Sys.	QUA-1-125-0039
16	Unassigned	QUA-1-125-0040
17	Reactor Bldg. Entry Doors Interlocks	QUA-1-125-0041
18	Reactor Bldg. Entry Doors Interlocks	QUA-1-125-0042
A01	Main Feed From 125-Vdc Turb. Bldg. Main Bus 1A	QUA-1-125-0043
A03	Reserve Feed From 125-Vdc Turb. Bldg. Res. Bus 1B-1	QUA-1-125-0044

125-VDC POWER FAILURE  
ANALYSIS INDEX

STATION: QUAD CITIES

UNIT: 1

BUS: TURBINE BLDG. MAIN BUS 1A

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA No.</u>
B01	Feed to Turb. Bldg. 125-Vdc Main Bus 1A-1	QUA-1-125-0045
B02	Main Feed to Rx. Bldg. 125-Vdc Dist. Pnl.	QUA-1-125-0046
B03	Main Feed to Turbine Bldg. 125-Vdc Reserve Bus 2B	QUA-1-125-0047
B04	Reserve Feed to Turb. Bldg. 125-Vdc Bus 1B-1	QUA-1-125-0048
B05	Feed to Turb. Bldg. 125-Vdc Main Bus 1A-2	QUA-1-125-0049
C01	Ground Detector Recorder	QUA-1-125-0050

BUS: BATTERY BUS 1

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA No.</u>
C01	Feed from Battery #1	QUA-1-125-0051
C02	Feed from Battery Charger #1	QUA-1-125-0052
C03	Feed from Battery Charger #1A	QUA-1-125-0053
C04	Feed to Turb. Bldg. 125-Vdc Main Bus 1A	QUA-1-125-0054

# 125-VDC POWER FAILURE

## ANALYSIS INDEX

STATION: Quad Cities

UNIT: 1

BUS: TURBINE BLDG. RESERVE BUS IB-1

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA No.</u>
1	480-V Swgr. Bus 19 (Main) Feed	QUA-1-125-0055 (shs. 1-19)
2	480-V Swgr. Bus 18 (Reserve) Feed	QUA-1-125-0056
3	4-kV Swgr. Bus 13-1 (Reserve) Feed	QUA-1-125-0057
4	4-kV Swgr. Bus 14-1 (Main) Feed	QUA-1-125-0058 (shs. 1-10)
5	4-kV Swgr. Bus 13 (Reserve) Feed	QUA-1-125-0059
6	4-kV Swgr. Bus 14 (Main) Feed	QUA-1-125-0060 (shs. 1-15)
7	Unassigned	QUA-1-125-0061
8	CAM/CAD Pnl. 901-56	QUA-1-125-0062
9	Core Spray Inj. Vlv. (EP#1402-6B)	QUA-1-125-0063
10	Plant Evacuation Sirens	QUA-1-125-0064
11	Bulk Hydrogen System Pnl. 912-1	QUA-1-125-0065
12	RPS Ch. B. Backup Scram Pnl. 901-17	QUA-1-125-0066
13	Standby DG #1 Pnl. 2251-12	QUA-1-125-0067
14	Standby Cond. Pump Auto-Start Pnl. 901-6	QUA-1-125-0068
15	Prim. Cont. Oxygen Analyzer Pnl. 912-7	QUA-1-125-0069
16	Rx. Bldg. HVAC Pnl. 2251-24X	QUA-1-125-0070
17	Radwaste Control Pnl. 2212-4	QUA-1-125-0071
18	RHR Panel 901-33	QUA-1-125-0072
19	Auto Blowdown Relay Pnl. 2201-32	QUA-1-125-0073
20	Auto Blowdown Sys. Pnl. 901-32	QUA-1-125-0074
21	PCI Vlv. 1-4722A&B Pnl. 901-4	QUA-1-125-0075
22	PCI Relay Pnl. 901-41	QUA-1-125-0076
23	HPCI Sys. Relay Pnl. 901-39	QUA-1-125-0077
24	Unassigned	QUA-1-125-0078

# 125-VDC POWER FAILURE

## ANALYSIS INDEX, Cont.

STATION: Quad Cities

UNIT: 1

### BUS: TURBINE BLDG. RESERVE BUS 1B-1

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA No.</u>
25	Unassigned	QUA-1-125-0079
26	345-kV Control Pnl. 912-2	QUA-1-125-0080
27	Jct. Box ITB-53, ITB-55, ITB-57	QUA-1-125-0081
28	CO <sub>2</sub> Fire Prot. Pnl. 2212-47	QUA-1-125-0082
29	Unassigned	QUA-1-125-0083
30	Unassigned	QUA-1-125-0084
31	Unassigned	QUA-1-125-0085
32	ATWS CAB. 2201-70B	QUA-1-125-0086
33	H <sub>2</sub> Seal Oil Unit Fire Prot. Pnl.	QUA-1-125-0087
34	Unassigned	QUA-1-125-0088
35	Unassigned	QUA-1-125-0089
36	DAC Cabinet	QUA-1-125-0090
37	Unassigned	QUA-1-125-0091
38	Supv. Master Sta. Pnl. 912-8	QUA-1-125-0092
B01	Main Feed From 125-Vdc Mn. Bus 2A (Unit 2) (VIA TB Res. Bus 1B)	QUA-1-125-0093
A01	Reserve Feed From 125-Vdc Mn. Bus 1A	QUA-1-125-0094
A02	Reserve Feed To Rx. Bldg. 125-Vdc Pnl. 1	QUA-1-125-0095
C01	Main Feed To 125-Vdc Res. Bus 1B-2	QUA-1-125-0096

125-VDC POWER FAILURE  
ANALYSIS INDEX

STATION: QUAD CITIES

UNIT: 1

BUS: TURBINE BLDG. MAIN BUS 1A-2

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA No.</u>
1	4-kV Swgr. Bus 11 (Main) Feed	QUA-1-125-0097 (Shts. 1-6)
2	4-kV Swgr. Bus 12 (Reserve) Feed	QUA-1-125-0098
3	480-V Swgr. Bus 15 (Main) Feed	QUA-1-125-0099 (Shts. 1-7)
4	480-V Swgr. Bus 16 (Reserve) Feed	QUA-1-125-0100
5	480-V Swgr. Bus 17 (Reserve) Feed	QUA-1-125-0101
6	Voltage Regulator Cabinet #2251-6	QUA-1-125-0102 (Shts. 1,2)
7	Main Control Rm. Annunciator Pnl. #901-34	QUA-1-125-0103
8	Gen. and Trans. Tripping Relays Pnl. #901-29	QUA-1-125-0104 (Shts. 1,2)
9	Turbine EHC Sys. Cab. #901-31	QUA-1-125-0105
10	Gen. and Trans. Tripping Relays Pnl. #901-29	QUA-1-125-0106
11	345-kV Relay Hood Dist. Pnl. #1	QUA-1-125-0107
12	Unassigned	QUA-1-125-0108
13	Unassigned	QUA-1-125-0109
14	Escape Lighting Turb. Room	QUA-1-125-0110
15	RCIC Condensate Drn. Vlv. Pnl. #901-4	QUA-1-125-0111
16	Cont. Room Ltg. Cab. #10	QUA-1-125-0112
17	Radwaste Bldg. Ltg. Cab. #30	QUA-1-125-0113
18	Unassigned	QUA-1-125-0114
19	Unassigned	QUA-1-125-0115
20	RCIC System Pnl. #901-48	QUA-1-125-0116 (Shts. 1,2)
21	Heating Boiler Ann. and Vlv. Rack	QUA-1-125-0117
22	H2-Stator Cooling Wtr. Pnl. 2251-7	QUA-1-125-0118
23	Unassigned	QUA-1-125-0119
24	Unassigned	QUA-1-125-0120

125-VDC POWER FAILURE  
ANALYSIS INDEX

STATION: QUAD CITIES

UNIT: 1

BUS: TURBINE BLDG. RESERVE BUS 1B-2

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA NO.</u>
1	4KV SWGR BUS 11 (RESERVE) FEED	QUA-1-125-0121
2	4KV SWGR BUS 12 (MAIN) FEED	QUA-1-125-0122 (Shts 1-6)
3	SPARE	QUA-1-125-0123
4	SPARE	QUA-1-125-0124
5	4KV SWGR BUS 16 (MAIN) FEED	QUA-1-125-0125 (Shts 1-5)
5	4KV SWGR BUS 17 (MAIN) FEED	QUA-1-125-0126 (Shts 1-9)
6	4KV SWGR BUS 15 (RESERVE) FEED	QUA-1-125-0127
7	GEN. & TRANSFORMER RLY. PNL. #901-29	QUA-1-125-0128
8	MAIN CONTROL RM. ANN. RLY CAB. #901-34	QUA-1-125-0129
9	SPARE	QUA-1-125-0130
10	SPARE	QUA-1-125-0131
11	SPARE	QUA-1-125-0132
12	SPARE	QUA-1-125-0133
13	SPARE	QUA-1-125-0134
14	VOLT. REG. CAB #2351-6 RESERVE FEED	QUA-1-125-0135
15	SPARE	QUA-1-125-0136
16	H2 & STATOR COOLING WTR CAB. #2251-7	QUA-1-125-0137
16	AUTO. TRANSFER INTERLOCKS	QUA-1-125-0138
17	SPARE	QUA-1-125-0139
18	TURB. EHC PANEL #901-31 RESERVE FEED	QUA-1-125-0140
19	SPARE	QUA-1-125-0141
20	GEN. & TRANS. BACKUP RLY. PNL. RESERVE FEED	QUA-1-125-0142
21	SPARE	QUA-1-125-0143
22	SPARE	QUA-1-125-0144

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-IC. ACTUATED EQUIPMENT 4160-480-V TRANSFORMER SWGR #15 FEED  
BREAKER 4-KV SWGR BUS 13 CUBICLE 1 (ACB  
152-1301)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1301 which feeds transformer #15.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1303 Rev. L, 4E-1347 Rev. F  
4E-1328 Rev. C, 4E-1685E Rev. G, 4E-1318B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This breaker feeds transformer #15 which supplies power to 480-V Swgr 15. The loads of switchgear #15 are non-safety-related.

When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed. Operator action is then required to restore power to 4-kV Bus 13.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. E. HillDate 3-8-89Reviewer RayeldeneDate 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-I
- C. ACTUATED EQUIPMENT CONDENSATE AND BOOSTER PUMP 1A BREAKER  
4-KV SWGR BUS 13 CUB #2 (ACB 152-1302)

DESCRIPTION: The condensate and condensate booster pumps are run with a common motor. The condensate pumps take their suction from the condenser hotwells. The condensate is used to cool the system jet air ejector condensers, the gland steam condensers, and the off-gas condensers before entering the demineralizer system. The condensate booster pumps are provided to raise the pressure of the condensate before passing through the low-pressure heaters and onto the suction of the reactor feedwater pumps. There are four motors provided, but only three are necessary for the dual pumps to deliver the required flow. This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1302 which feeds condensate and booster pump 1A motor.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1303 Rev. L, 4E-1370 Rev. H  
4E-1328 Rev. C, 4E-1685E Rev. G, 4E-1318B Rev. C
- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The condensate booster pumps serve an important but non-safety-related service.

When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed. Operator action is then required to restore power to this bus.

PFA No. QUA-1-125-0001

Rev.: 1

Sh. 2a of 14

## DC POWER FAILURE ANALYSIS

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

A. E. Hill

Date 3-8-89

Reviewer

Raymond

Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS 1A-1 CKT. 1 DIV. ESS-I
- C. ACTUATED EQUIPMENT 4-KV BUS 13 RESERVE FEED BREAKER (ACB 152-1303)

DESCRIPTION: 125-Vdc supply is used for closing, tripping and breaker indication. 4160-Vac power is fed through this breaker (1303) from Unit Auxiliary Transformer #11. This breaker is usually open since Reserve Auxiliary Transformer #12 is the normal source of power to Bus 13.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1303 Rev. L, 4E-1318B Rev. C  
4E-1328 Rev. C, 4E-1685E Rev. G  
4E-1342 Rev. T, 4E-1344 Sh. 1 Rev. A

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). On loss of offsite power Bus 13 can be fed from Diesel Generator #1/2 via Bus 13-1. The only equipment on Bus 13 required for ECCS is the RHR Service Water Pumps 1A and 1B. This equipment is not utilized during the Low-Pressure Coolant Injection Mode but only during the postaccident Containment Cooling Mode. In addition there are 4 RHR Service Water Pumps.

When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: J. E. Hill

Date 3-8-89

Reviewer Rayeldand

Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-I
- C. ACTUATED EQUIPMENT UNDervOLTAGE AUXILIARY RELAYS  
4-KV SWGR BUS 13 CUB #4

DESCRIPTION: 4-kV Bus 13 undervoltage auxiliary relays energize upon a loss of bus voltage. This in turn will trip the tie breakers from Bus 13 to Bus 13-1 and energize the Diesel Generator #1/2, auto start relay. (This is a backup scheme to a similar undervoltage relay function on Bus 13-1.) Also, all loads fed from 4-kV Bus 13 are tripped on bus undervoltage. This 125-Vdc circuit provides the power to the undervoltage auxiliary relay coils.

REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1347 Rev., 4E-1438P Rev. M  
4E-1318B Rev. C, 4E-1370 Rev., 4E-1391 Rev. F  
4E-1342 Rev. T, 4E-1368 Rev. G

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Upon loss of 125-Vdc the Bus 13 load shedding logic and diesel start logic will not perform its intended function on bus undervoltage at Bus 13. The undervoltage logic at Bus 13-1 is available and will auto start Diesel Generator #1/2 and perform the necessary load shedding of Bus 13 (via opening the tie breakers) to maintain a source of power for the Division I ECCS pumps and valves. Operator action is then required if power is to be restored to Bus 13.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: A. E. Hill

Date 3-8-89

Reviewer Rayeland

Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125.V BUS TB MN 1A-1 CKT. 1 DIV. ESS-I
- C. ACTUATED EQUIPMENT CONTROL ROD HYDRAULIC DRIVE PUMP 1A  
BREAKER  
4-KV SWGR BUS 13 CUB #5 (ACB 152-1304)

DESCRIPTION: The CRD drive pump provides water for charging the scram accumulators, for normal drive operation and cooling each CRD mechanism. Two 100% capacity CRD pumps are provided (one is considered a spare). This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1304 which feeds CRD Pump 1A motor.

REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1303 Rev. L, 4E-1416 Rev. J  
4E-1328 Rev. C, 4E-1685E Rev. G, 4E-1318B Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). There is an alternate CRD Pump No. 1B fed from Division II which is available. ECCS is not impacted by this circuit's failure.

When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: A. E. Self

Date 3-8-89

Reviewer Rayeldandi Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-I
- C. ACTUATED EQUIPMENT SERVICE WATER PUMP 1A BREAKER  
4-KV SWGR BUS 13 CUB #6 (ACB-152-1305)

DESCRIPTION: The service water system provides strained river water for cooling the reactor and turbine building closed cooling water systems and other building services. The station service water system consists of five service water pumps total for both units. During normal operation there will be four pumps operating with the fifth in standby. This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1305 which feeds Service Water Pump 1A motor.

REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1303 Rev. L, 4E-1391 Rev. F  
4E-1328 Rev. C, 4E-1685E Rev. G, 4E-1318B Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Assuming a condition where all off-site power is lost and a loss-of-coolant accident on Unit 1, the running of one service water pump is sufficient to satisfy the needs of both units. The loss of offsite power will result in both reactors being scrammed. Since Unit 1 has experienced a LOCA, service water supply to Unit 1 is not required and Unit 2 requires only one pump to handle the heat load from the primary containment. Two of the service water pumps are powered from Unit 1 buses and two others are from Unit 2 buses with the fifth pump being able to be powered from both units. Therefore, more than enough service water pumps would be available. ECCS is not impacted by not being able to electrically operate the subject breaker.

## DC POWER FAILURE ANALYSIS

When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: H. E. Hill

Date 3-8-89

Reviewer Raymond Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-1
- C. ACTUATED EQUIPMENT CIRCULATING WATER PUMP 1A BREAKER  
4-KV SWGR BUS 13 CUB #7 (ACB 152-1306)

DESCRIPTION: The circulating water system utilizes three pumps to deliver water to the condenser water boxes. This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker #152-1306 which feeds Circulating Water Pump 1A motor.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1685E Rev. G, 4E-1318B Rev. C  
4E-1328 Rev. C, 4E-1368 Rev. G, 4E-1571 Rev. N  
4E-1303 Rev. L

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The circulating water system is utilized for normal station operations and does not serve any design-basis purpose for reducing the consequences of postulated accidents.

When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: J. E. Hill

Date 3-8-89

Reviewer Ray J. Dand Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-1
- C. ACTUATED EQUIPMENT CONDENSATE AND BOOSTER PUMP 1B BREAKER  
4-KV SWGR BUS 13 CUB #8 (ACB 152-1307)

DESCRIPTION: The condensate and condensate booster pumps are run with a common motor. The condensate pumps take their suction from the condenser hotwells. The condensate is used to cool the steam jet air ejector condensers, the gland steam condensers, and the off-gas condensers before entering the demineralizer system. The condensate booster pumps are provided to raise the pressure of the condensate before passing through the low-pressure heaters and onto the suction of the reactor feedwater pumps. There are four motors provided, but only three are necessary for the dual pumps to deliver the required flow. This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1307 which feeds Condensate and Booster Pump 1B motor.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1303 Rev. L, 4E-1370 Rev. H  
4E-1328 Rev. C, 4E-1685E Rev. G, 4E-1318B Rev. C
- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The condensate booster pumps serve an important but non-safety-related service.

When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed. Operator action is then required to restore power to this bus.

DC POWER FAILURE ANALYSIS

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: M. E. Hill

Date 3-8-89

Reviewer Layel dand Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-1
- C. ACTUATED EQUIPMENT RHR SERVICE WATER PUMP 1B BREAKER  
4-KV SWGR BUS 13 CUB #9 (ACB 152-1308)

DESCRIPTION: The Residual Heat Removal System (RHR) performs 2 specific safety functions, namely:

- a) to restore and maintain the coolant inventory in the reactor vessel, after a LOCA, so that the core is cooled to prevent fuel clad melting (LPCI mode), and
- b) to limit suppression pool water temperatures after a LOCA blowdown (containment cooling mode).

This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1308 which feeds RHR Service Water Pump 1B motor. There are 4 RHR service water pumps and 2 RHR heat exchangers (i.e., 2 pumps per heat exchanger).

Service water flow to the RHR heat exchangers is not required immediately after a LOCA because heat rejection from the containment is not necessary during the time it takes to flood the reactor. Therefore, the RHR service water system is needed only during the postaccident containment cooling mode of the RHR system.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1303 Rev. L, 4E-1438P Rev. M  
4E-1328 Rev. C, 4E-1685E Rev. G, 4E-1318B Rev. C
- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability to close this breaker when required

would disable only RHR Service Water Pump 1B (i.e., the 3 other RHR service water pumps are unaffected).

When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

M. E. Hill

Date 3-8-89

Reviewer

Rayel Daud

Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-I
- C. ACTUATED EQUIPMENT 4-KV BUS 13 CUB #10 FEED BREAKER (ACB 152-1309)

DESCRIPTION: 125-Vdc supply is used for closing, tripping and breaker indication. 4160-Vac power is fed through this breaker (Cub #10) from Res. Aux. Trans. #12 to Bus 13. This breaker is normally closed, since the Reserve Auxiliary Transformer #12 is the preferred source of power for Bus 13.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1685E Rev. G, 4E-1342 Rev. T  
4E-1328 Rev. C, 4E-1318B Rev. C  
4E-1303 Rev. L, 4E-1344 Sh. 1 Rev. A

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., the loss of breaker status indication and the ability to trip and close). Bus 13 feeds RHR Service Water Pumps 1A and 1B. This equipment is not utilized during the low-pressure coolant injection mode but only during the containment cooling mode. On loss of offsite power, Bus 13 is shed. Operator action is then required to restore power to this bus from Diesel Generator #1/2. This failure does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: *J. E. Hill*Date 3-8-89Reviewer: *Rayeldandi*Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-1
- C. ACTUATED EQUIPMENT CIRCULATING WATER PUMP 1B BREAKER  
4-KV SWGR BUS 13 CUB #11 (ACB 152-1310)

DESCRIPTION: The circulating water system utilizes three pumps to deliver water to the condenser water boxes. This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1312 which feeds Circulating Water Pump 1B motor.

- D. REFERENCE DRAWINGS: 4E-1418A Rev. J, 4E-1685E Rev. G, 4E-1318B Rev. C  
4E-1328 Rev. C, 4E-1368 Rev. G, 4E-1571 Rev. N  
4E-1303 Rev. L

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The circulating water system is utilized for normal station operations and does not serve any design basis purpose for reducing the consequences of postulated accidents.

When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: J. E. Hill

Date 3-8-89

Reviewer Rayelband Date 3-13-89

DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-I
- C. ACTUATED EQUIPMENT RHR SERVICE WATER PUMP 1A BREAKER  
4-KV SWGR BUS 13 CUB #12 (ACB 152-1311)

DESCRIPTION: The Residual Heat Removal System (RHR) performs 2 specific safety functions, namely:

- a) to restore and maintain the coolant inventory in the reactor vessel, after a LOCA, so that the core is cooled to prevent fuel clad melting (LPCI mode), and
- b) to limit suppression pool water temperatures after a LOCA blowdown (containment cooling mode).

This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1311 which feeds RHR Service Water Pump 1A motor. There are 4 RHR service water pumps and 2 RHR heat exchangers (i.e., 2 pumps per heat exchanger). Service water flow to the RHR heat exchangers is not required immediately after a LOCA because heat rejection from the containment is not necessary during the time it takes to flood the reactor. Therefore, the RHR service water system is needed only during the postaccident containment cooling mode of the RHR system.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1303 Rev. L, 4E-1438P Rev. M  
4E-1328 Rev. C, 4E-1685E Rev. G, 4E-1318B Rev. C
- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of the 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability to close this breaker when required would disable only RHR Service Water Pump 1A (i.e., the 3 other RHR service water pumps are unaffected).

## DC POWER FAILURE ANALYSIS

When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: M. E. Hill

Date 3-8-89

Reviewer Raymond, Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-I
- C. ACTUATED EQUIPMENT 4-KV BUS 13-1 FEED BREAKER  
4-KV SWGR BUS 13 CUB #13 (ACB 152-1312)

DESCRIPTION: Breaker #152-1312 is utilized as a bus tie that connects Bus 13-1 to Bus 13 and therefore to the reserve auxiliary transformer or unit auxiliary transformer. This 125-Vdc circuit provides the control power to electrically operate Breaker #152-1312.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1303 Rev. L  
4E-1344 Sh. 1 Rev. A, 4E-1328 Rev. C  
4E-1685E Rev. G, 4E-1318B Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip or close). Breaker 1312 is designed to be auto tripped on undervoltage such that 4-kV Bus 13-1 and its loads will be the only bus fed initially from Diesel Generator #1/2. However, all loads fed from Bus 13 are shed on bus undervoltage and not sequenced back onto the bus. Thus there are no extra loads tied to the diesel generator if Breaker #152-1312 is electrically inoperable.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: *M. E. Hill*

Date 3-8-89

Reviewer *Rayel Daudi*

Date 3-13-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 1 DIV. ESS-IC. ACTUATED EQUIPMENT 4160-V to 480-V TRANSFORMER 1A FEED BREAKER  
4-KV SWGR BUS 13 CUB #14 (ACB 152-1313)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker #152-1313 which feeds Maximum Recycle Radwaste Building 4.16-kV/480-V Transformer #1A. This transformer feeds Radwaste Building MCC #1A.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1685E Rev. G, 4E-1318B Rev. C  
4E-1328 Rev. C, 4E-1370 Rev. H, 4E-685 Rev. E  
4E-1303 Rev. L, 4E-650 Rev. T

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical controls (i.e., loss of breaker status indication and the ability to trip and close). There are no safety-related loads attached to this MCC. Therefore, no impact on ECCS.

When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. E. HillDate 3-8-89Reviewer Rayeland Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 2 DIV. ESS-I
- C. ACTUATED EQUIPMENT 4-KV SWGR BUS 14 RESERVE FEED

DESCRIPTION: This 125 Vdc circuit provides control power for electrically operating the 4-kV breakers at Switchgear 14. This feed is an alternate source of 125 Vdc to 4-kV breakers of Bus 14.

- D. REFERENCE DRAWINGS: 4E-1303, Rev. L  
4E-1328, Rev. C  
4E-1318A, B, Rev. C  
4E-1318, Sh. 1, Rev. B  
4E-1685E, Rev. G

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This breaker is normally open and serves as a reserve feed to 4-kV Bus 14. The regular source of 125 Vdc is from TB Res. Bus 1B-1. Therefore there is no impact on ECCS availability if this circuit is lost.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: J.E. Hill

Date 3-8-89

Reviewer: Rayeldandi

Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 3 DIV. ESS-I
- C. ACTUATED EQUIPMENT AUTO-BLOWDOWN SYSTEM PNL. 901-32 (PART I)

DESCRIPTION: This 125-Vdc circuit provides power to relays in the auto-blowdown system Part I. Contacts of these relays are used to automatically actuate the electromatic relief valves and the target rock relief valve.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1685E Rev. G  
4E-1462 Sh. 1 & 2 Rev. AC  
4E-1461 Rev. AF

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would prevent automatic actuation of these relief valves from the auto-blowdown system Part I. However, there exists an auto-blowdown system Part II which is unaffected by this power loss and which will automatically operate the relief valves to perform their intended safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Core Spray Pumps 1A, 1B  
RHR Pumps 1A, 1B, 1C, 1D  
HPCI System  
Auto-Blowdown System (Part II)

Preparer: M. E. Hill

Date 3-8-89

Reviewer Rayeland Date 3-13-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT AUTO-BLOWDOWN SYSTEM PNL. 901-32 (PART II)

DESCRIPTION: 125-Vdc TB MN Bus 1A-1, Ckt. 3 is available as an "alternate source" for auto-blowdown system Part II.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1685E Rev. G  
4E-1462 Sh. 2 Rev. AC  
4E-1462 Sh. 1 Rev. AC

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit does not affect the auto-blowdown system Part II since the regular ESS-II source (i.e., 125-Vdc Turb. Bldg. Bus 1B-1) is available.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Core Spray Pumps 1A, 1B

RHR Pumps 1A, 1B, 1C, 1D

HPCI System

Auto-Blowdown System

Preparer: M. E. HillDate 3-8-89Reviewer Rayland Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 4 DIV. ESS-I
- C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

- D. REFERENCE DRAWINGS: 4E-1318, Sh. 1, Rev. B  
4E-1318, Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 2-2-88Reviewer L.P. Burkey Date 3-2-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 5 DIV. ESS-I
- C. ACTUATED EQUIPMENT RHR SYS. PANEL 901-32 (RELAY LOGIC CIRCUIT)

DESCRIPTION: 125 Vdc is used as power for relay logic circuit "A" of RHR system. On high drywell pressure or reactor low water level the RHR circuit A relays will initiate the LPCI mode of the RHR system (e.g., start pumps 1A and 1B, open injection valves).

- D. REFERENCE DRAWINGS:
- |                           |                        |
|---------------------------|------------------------|
| 4E-1318A, Rev. J          | 4E-1438D, Rev. J       |
| 4E-1318B, Rev. C          | 4E-1438P, Rev. M       |
| 4E-1438C, Rev. X          | 4E-1438Q, Rev. M       |
| 4E-1438J (Sht. 1), Rev. V | 4E-1438K (Shts. 1, 2), |
| 4E-1438J (Sht. 2), Rev. Y | Rev. N                 |
| 4E-1438J (Sht. 3), Rev. V | 4E-1438N, Rev. K       |

- E. DISPOSITION/CONSEQUENCES OF FAILURE: On loss of 125 Vdc, the following equipment cannot operate automatically:

RHR Pump 1A (EP# 1002A)  
RHR Pump 1B (EP# 1002B)  
Associated Valves

Therefore, one loop of RHR is not available to start automatically but redundant loop is available.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

RHR Pumps 1C, 1D

Cores Spray 1A, 1B

HPCI System

Auto-Blowdown System

Prepared by:

Rayeldandi

Date 3-16-88

Reviewer

J. P. Perry

Date 3-18-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 5 DIV. ESS-1
- C. ACTUATED EQUIPMENT RHR SYS. PANEL 901-46 (BREAK DETECTION CIRCUIT)

DESCRIPTION: Break detection circuit "A" is used to sense a broken RHR line and thus isolate the system by closing certain valves.

- D. REFERENCE DRAWINGS: 4E-1318A, Rev. J      4E-1438K (Sht. 1), Rev. N  
4E-1318B, Rev. C      4E-1438P, Rev. M  
4E-1438C, Rev. X      4E-1438Q, Rev. M  
4E-1438D, Rev. J  
4E-1438J (Sht. 3), Rev. V

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Could not use break detection circuit A to isolate lines but there is a redundant break detection "B" circuitry which would function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: Rayeldandi Date 3-16-88 Reviewer J.P. Penney Date 3-18-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 5 DIV. ESS-I
- C. ACTUATED EQUIPMENT CORE SPRAY SYSTEM I PANEL 901-32

DESCRIPTION: 125 Vdc is used to energize interlocking relays to operate core spray valves and core spray pump 1401A.

- D. REFERENCE DRAWINGS: 4E-1318A, Rev. J.  
4E-1318B, Rev. C  
4E-1430 Sht. 1, Rev. AK  
4E-1429, Rev. J

DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent automatic starting of core spray pump 1401A and automatic opening/closing of core spray valves.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

RHR Pumps 1A, 1B, 1C, 1D

HPCI System, Auto-Blowdown system

Core Spray Pump 1B

Preparer: Rayel dandi Date 3-16-88

Reviewer J.P. Perry Date 3-18-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 5 DIV. ESS-I
- C. ACTUATED EQUIPMENT HPCI SYSTEM - PANEL 901-32  
(SENSORS AND AUXILIARY RELAYS)

DESCRIPTION: 125 Vdc is used to energize auxiliary relays on high primary containment pressure. Other relays are energized on high reactor water level.

- D. REFERENCE DRAWINGS: 4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1527 (Sht. 3), Rev. B  
4E-1533, Rev. U

- E. DISPOSITION/CONSEQUENCES OF FAILURE: High containment pressure has other redundant circuitry which is not affected by losing this dc source.

Reactor high water level signal does not have redundant circuitry. Therefore the HPCI turbine will not trip automatically on high reactor vessel water level. Operator can manually shut off the HPCI system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

RHR Pumps 1A, 1B, 1C, 1D

Core Spray Pumps 1A, 1B

HPCI System

Auto-Blowdown System

Preparer: Rayeldandi Date 3-16-88 Reviewer J.P. Penney Date 3-18-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 6 DIV. ESS-I
- C. ACTUATED EQUIPMENT HPCI SYSTEM PANEL 901-39

DESCRIPTION: 125 Vdc is used to energize interlocking relays on reactor vessel low water level, high primary containment pressure, excess temperature (steam leak), and steamline high  $\Delta P$ . The interlocking relays will activate HPCI valves.

- D. REFERENCE DRAWINGS: 4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1527, Shts. 1, 2, Rev. B  
4E-1528, Sht. 1, Rev. AC  
4E-1530, Sht. 3, Rev. P  
4E-1527A, Rev. E

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent automatic operation of HPCI valves on these signals. This source of 125 Vdc works as a reserve supply. The main supply is available from Bus 1B-1 Ckt. 23 (Div. II). Therefore there is a redundant source of power.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Core Spray Pumps 1A, 1B  
RHR Pumps 1A, 1B, 1C, 1D  
HPCI System  
Auto-Blowdown System

Preparer: Rajeldandi Date 2-26-88

Reviewer J. P. Reingrey Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 7 DIV. ESS-IC. ACTUATED EQUIPMENT CORE SPRAY INJECTION VALVE (EP #1402-6A)

DESCRIPTION: 125 Vdc is used to indicate core spray injection valve position  
(manually operated valve).

D. REFERENCE DRAWINGS: 4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1685F, Rev. G  
4E-1428, Rev. V

DISPOSITION/CONSEQUENCES OF FAILURE: On loss of 125 Vdc valve's position  
is not indicated.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Core Spray Pumps 1A, 1B

RHR Pumps 1A, 1B, 1C, 1D

HPCI System

Auto-Blowdown System

Preparer: Rayeldandi Date 2-2-88Reviewer S.P. Leisney Date 3-3-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 8 DIV. ESS-I
- C. ACTUATED EQUIPMENT CHANNEL "A" REACTOR PROTECTION SYSTEM  
BACKUP SCRAM VALVE (PNL. 901-15)

DESCRIPTION: 125 Vdc is used to energize backup scram valve solenoid upon drywell high pressure, reactor high pressure, reactor low water level, main steam high radiation, and a reactor neutron monitoring signal.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1685E Rev. G  
4E-1465 Rev. U  
4E-1467 Sht. 3 Rev. U  
4E-1466 Shts. 1, 2, & 3 Rev. X

- E. DISPOSITION/CONSEQUENCES OF FAILURE:  
On loss of 125 Vdc this backup scram valve fails to function. There is a channel "B" backup scram valve (Div. ESS II) which is unaffected by this dc circuit failure.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: J. E. Hall

Date 3-8-89

Reviewer Raymond

Date 3-13-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 9 DIV. ESS-I
- C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT  
  
DESCRIPTION: Unassigned.
- D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C
- E. DISPOSITION/CONSEQUENCES OF FAILURE:  
  
REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: Rayeldandi Date 2-2-88Reviewer J.P. Lemieux Date 3-3-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 10 DIV. ESS-I
- C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

- D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318B, Rev. C, 4E-1318A, Rev. J

- E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 2-2-88Reviewer J. P. Penney Date 3-3-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 11 DIV. ESS-I
- C. ACTUATED EQUIPMENT PCI SYSTEM INBOARD PILOT SOLENOIDS - MAIN STEAM VALVES (PANEL 901-40)

DESCRIPTION: 125 Vdc is used for the inboard main steam isolation valve (MSIV) position indicators and pilot solenoids. Each MSIV has two solenoids (i.e., an ac solenoid and a dc solenoid). If either of the two solenoids is energized, the pilot valve will open the MSIV. Deenergizing both solenoids will close the MSIV. In addition, there is a separate third solenoid used for testing purposes.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J      4E-1502 Rev. J  
4E-1318B Rev. C      4E-1505A Rev. S  
4E-1685E Rev. G
- E. DISPOSITION/CONSEQUENCES OF FAILURE: Upon a loss of 125 Vdc the "DC" main steam valve solenoids de-energize, and the MSIV position cannot be indicated. The four inboard MSIVs are still open and capable of closing when they receive an isolation signal.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: J. E. HillDate 3-8-89Reviewer RayelaudDate 3-13-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 12 DIV. ESS-IC. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318B, Rev. C, 4E-1318A, Rev. J, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 2-2-88Reviewer A.P. Penney Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 13 DIV. ESS-IC. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 2-2-88Reviewer J.P. Curcio Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 14 DIV. ESS-IC. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 2-2-88Reviewer A.P. Bingham Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 15 DIV. ESS-1C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Ray eldandi Date 2-2-88Reviewer J. P. Perry Date 3-3-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 16 DIV. ESS-I
- C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned

- D. REFERENCE DRAWINGS: 4E-1318, Sht 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 2-2-88Reviewer L.P. Bingham Date 3-3-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 17 DIV. ESS-I
- C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT  
  
DESCRIPTION: Unassigned.
- D. REFERENCE DRAWINGS: 4E-1318, Sht 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C
- E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 2-2-88Reviewer J.P. [Signature] Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A -1 CKT. 18 DIV. ESS-IC. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 2-2-88Reviewer L.P. Rigney Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 19 DIV. ESS-IC. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned

D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 2-2-88Reviewer S. P. Penney Date 3-3-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 20 DIV. ESS-I
- C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

- D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Ray eldandi Date 2-2-88Reviewer A.P. Rungiey Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 21 DIV. ESS-IC. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: RayeldandiDate 2-2-88Reviewer J.P. Purgney Date 3-3-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 22 DIV. ESS-1
- C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT  
  
DESCRIPTION: Unassigned.
- D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C
- E. DISPOSITION/CONSEQUENCES OF FAILURE:  
  
REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: Rayeldandi Date 2-2-88Reviewer J.P. Penney Date 3-3-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 23 DIV. ESS-1
- C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

- D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 2-2-88Reviewer J.P. Penney Date 3-3-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities  
UNIT 1
- B. DC SYSTEM 125 V BUS TB MN 1A-1 CKT. 24 DIV. ESS-I
- C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT  
DESCRIPTION: Unassigned.
- D. REFERENCE DRAWINGS: 4E-1318, Sht. 1, Rev. B, Sht. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C
- E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayelaudi Date 2-2-88Reviewer J. Penney Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 1 DIV. ESS-IC. ACTUATED EQUIPMENT STANDBY D/G 1/2 FEED BREAKER 4-KV BUS 13-1 CUB. #1 (ACB 152-1321)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1321. This breaker connects the output of Diesel Generator #1/2 to Bus 13-1.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1328-Rev. D,  
4E-1686 Rev. X, 4E-1304 Rev. S, 4E-1345-Rev. AP  
4E-1438C Rev. Y, 4E-1430 SH. I Rev. AK

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of indication and the ability to trip and close). If this single failure would happen concurrently with a LOOP and LOCA condition, then RHR Pumps 1A and 1B and Core Spray Pump 1A would not be immediately available. In no way will this inhibit Diesel Generator #1 and the other redundant ECCS equipment from performing their required functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1B, RHR Pumps 1C and 1D  
HPCI System, Auto Blowdown System

Preparer: J.E. HillDate 3-16-89Reviewer: RayeldamerDate 3-21-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 1 DIV. ESS-IC. ACTUATED EQUIPMENT UNDERVOLTAGE RELAYS 4-KV SWGR. BUS 13-1  
CUB. #2

DESCRIPTION: 4-kV Bus 13-1 undervoltage auxiliary relays are energized upon a loss of bus voltage. This in turn will energize the Diesel Generator #1/2 auto start relay, trip the tie breaker (#1312) to Bus 13 and send a trip signal to all feeder breakers of Bus 13-1. This 125-Vdc circuit provides the power to the undervoltage auxiliary relay coils.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318 B Rev. C, 4E-1344 Sh.1  
Rev. A,

4E-1318 Sh.1 Rev. B, 4E-1345 Rev. AQ, 4E-1304 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Upon loss of 125 Vdc the Bus 13-1 load shedding logic and diesel start logic could not perform its intended function. (Note: Bus 13 undervoltage auxiliary relays will start the diesel.) The inability of these auxiliary relays to trip the assigned loads can cause an overloading of Diesel Generator #1/2. In no way will this inhibit the other diesel generator (D.G. #1) and the other redundant ECCS equipment from performing its required functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1B, RHR Pumps 1C and 1D  
Auto Blowdown System, HPCI System

Preparer: J.E. HillDate 3-16-89Reviewer Rayelanda Date 3-21-89

DC POWER FAILURE ANALYSIS

A. STATION Quad Cities

UNIT 1

B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 1 DIV. ESS-I

C. ACTUATED EQUIPMENT UNUSED ACB 4-KV SWGR. BUS 13-1 CUB. #10  
(ACB152-1329)

DESCRIPTION: (Spare)

D. REFERENCE DRAWINGS: 4E-1318 A Rev. J, 4E-1318B Rev. C,  
4E-1304 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unused ACB

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: *J.E. Hill*

Date 3-16-89

Reviewer *Ray J. Dandi*

Date 3-21-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 1 DIV. ESS-IC. ACTUATED EQUIPMENT 4-KV PUMP HOUSE AND RELAY HOUSE 500-KVA  
TRANSFORMER 1/2 BREAKER BUS 13-1 CUB. #4  
(ACB 152-1323)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1323. This breaker feeds a 500-kVA transformer at the well water pump house. This transformer steps the voltage from 4160 V to 480-277 V which is then utilized by the pump house distribution panel to feed local equipment.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1328 Rev. D,  
4E-1686 Rev. X, 4E-1304 Rev. S, 4E-1387 D Rev. F,  
4E-1845 Rev. L

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (i.e., on bus undervoltage) has been reviewed. The results are that Diesel Generator #1/2 will be overloaded. In no way will this dc failure inhibit the other diesel generator (DG #1) and its ECCS loads from performing the required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1B, RHR Pumps 1C & 1D  
HPCI System, Auto-Blowdown System

Preparer: H. E. HillDate 3-16-89Reviewer S. R. SavaDate 3-21-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 1 DIV. ESS-IC. ACTUATED EQUIPMENT RHR PUMP 1002B BREAKER BUS 13-1 CUB. #5  
(ACB 152-1324)

DESCRIPTION: The Residual Heat Removal System (RHR) performs 2 specific safety functions, namely:

(a) to restore and maintain the coolant inventory in the reactor vessel after a LOCA so that the core is cooled to prevent fuel clad melting (LPCI mode), and (b) to limit suppression pool water temperatures after a LOCA blowdown (containment cooling mode).

This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1324 which feeds RHR Main System Pump 1B motor. There are four main system pumps in the RHR system. When the plant is at full power this breaker is open.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1686 Rev. X,  
4E-1304 Rev. S, 4E-1685C Rev. J, 4E-1438Q Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability to close this breaker when required would disable only RHR Pump 1B (i.e., 3 other RHR pumps are unaffected).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pumps 1A, 1B; RHR Pumps 1A, 1C and 1D  
Auto Blowdown System; HPCI System

Preparer: M. E. HillDate 3-16-89Reviewer Rayel LandiDate 3-21-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 1 DIV. ESS-IC. ACTUATED EQUIPMENT 4160-480-V TRANSFORMER #18 FEED BREAKER BUS  
13-1 CUB. #6 (ACB 152-1325)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker #152-1325. This breaker is connected to Transformer #18 which steps the voltage from 4160 to 480 V. The output of this transformer is fed to 480-V Bus 18. This bus contains safety-related loads.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1328 Rev. D,  
4E-1686 Rev. X, 4E-1304 Rev. S, 4E-1349 Sh. 1 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of indication and the ability to trip and close). This breaker is normally closed. This transformer is not shed on bus undervoltage. Since no breaker actions are required under a LOOP/LOCA condition, there is no adverse condition created.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: J. E. HillDate 3-16-89Reviewer: LayeldandDate 3-21-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 1 DIV. ESS-IC. ACTUATED EQUIPMENT 4160V to 480V TRANSFORMER #10 FEED BREAKER BUS 13-1 CUB. #7 (ACB 152-1326)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker #152-1326. This breaker feeds a 500-kVA transformer at the off-gas filter building. This transformer steps the voltage from 4160 to 480 V/277 V which is then utilized by different equipment in this building. These loads are not required for a LOCA condition.

REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1328 Rev. D,  
4E-1686 Rev. X, 4E-1304 Rev. S, 4E-1349 Sh. 1 Rev. M  
4E-6230 Rev. A

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one breaker to trip when required (i.e., on bus undervoltage) has been evaluated. The result is that Diesel Generator #1/2 will be overloaded. In no way will this dc failure inhibit the other diesel generator (DG #1) and its ECCS loads from performing the required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1B, RHR Pumps 1C &amp; 1D

HPCI System, Auto-Blowdown System

Preparer: J. E. HillDate 3-16-89Reviewer S. R. SahaDate 3-21-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 1 DIV. ESS-IC. ACTUATED EQUIPMENT 4-KV BUS 13-1 MAIN FEED BREAKER FROM BUS 13, BUS 13-1. CUB. #8 (ACB 152-1327)

DESCRIPTION: 125-Vdc supply is used for closing, tripping and breaker indication. This breaker is normally closed. Breaker #1327 is utilized in series with Breaker #1312 to tie Bus 13 to Bus 13-1. Breaker 1327 trips when Breaker 152-1312 is tripped. When the onsite emergency ac source of power (i.e., Diesel Generator #1/2) is in operation, Bus 13 is shed via opening breaker #1312 and #1327. Operator action is then required to restore power to this bus.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1328 Rev. D, 4E-1686 Rev. X, 4E-1304 Rev. S, 4E-1344 Sh. 3 Rev. A

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc to this swgr. cubicle would prevent closing and tripping of this breaker. There will be no impact on ECCS availability, since Breaker #1312 will operate to isolate Bus 13 from Bus 13-1 and its diesel generator source.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: *J. E. Kel*Date 3-16-89Reviewer: *Rayeldandi*Date 3-21-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 1 DIV. ESS-IC. ACTUATED EQUIPMENT RHR PUMP 1002A BREAKER BUS 13-1 CUB. #9  
(ACB 152-1328)

DESCRIPTION: The Residual Heat Removal System (RHR) performs 2 specific safety functions, namely:

(a) to restore and maintain the coolant inventory in the reactor vessel after a LOCA so that the core is cooled to prevent fuel clad melting (LPCI mode), and (b) to limit suppression pool water temperatures after a LOCA blowdown (containment cooling mode).

This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1328 which feeds RHR Main System Pump 1A motor. There are four main system pumps in the RHR system. When operating the plant at full power, this breaker is open.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1686 Rev. X,  
4E-1304 Rev. S, 4E-1685C Rev. J, 4E-1438Q Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability to close this one breaker when required would disable only RHR Pump 1A (i.e., the 3 other RHR pumps are unaffected).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

DC POWER FAILURE ANALYSIS

Core Spray Pumps 1A, 1B; RHR Pumps 1B, 1C, 1D

Auto Blowdown System; HPCI System

Preparer: M. E. Hill

Date 3-16-89

Reviewer Rayel David

Date 3-21-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS R.B. Pnl. 1 CKT. 1 DIV. ESS-IC. ACTUATED EQUIPMENT CORE SPRAY PUMP 1A (1401-A) BREAKER BUS 13-1 CUB. #10 (ACB 152-1322)

DESCRIPTION: The Core Spray System operates to prevent fuel clad melting by restoring and maintaining the coolant inventory in the reactor vessel following a LOCA. This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1322 which feeds Core Spray Pump 1A motor. There are two 100% capacity core spray pumps. The breakers feeding these pumps are normally open.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1686 Rev. X, 4E-1304 Rev. S, 4E-1685C Rev. J, 4E-1429 Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability to close this one breaker when required would disable only Core Spray Pump 1A (i.e., the other core spray pump is unaffected).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

RHR Pumps 1A, 1B, 1C, 1D; Core Spray Pump 1B  
HPCI System, Auto Blowdown System

Preparer: J. E. HillDate 3-16-89Reviewer RayeldandDate 3-21-89

DC POWER FAILURE ANALYSIS

A. STATION Quad Cities

UNIT 1

B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 2 DIV. ESS-I

C. ACTUATED EQUIPMENT 4-KV SWGR. BUS 14-1 (RESERVE FEED)

DESCRIPTION: 125-Vdc supply is used for closing, tripping and indication of breakers at Bus 14-1. This feed is the alternate source of 125-Vdc to 4-kV swgr. Bus 14-1.

D. REFERENCE DRAWINGS: 4E-1304A Rev. S, 4E-1656B Rev. AE, 4E-1318A Rev. J,  
4E-1318B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent closing and tripping of this breaker. This breaker is normally open and serves as an alternate source to Bus 14-1. The regular source of 125 Vdc to 4 kV Bus 14-1 is from 125 Vdc TB Bus 1B-1 (DIV ESS-II).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: *J.E. Hill* Date 3-16-89 Reviewer *Layeldand* Date 3-21-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT 480-V SWGR. BUS 18 (MAIN FEED) BREAKER BUS 18  
CUB. #182B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V Feed Breaker to Bus 18. This breaker is normally closed.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1686 Rev. X, 4E-1660A Rev. Q,  
4E-1349 Sh. 2 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., the loss of breaker status indication and the ability to trip and close). This breaker is normally closed and is required to be closed under a LOOP/LOCA condition to power essential loads. Therefore, no adverse condition is created by a loss of control power to this circuit.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: *J.E. Hill*Date 3-23-89Reviewer *Rayellad*, Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT 480-V BUS TIE BREAKER (BUS 18 TO BUS 19) BUS 18 CUB. #182C (ACB 1819)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V Tie Breaker #1819. This breaker is normally open and is used in conjunction with normally open Breaker #1918 to tie Bus 18 and Bus 19 loads to one source.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1686 Rev. X, 4E-1660A Rev. Q,  
4E-1349 Sh. 3 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This breaker is normally open and does not close automatically. Furthermore, it is not required to operate for the ECCS to perform its function. The tie breakers are provided for operational flexibility.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: *J. E. Hill*Date 3-23-89Reviewer *Rayeldaniel*Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT 480-V RX BLDG SUPPLY FAN 1B (1-5703B) BUS 18 CUB. #183B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V Breaker of Cubicle #183B of Switchgear #18. This breaker feeds the Reactor Building Supply Fan 1B (#1-5703B). There are a total of 3 Reactor Building supply system fans per unit, two of which operate continuously with one fan in standby. The fans are not safety-related equipment.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1686 Rev. X, 4E-1660A Rev. Q, 4E-1387B Rev. F

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (i.e., on bus undervoltage) has been reviewed. The results are that the Diesel Generator #1/2 will be overloaded. In no way will this dc failure inhibit the other diesel generator (DG #1) and its ECCS loads from performing the required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1B, RHR Pumps 1C &amp; 1D

HPCI System, Auto-Blowdown System

Preparer: M. E. HillDate 3-23-89Reviewer S. K. SahaDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT FUEL POOL COOLING WATER PUMP 1A (#1-1902A)  
BREAKER BUS 18 CUB. #183C

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V Breaker of Cubicle 183C of Switchgear #18. This breaker feeds Fuel Pool Cooling Water Pump 1A. The Fuel Pool Cooling System consists of two 50% capacity pumps and heat exchanger loops per unit. The design objective of the fuel pool cooling and cleanup system is to handle the spent fuel heat load and maintain pool water clarity. The pumps are not safety-related equipment.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1686 Rev. X, 4E-1660A Rev. Q, 4E-1548 Rev. N

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., on bus undervoltage) has been reviewed. The result is that Diesel Generator #1/2 will be overloaded. In no way will this dc failure inhibit the other diesel generator (DG #1) and its ECCS loads from performing the required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1B, RHR Pumps 1C &amp; 1D

HPCI System, Auto-Blowdown System

Preparer: M. E. HillDate 3-23-89Reviewer S. R. SahaDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT EAST TURBINE BLDG SUPPLY FAN 1A (1-5702A)  
BREAKER BUS 18 CUB. #183D

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V Breaker of Cubicle 183D of Switchgear #18. This breaker feeds East Turbine Building Supply Fan 1A (1-5702A). There are a total of 4 supply fans for the East Turbine Building ventilation system. The system operates on two fans with two fans on standby. The fans are not safety-related equipment.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1686 Rev. X, 4E-1660A Rev. Q, 4E-1387A Rev. G

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., on bus undervoltage) has been reviewed. The result is that Diesel Generator #1/2 will be overloaded. In no way will this dc failure inhibit the other diesel generator (DG #1) and its ECCS loads from performing the required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1B, RHR Pumps 1C & 1D  
HPCI System, Auto-Blowdown System

Preparer: A. E. HillDate 3-23-89Reviewer S. R. LahaDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT RX BUILDING SUPPLY FAN 1C (1-5703C) BREAKER  
BUS 18 CUB. #184B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V Breaker of Cubicle 184B of Switchgear #18. This breaker feeds Reactor Building Supply Fan 1C (#1-5703C). There are a total of 3 supply fans per unit. Each unit operates on two fans, the third fan is on standby. The fans are not safety-related equipment.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1686 Rev. X, 4E-1660A Rev. Q, 4E-1387B Rev. F

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., on bus undervoltage) has been reviewed. The results are that Diesel Generator #1/2 will be overloaded. In no way will this dc failure inhibit the other diesel generator (DG #1) and its ECCS loads from performing the required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1B, RHR Pumps 1C &amp; 1D

HPCI System, Auto-Blowdown System

Preparer: M. E. HillDate 3-23-89Reviewer S. R. SahaDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT DIESEL GENERATOR COOLING WATER PUMP 1/2  
(1/2-3903) BREAKER BUS 18 CUB. #184C

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V Breaker of Cubicle 185B of Switchgear 18. This breaker feeds Diesel Generator Cooling Water Pump 1/2. Besides this feed there is an alternate feed from 480-V Unit 2 Switchgear 28.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1686 Rev. X, 4E-1660A Rev. Q, 4E-1351C Rev. E

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The loss of this cooling water pump could lead to the Diesel generator #1/2 being overheated. In no way will this inhibit the other diesel generator (D.G. #1) and its ECCS loads from performing the required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: J. E. Kel Date 3-23-89 Reviewer Ray El Santo Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT RX BLDG EXHAUST FAN 1A (1-5704A) BREAKER  
BUS 18 CUB. #185B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V Breaker of Cubicle 185B of Switchgear #18. This breaker feeds Reactor Building Exhaust Fan 1A (#1-5704A). There are a total of 3 exhaust fans per unit. Each unit operates on two fans, the third fan is on standby. The fans are not safety-related equipment.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1686 Rev. X, 4E-1660A Rev. Q, 4E-1387B Rev. F

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., on bus undervoltage) has been reviewed. The results are that Diesel Generator #1/2 will be overloaded. In no way will this dc failure inhibit the other diesel generator (DG #1) and its ECCS loads from performing the required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1B, RHR Pumps 1C &amp; 1D

HPCI System, Auto-Blowdown System

Preparer: J. E. HillDate 3-23-89Reviewer S. R. SahaDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT RX BLDG COOLING WATER PUMP 1A (1-3701A)  
BREAKER BUS 18 CUB. #185C

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V Breaker of Cubicle 185C of Switchgear #18. This breaker feeds Reactor Building Cooling Water Pump 1A. There are 5 RBCCW pumps and heat exchangers provided for the plant. Two pumps and heat exchangers are in service on each operating unit during normal plant operation. The remaining pump and heat exchanger is a spare and can be lined up to either unit. The pumps are not safety-related.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1686 Rev. X, 4E-1660A Rev. Q, 4E-1397 Rev. G

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., drywell high pressure/low reactor water level) has been reviewed. The results are that Diesel Generator #1/2 will be overloaded. In no way will this dc failure inhibit the other diesel generator (DG #1) and its ECCS loads from performing the required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1B, RHR Pumps 1C & 1D  
HPCI System, Auto-Blowdown System

Preparer: *M. E. Hill*Date 3-23-89Reviewer *A. R. Laha*Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT RX BLDG 480 V MCC 18/19-5 FEED BREAKER BUS 18 CUB. #186A (ACB #1851)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker of Cubicle 186A of Switchgear #18. This breaker is normally open and will close on undervoltage on Bus 19. This breaker is standby source of power to MCC 18/19-5.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1686 Rev. X, 4E-1660A Rev. Q, 4E-1373B Rev. L

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This breaker serves to connect the standby source of power to MCC 18/19-5. MCC 18/19-5 is normally fed from 480-V Bus 19 via normally closed breaker #1951. LPC1 injection and RR loop selection valves are powered from this MCC. A loss of 125 Vdc to this breaker #1851 will not affect the normal source of power to MCC 18/19-5.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 3-23-89Reviewer: RayelandDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT INSTRUMENT AIR COMPR. 1/2 BREAKER BUS 18  
CUB. #186B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V Breaker of Cubicle 186B of Switchgear #18. This breaker feeds instrument air compressor #1/2. This air compressor supplies air to both units simultaneously. Besides this system Unit 1 has instrument air systems A and B. Although not safety-related, the instrument air systems supply numerous safety-related equipment.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1686 Rev. X, 4E-1660A Rev. Q, 4E-1372B Rev. P

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The reactor cannot be operated without instrument air but complete failure will not jeopardize the safe shutdown of the reactor.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: *J.E. Kil*Date 3-23-89Reviewer *Ray Eldand*Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT UNDERVOLTAGE RELAYS 480V-BUS 18

DESCRIPTION: 480-V Bus 18 undervoltage auxiliary relays are energized upon a loss of bus voltage. This in turn will trip all non-safety-related electrically operated feeder breakers of Bus 18. This 125-Vdc circuit provides the power to the undervoltage auxiliary relay coils.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1306 Rev. U,  
4E-1318 Sh. 1 Rev. B, 4E-1349 Sh. 1 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Upon loss of 125 Vdc the Bus 18 load shedding logic could not perform its intended function. The inability of the auxiliary relays to trip the loads can cause an overload on Diesel Generator #1/2. The other diesel generator (DG #1) and its redundant ECCS loads will be available.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1B; RHR Pumps 1C, 1D  
Auto Blowdown System; HPCI System

Preparer: A. E. Hill Date 3-23-89 Reviewer Rayeland Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT 480-V SWGR 18 FEED BREAKER TO RX BLDG. ESS. SERV. 480-V MCC 18-1A, CUB. #183A

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed. The following essential or important loads are fed from this MCC:

480-V Loads

- 1) Motor-operated valves associated with core spray pump 1A
- 2) Motor-operated valves associated with RHR pumps 1A & 1B heat exchanger
- 3) RHR emergency air handling Unit #1A (Pt #1-5746)
- 4) Core Spray emergency air handling Unit #1A (Pt #1-5748)
- 5) RHR emergency air handling Unit #2A (alternate feed) (Pt #2-5746A)
- 6) Diesel room HVAC supply fan #1/2 (Pt #1/2-5727)
- 7) Diesel starting air compressor #1/2B
- 8) Diesel oil transfer pump #1/2 (Pt #1/2-5203)
- 9) Motor-operated isolation valves (several systems)
- 10) H<sub>2</sub>/O<sub>2</sub> monitoring sample pump 1A
- 11) Standby Liquid Control pump 1A

120-V/208-V Loads (via transformer)

- 1) ACAD/CAM System

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1311 Rev. AG, 4E-1318B Rev. C,  
4E-1318 Sh. 1, Rev. B

## DC POWER FAILURE ANALYSIS

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Although this breaker and its loads do not require dc power, a failure in an upstream 125-Vdc Division I circuit could impair the above loads. Some of the above air handling units have backup feeds. The diesel generator #1/2 (swing diesel) auxiliary equipment listed above has feeds from both DIV I Unit 1 and DIV I Unit 2 or has a redundant piece of equipment fed from Unit 2 Division I sources. The core spray pump 1A valves are affected as well as RHR valves associated with the heat exchanger for pumps 1A and 1B. In any case, the total failure of the above components cannot affect the redundant Division II emergency core cooling equipment from Division II sources.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: M. E. Hill Date 3-23-89 Reviewer Rayeldand Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT 480-V SWGR 18 FEED BREAKER TO RX BLDG. ESS.  
SERV. 480-V MCC 18-1B, CUB. #186C

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed. The following essential or important loads are fed from this MCC:

480-V Loads

- 1) Motor-operated valves associated with RHR pumps 1A and 1B
- 2) Standby liquid control tank heater

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1312 Sh. 1 Rev. R, 4E-1318B  
Rev. C, 4E-1318 Sh. 1 Rev. B

E. DISPOSITION/CONSEQUENCES OF FAILURE: Although this breaker and its loads do not rely on dc power, a failure in an upstream 125-Vdc Division I circuit could electrically impair motor-operated valves associated with RHR pumps 1A and 1B. In any case, the total failure of the above circuits cannot affect the redundant Division II core cooling equipment from Division II sources.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 3-23-89Reviewer Rayel dandiDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT 480-V SWGR 18 FEED BREAKER TO TURB. BLDG.  
ESS. SERV. 480-V MCC 18-2, CUB. 184A

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed. The following essential or important loads are fed from this MCC:

480-V Loads

- 1) 125-Vdc battery charger #1A
- 2) 250-Vdc battery charger #1/2
- 3) RHR serv. wtr. pump #1A cooler fans
- 4) RHR serv. wtr. pump #1B cooler fans
- 5) Diesel generator #1/2 cooling wtr pump cooler fans (A&B)

120-V/240-V Loads

- 1) Analog trip sys (ATS) logic

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1310 Rev. Y, 4E-1318B Rev. C,  
4E-1318 Sh. 1 Rev. B

E. DISPOSITION/CONSEQUENCES OF FAILURE: A failure in an upstream 125-Vdc Division I circuit could impair the operation of the cooler fans of diesel generator #1/2 cooling pump and the RHR service water pump cubicle coolers. Also one of the two battery chargers available for the Unit 1, 125-Vdc battery system and one of the two

## DC POWER FAILURE ANALYSIS

chargers available for the Unit 1, 250-Vdc battery system could be inoperable. In any case, the total failure of the above circuits cannot affect the redundant Division II emergency core cooling equipment from Division II sources.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill Date 3-23-89 Reviewer: Rayelaudi Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT 480-V SWGR. 18 FEED BREAKER TO RX BLDG. 480-VAC MCC 18-3, CUB. 185A

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1311 Rev. AG, 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B

E. DISPOSITION/CONSEQUENCES OF FAILURE: A dc failure upstream can disable this MCC and its loads. A review of the loads connected to this MCC shows that none of them are safety-related.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. Hill Date 3-23-89 Reviewer Rayel Dand. Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 VDC BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT 480-V SWGR 18 FEED BREAKER TO CONTROL RM.  
STANDBY HVAC 480-V MCC 18-4, CUB. 186D

DESCRIPTION: This breaker is a manually operated breaker with an electrical shunt trip. This breaker is normally open.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318B Rev. C, 4E-1318 Sh. 1  
Rev. B

E. DISPOSITION/CONSEQUENCES OF FAILURE: This HVAC system is a standby system and is manually started. There is no redundant counterpart. A failure in an upstream 125-Vdc Division I circuit can disable this MCC and its loads. In any case, there is no impact on ECCS by the loss of this HVAC system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. Hill Date 3-23-89 Reviewer Rayeldandi Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 VDC BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT 480-V SWGR 18 FEED BREAKER TO 120/240-VAC UPS  
(PANEL 901-63), CUB. 184D

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed. This breaker feeds a 120-V/240-Vac uninterruptible power supply (UPS) which in turn feeds the 120/240-V essential service bus.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318B Rev. C, 4E-1318 Sh. 1  
Rev. B, 4E-1320 Sh. 1 Rev. Z, 4E-1320 Sh. 2 Rev. Z,  
4E-1660, Rev. E

E. DISPOSITION/CONSEQUENCES OF FAILURE: A failure in an upstream 125-Vdc Division I circuit can disable this feed to the UPS. The UPS and essential service bus have alternate ac feeds as well as a 250-Vdc feed. Therefore power will be available to the essential service bus loads.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. Hill Date 3-23-89 Reviewer Rayel d. d. Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 VDC BUS RB Pnl. 1 CKT. 3 DIV. ESS-IC. ACTUATED EQUIPMENT 480-V SWGR 18 FEED BREAKER TO TURB. & RX  
LDG. LTG. #1, CUB. 185D

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed. This breaker feeds general area lighting circuits in the turbine and reactor buildings.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B, 4E-1660J Rev. E

E. DISPOSITION/CONSEQUENCES OF FAILURE: A failure in an upstream 125-Vdc Division I circuit can disable these lighting circuits. Other emergency lighting would be available. Loss of these lighting loads has no impact on ECCS.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M.E. HillDate 3-23-89Reviewer RayeldandrDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 4 DIV. ESS-IC. ACTUATED EQUIPMENT 480-V SWGR. BUS-19 RESERVE FEED

DESCRIPTION: This feed is normally open and serves as a reserve source of 125-Vdc power for 480-V swgr. Bus 19. This 125-Vdc supply when connected provides control power for electrically operating the 480-V breakers and logic at Bus 19.

D. REFERENCE DRAWINGS: 4E-1306A Rev. U, 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1686 Rev. X, 4E-1661A Rev. N

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close) and the undervoltage logic. But since this is the reserve supply and not the normal supply (i.e., TB Bus 1B-1 CKT 1), there is no impact on ECCS availability.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill Date 3-23-89 Reviewer Rayeland Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 5 DIV. ESS-IC. ACTUATED EQUIPMENT REACTOR BLDG ESCAPE LTG CAB #29

DESCRIPTION: 125 Vdc is used for lighting.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1686 Rev. X,  
4E-1318 Sh. 1 Rev. B

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of escape lighting for fixtures fed from lighting cabinet #29.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-9-88 Reviewer J. P. Perry Date 3-1-88

DC POWER FAILURE ANALYSIS

A. STATION Quad Cities

UNIT 1

B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 6 DIV. ESS-I

C. ACTUATED EQUIPMENT WATER SPRAY FIRE PROT SYSTEM HPCI VAULT

DESCRIPTION: 125 Vdc is used to energize trouble horn and auxiliary relay for alarm.

D. REFERENCE DRAWINGS: -- 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1686 Rev. X,  
4E-1318 Sh. 1 Rev. B, 4E-1597 Rev. U

DISPOSITION/CONSEQUENCES OF FAILURE: Trouble horn and fire alarm gong do not work on loss of 125 Vdc.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldand Date 2-9-88 Reviewer J. P. Perry Date 3-1-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 7 DIV. ESS-IC. ACTUATED EQUIPMENT DISTR. PANEL HEATER

DESCRIPTION: 125 Vdc is used for the space heaters of this Reactor Building Dist. Panel #1.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B, 4E-1686 Rev. X

E. DISPOSITION/CONSEQUENCES OF FAILURE: On loss of 125 Vdc the space heaters will not function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 2-26-88 Reviewer J.P. Birney Date 3-1-88

DC POWER FAILURE ANALYSIS

A. STATION Quad Cities

UNIT 1

B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 8 DIV. ESS-I

C. ACTUATED EQUIPMENT HPCI VAULT FIRE PROT SYSTEM - PANEL 2251-47

DESCRIPTION: 125 Vdc is used to operate deluge valve.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1686 Rev. X,  
4E-1318 Sh. 1 Rev. B, 4E-1597 Rev. U

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc to this panel would prevent, in case of a fire, the operation of the deluge valve.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 2-9-88 Reviewer J.P. Bergin Date 3-1-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 9 DIV. ESS-IC. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B, Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldaudi Date 2-18-88 Reviewer L.P. Perry Date 3-1-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 10 DIV. ESS-IC. ACTUATED EQUIPMENT AUTO BLOWDOWN SYSTEM PART 1

DESCRIPTION: 125Vdc is used to operate solenoids of target rock valves and electromatic relief valves (203-3A, 203-3B, 203-3C, 203-3D and 203-3E).

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C  
4E-1318 Sh. 1 Rev. B, 4E-1686 Rev. X  
4E-1461 Rev. AG  
4E-1462 Rev. AB, 4E-1462A Rev. B

E. DISPOSITION/CONSEQUENCES OF FAILURE: An alternate source of 125-Vdc supply is available from Turbine Bldg Bus 1B-1 (ESS-II). This alternate source is automatically connected when normal supply is lost.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: *M. E. Hill*Date 3-23-89Reviewer *Rayelonde*Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 11 DIV. ESS-IC. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B, Sh. 2 Rev. C

DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-18-88 Reviewer D.P. Poirier Date 3-1-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 12 DIV. ESS-IC. ACTUATED EQUIPMENT CAM/ACAD ANNUNCIATOR SYSTEM PANEL 901-55

DESCRIPTION: 125 Vdc is used to energize relays on an accident signal. These relays provide inputs to the annunciator system and interlock other equipment.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1318 Sh. 1 Rev. B,  
4E-6557 Rev. C, 4E-6559 Rev. K

E. DISPOSITION/CONSEQUENCES OF FAILURE: On loss of 125 Vdc there will not be an alarm signal on an accident condition.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldand Date 2-10-88 Reviewer J. P. Piquier Date 3-1-88

DC POWER FAILURE ANALYSIS

A. STATION Quad Cities

UNIT 1

B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 13 DIV. ESS-I

C. ACTUATED EQUIPMENT STANDBY DIESEL GEN. 1/2 CONT. PANEL 2212-46

DESCRIPTION: 125 Vdc is used for the starting field supply circuit, the diesel generator starting circuit (including fuel pump), protective relays and diesel generator emergency auto start relay circuit.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1686 Rev. X,  
4E-1318 Sh. 1 Rev. B, 4E-1337 Rev. K,  
4E-1351A Sh. 1 Rev. X, Sh. 2 Rev. W

E. DISPOSITION/CONSEQUENCES OF FAILURE: An emergency 125-Vdc supply is provided as an alternate source.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 2-10-88 Reviewer J.P. Berney Date 3-1-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 14 DIV. ESS-IC. ACTUATED EQUIPMENT UNUSED

DESCRIPTION:

D. -REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B

E. DISPOSITION/CONSEQUENCES OF FAILURE: UnusedREQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-26-88 Reviewer S.P. Levis Date 3-1-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 15 DIV. ESS-IC. ACTUATED EQUIPMENT ATWS RECIRC. PUMP TRIP SYSTEM DIV. 1

DESCRIPTION: 125 Vdc is used for the power supplies of the ATWS recirc. pump trip system (through a filter and inverter setup).

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1318 Sh. 1 Rev. B,  
4E-6577C Rev. F, 4E-1686 Rev. X

E. DISPOSITION/CONSEQUENCES OF FAILURE: A 120-Vac supply is available as a parallel power source. There is also a redundant ESS Division II ATWS recirc. pump trip system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 2-10-88 Reviewer J.P. Berney Date 3-1-88

DC POWER FAILURE ANALYSIS

A. STATION Quad Cities

UNIT 1

B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 16 DIV. ESS-I

C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: UNASSIGNED

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B, Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE:

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayel dand Date 2-18-88 Reviewer D. P. Beniquez Date 3-1-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 17 DIV. ESS-IC. ACTUATED EQUIPMENT REACTOR BUILDING PERSONNEL ENTRY DOORS  
INTERLOCKS UNIT 1/2

DESCRIPTION: 125 Vdc is used to operate the RX building door locks for doors 105, 147, 148.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1318 Sh. 1 Rev. B, Sh. 2 Rev. C;  
4E-1686 Rev. X, 4E-6832A Rev. A

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent operating these reactor building doors.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldand - Date 2-18-88 Reviewer J.P. Gurgis Date 3-1-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. 18 DIV. ESS-IC. ACTUATED EQUIPMENT REACTOR BUILDING PERSONNEL ENTRY DOOR  
INTERLOCKS UNIT -1

DESCRIPTION: 125 Vdc is used to operate the RX building door locks for doors 154, 155, 157, 239.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1318 Sh. 1 Rev. B, Sh. 2 Rev. C;  
4E-1686 Rev. X, 4E-6832B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent operating these reactor building doors.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldand Date 2-18-88 Reviewer J.P. Purquy Date 3-1-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. A01 DIV. ESS-IC. ACTUATED EQUIPMENT MAIN FEED FROM TURB. BLDG. 125-VDC MAIN BUS 1A

DESCRIPTION: This 125-Vdc circuit connects (via a copperlink) Turbine Building 125-Vdc Main Bus 1A to Reactor Building Distribution Panel #1.

REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B; Sh. 2 Rev. C, 4E-1318A Rev. J, 4E-1318B Rev. C; 4E-1686 Rev. X

E. DISPOSITION/CONSEQUENCES OF FAILURE: A loss of 125 Vdc would impact the control power to breakers and logic at 4-k Bus 13-1 (i.e., includes breakers for RHR Pumps 1A and 1B, Core Spray Pump 1A and Diesel Generator #1/2) and breakers and logic at 480-V Bus 18. In addition, one of two sources of power to the Auto Blowdown logic would be affected (see PFA: QUA-1-125-25 through 42). The other source of power (125-Vdc Turb. Bldg. Bus 1B-1 Ckt 20) to the Auto Blowdown logic would be available.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Core Spray Pump 1B

RHR Pumps 1C, 1D

HPCI System, Auto Blowdown System

Preparer: J. E. HillDate 3-23-89Reviewer RayelardDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS RB Pnl. 1 CKT. A03 DIV. ESS-1C. ACTUATED EQUIPMENT RES. FEED FROM TURBINE BLDG. 125-VDC RES.  
BUS 1B-1

DESCRIPTION: 125 Vdc is used as emergency feed to RX bldg. distr. panel.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B; Sh. 2 Rev. C, 4E-1318A Rev. J,  
4E-1318B Rev. C; 4E-1686 Rev. XE. DISPOSITION/CONSEQUENCES OF FAILURE: Used in emergency. Normally not  
connected, but can be connected via a copper link.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-26-88 Reviewer J.P. Perone Date 3-2-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A CKT. B01 DIV. ESS-IC. ACTUATED EQUIPMENT FEED TO TURBINE BUILDING 125-VDC MAIN BUS 1A-1

DESCRIPTION: This 125-Vdc is connected from 125-Vdc Turb. Bldg. Main Bus 1A to 125-Vdc Turbine Building Main Bus 1A-1 via a fusible disconnect switch. Bus 1A-1 feeds the control circuits of the following safety-related equipment: 4-kV Bus 13, the Auto-Blowdown logic, the RHR logic, the HPCI logic, Core Spray logic, and inboard MSIVs.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1685E Rev. G

E. DISPOSITION/CONSEQUENCES OF FAILURE: A loss of 125 Vdc would prevent automatic initiation of RHR Pumps 1A and B, and Core Spray Pump 1A. An automatic redundant source of power would be available to the HPCI and Auto-Blowdown functions. (See PFA: QUA-1-125-1 through 24.)

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

RHR Pumps 1C, 1D

Core Spray Pump 1B

HPCI System

Auto-Blowdown System

Preparer: J. E. HillDate 3-23-89Reviewer R. J. EldredDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A CKT. B02 DIV. ESS-1C. ACTUATED EQUIPMENT MAIN FEED TO 125-VDC MAIN REACTOR BUILDING  
DIST. PNL. #1

DESCRIPTION: 125 Vdc is used for supplying essential equipment on Reactor Bldg. Dist. Pnl. #1. This distribution panel supplies control power to 4-kV SWGR. Bus 13-1, 480-V SWGR. Bus 18 and the auto-blowdown system.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J      4E-1318B Rev. C  
4E-1461 Rev. AF

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent operation of equipment on 4-kV SWGR. Bus 13-1, 480-V SWGR. Bus-18 and the auto-blowdown system (see PFA: QUA-1-125-25 through 44). An automatic redundant source of power (125 Vdc T. B. Bus 1B-1, Ckt 20) is available for the Auto-Blowdown functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

RHR Pumps 1C, 1D

Core Spray Pump 1B

HPCI System

Auto-Blowdown System

Preparer: M. E. HillDate 3-23-89Reviewer Rayelaud, Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A CKT. B03 DIV. ESS-IC. ACTUATED EQUIPMENT MAIN FEED TO TURBINE BUILDING 125-VDC RE-SERVE BUS #2B (DIV. II) UNIT 2

DESCRIPTION: 125 Vdc is used for the essential loads on turbine building reserve Bus #2B (Unit 2).

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Feed for Unit 2 equipment. No impact on Unit 1 emergency core cooling equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 3-23-89Reviewer Rayel DaudDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A CKT. B04 DIV. ESS-IC. ACTUATED EQUIPMENT RES. FEED TO TURBINE BUILDING BUS #1B-1  
(DIV. II)

DESCRIPTION: 125 Vdc is used as a backup source for the essential loads of TB Bus 1B-1. The disconnect switch to the bus from TB MN 1A is normally open.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc will not affect the availability of ECCS equipment. This is a backup supply. Normal feed is available through Ckt. B01 TB Bus 1B (ESS-II).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M.E. HillDate 3-23-89Reviewer: RaymondDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A CKT. B05 DIV. ESS-IC. ACTUATED EQUIPMENT TURBINE BLDG. 125-VDC MAIN BUS 1A-2 FEED  
(NON-ESS DIV. I)

DESCRIPTION: 125 Vdc is used for nonessential loads (e.g., SWGR. Bus 11, SWGR. Bus 15, EHC equipment, area lighting, generator and transformer equipment, etc.)

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1685C Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent operation of only nonessential equipment. This does not affect the ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 3-23-89Reviewer Rayel DandiDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A CKT. C01 DIV. ESS-IC. ACTUATED EQUIPMENT GROUND DETECTOR RECORDER INSTRUMENT  
COMPARTMENT

DESCRIPTION: 125 Vdc is used for testing the ground leakage of the 125-Vdc system.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1685C Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 3-23-89Reviewer RayelandaDate 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS BATTERY #1 CKT. C01 DIV. ESS-IC. ACTUATED EQUIPMENT FEED FROM 125-VDC BATTERY #1

DESCRIPTION: 125 Vdc is used for essential loads on Turbine Building Bus 1A-1 and Rx Bldg. Dist. Pnl. #1 and nonessential loads on Turbine Building Bus 1A-2.

REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: The consequences of losing the essential loads is discussed in PFA: QUA-1-125-0045 and QUA-1-125-0046.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 3-7-88Reviewer Rayeldand Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS BATTERY #1 CKT. C02 DIV. ESS-IC. ACTUATED EQUIPMENT FEED FROM BATTERY CHARGER #1

DESCRIPTION: 125 Vdc is used for charging the battery #1 (Unit 1).

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1685C Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc will not affect the availability of ECCS equipment. Battery charger #1A will be available as well as the Unit 1 battery.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J.E. HillDate 3-23-89Reviewer Ray Eldon Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS BATTERY #1 CKT. C03 DIV. ESS-IC. ACTUATED EQUIPMENT FEED FROM BATTERY CHARGER 1A

DESCRIPTION: 125 Vdc is used for charging battery #1 (Unit 1).

REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1685C Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit will not affect the availability of ECCS equipment. Battery charger #1 will be available as well as the Unit 1 battery.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HallDate 3-23-89Reviewer Rayelaud, Date 3-29-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS BATTERY #1 CKT. C04 DIV. ESS-IC. ACTUATED EQUIPMENT MAIN FEED TO TURBINE BUILDING 125-VDC MAIN BUS 1A

DESCRIPTION: 125 Vdc is used for the essential and nonessential loads of TURB. BLDG. Bus 1A (Unit 1).

D. REFERENCE DRAWINGS: 4E-1318A Rev. J      4E-1318B Rev. C  
4E-1685C Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would prevent the operation of Unit 1 (ESS-I) essential equipment fed from Bus 1A (i.e., 4-kV SWGR. Bus 13, 13-1, and 480-V SWGR. Bus 18). This makes Div. I ECCS equipment unavailable. HPCI and the auto-blowdown system for Unit 1 are also affected but they have an automatic redundant source of 125-Vdc available. Unit 1 ESS-II ECCS equipment will be available. (See PFA: QUA-1-125-0045, QUA-1-125-0046, and QUA-1-125-0049.)

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Core Spray Pump 1B  
RHR Pumps 1C & 1D  
HPCI System  
Auto-Blowdown System

Preparer: M. E. HillDate 3-23-89Reviewer Rayelband Date 3-29-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT 480-V BUS 19 MAIN FEED BREAKER  
480-V SWGR. BUS 19 CUB 192B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V feed breaker to Bus 19. This breaker is normally closed.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1306 Rev. U  
4E-1349 Sh. 3 Rev. M

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., the loss of breaker status indication and the ability to trip and close). This breaker is closed and required to be closed under a LOOP/LOCA condition to power essential loads. Therefore no adverse condition is created by a loss of control power to this circuit.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill

Date 3-28-89

Reviewer Rayelanda

Date 4-5-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT 480-V BUS TIE BREAKER (BUS 18 TO BUS 19)  
480-V SWGR. BUS 19 CUB 192C (ACB1918)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V tie breaker #1918. This breaker is normally open and is used in conjunction with normally open breaker #1819 to tie bus 19 and bus 18 loads to one source.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1306 Rev. U  
4E-1349 Sh. 3 Rev. M

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This breaker is normally open and does not close automatically. Furthermore it is not required to operate for the ECCS to perform its function. The tie breakers are provided for operational flexibility.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: A. E. Hill

Date 3-28-89

Reviewer: Rayeldandi

Date 4-5-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-IIC. ACTUATED EQUIPMENT TURBINE BUILDING EXHAUST FAN 1C (1-5705C)  
BREAKER 480-V SWGR. BUS 19 CUB 193B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker of cubicle 193B of switchgear 19. This breaker feeds Turbine Building Exhaust Fan 1C. There are a total of 6 turbine building exhaust fans for the station. The system operates on four fans; the other two fans are on standby. The fans are not safety-related equipment.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318 Sh. 1 Rev. B, 4E-1306 Rev. U, 4E-1318B Rev. C, 4E-1318 Sh. 2 Rev. C, 4E-1387A Rev. G

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., bus undervoltage) has been reviewed. The results are that Diesel Generator #1 will not be overloaded.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: J. E. HillDate 3-28-89Reviewer S. K. LahaDate 4-5-89

DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT RX. BUILDING SUPPLY FAN 1A (1-5073A)  
480-V SWGR. BUS 19 CUB 193C

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker of cubicle 193C of switchgear #19. This breaker feeds Reactor Building Supply Fan 1A (#1-5703A). There are a total of 3 supply fans per unit. Each unit operates on two fans; the third fan is on standby. The fans are not safety-related equipment.

REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1306 Rev. U  
4E-1387B Rev. F

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., on bus undervoltage) has been reviewed. The results are that Diesel Generator #1 will not be overloaded.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: M. E. Hill

Date 3-28-89

Reviewer Rayelaud Date 4-5-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-IIC. ACTUATED EQUIPMENT EAST TURBINE BUILDING SUPPLY FAN 1B  
(1-5702B) BREAKER 480-V SWGR. BUS 19 CUB 193D

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker of cubicle 193D of switchgear #19. This breaker feeds East Turbine Building Supply Fan 1B (#1-5702B). There are a total of 4 supply fans for the East Turbine Building Ventilation System. The system operates on two fans with two fans on standby. The fans are not safety-related equipment.

REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B V Rev. C  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1306 Rev. U  
4E-1387A Rev. G

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., on bus undervoltage) has been reviewed. The results are that Diesel Generator #1 will not be overloaded.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: J. E. HillDate 3-28-89Reviewer RayoldDate 4-5-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT RX. BUILDING EXHAUST FAN 1C (1-5704C)  
BREAKER 480-V SWGR. BUS 19 CUB 194B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker of cubicle 194B of switchgear #19. This breaker feeds Reactor Building Exhaust Fan 1C (#1-5704C). There are a total of 3 exhaust fans per unit. Each unit operates on two fans; the third fan is on standby. The fans are not safety-related equipment.

REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1306 Rev. U  
4E-1387B Rev. F

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., on bus undervoltage) has been reviewed. The results are that Diesel Generator #1 will not be overloaded.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: M. E. Hill

Date 3-28-89

Reviewer Rayeldad

Date 4-5-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-IIC. ACTUATED EQUIPMENT RX. BUILDING COOLING WATER PUMP 1/2C  
(1/2-3701C) BREAKER 480-V SWGR. BUS 19 CUB  
194C

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker of cubicle 194C of switchgear #19. This breaker feeds Reactor Building Cooling Water Pump 1/2C. There are five RBCCW pumps and heat exchangers provided for the plant. Two pumps and heat exchangers are in service on each operating unit during normal plant operation. The remaining pump (i.e., this pump) and heat exchanger is a spare and can be lined up to either unit. The pumps are not safety-related equipment.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318 Sh. 1 Rev. B, .  
4E-1306 Rev. U4E-1318B Rev. C, 4E-1318 Sh. 2 Rev. C,  
4E-1387 Rev. G

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit, if running, to trip when required (e.g., on bus undervoltage) has been reviewed. The results are that Diesel Generator #1 will not be overloaded.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: A. E. HillDate 3-28-89Reviewer Rayel dandDate 4-5-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT RX. BUILDING EXHAUST FAN 1B, (1-5704B)  
BREAKER 480-V SWGR. BUS 19 CUB 195B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker of cubicle 195B of switchgear #19. This breaker feeds Reactor Building Exhaust Fan 1B (#1-5704B). There are a total of 3 exhaust fans per unit. Each unit operates on two fans; the third fan is on standby. The fans are not safety-related equipment.

REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1306 Rev. U  
4E-1387B Rev. F

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., on bus undervoltage) has been reviewed. The results are that Diesel Generator #1 will not be overloaded.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill

Date 3-28-89

Reviewer Rayelaud, Date 4-5-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT RX. BUILDING COOLING WATER PUMP 1B  
(1-3701 B) BREAKER 480-V SWGR. BUS 19 CUB  
195C

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker of cubicle 195C of switchgear #19. This breaker feeds Reactor Building Cooling Water Pump 1B. There are five RBCCW pumps and heat exchangers provided for the plant. Two pumps and heat exchangers are in service on each operating unit during normal plant operation. The remaining pump and heat exchanger is a spare and can be lined up to either unit. The pumps are not safety-related equipment.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318 Sh. 1 Rev. B  
4E-1318B Rev. C, 4E-1318 Sh. 2 Rev. C  
4E-1306 Rev. U, 4E-1397 Rev. G
- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., drywell high pressure/low reactor water level) has been reviewed. The results are that Diesel Generator #1 will not be overloaded.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill

Date 3-28-89

Reviewer Ray J. Daudt Date 4-5-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-IIC. ACTUATED EQUIPMENT FUEL POOL COOLING WTR. PUMP 1B (1-1902B)  
BREAKER 480-V SWGR. BUS 19 CUB 195D

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker of cubicle 195D of switchgear #19. This breaker feeds Fuel Pool Cooling Water Pump 1B. The Fuel Pool Cooling System consists of two 50% capacity pumps and heat exchanger loops per unit. The design objective of the fuel pool cooling and cleanup system is to handle the spent fuel heat load and maintain pool water clarity. This pump is not safety-related equipment.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1306 Rev. U  
4E-1548 Rev. N

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability of this one circuit to trip when required (e.g., on bus undervoltage) has been reviewed. The results are that Diesel Generator #1 will not be overloaded.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: J. E. HillDate 3-28-89Reviewer Rayeldand Date 4-5-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-IIC. ACTUATED EQUIPMENT ESS. SERV. DIESEL GEN. COOLING WTR. PUMP #1  
(1-4403) BREAKER 480-V SWGR. BUS 19 CUB 196A

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker of cubicle 196A of switchgear #19. This breaker feeds Diesel Generator Cooling Water Pump #1.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318 Sh. 1 Rev. B,  
4E-1306 Rev. U4E-1318B Rev. C, 4E-1318 Sh. 2 Rev. C,  
4E-1350B Sh. 1 Rev. AC

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The loss of this cooling water pump could lead to the Diesel Generator #1 being overheated. In no way will this inhibit the other diesel generator (DG #1/2) and its ECCS loads from performing required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESCore Spray Pump 1A, RHR Pumps 1A and 1B  
HPCI System, Auto-Blowdown SystemPreparer: M. E. HillDate 3-28-89Reviewer RayelandoDate 4-5-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT RX. BLDG ESS. SERV. MCC 18/19-5 FEED  
BREAKER 480-V SWGR. BUS 19 CUB 196B (ACB  
#1951)

DESCRIPTION: 125-Vdc supply is used for closing, tripping and breaker indication. This breaker is normally closed and will trip and transfer MCC 18/19-5 to 480-V Bus 18 upon undervoltage on Bus 19.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1306 Rev. U  
4E-1373B Rev. L

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The circuitry for this breaker and Breaker #1851 is currently being revised under Modification #M4-1(2)-88-6A to allow transfer to Bus 18 upon loss of dc control power. Thus, once this modification is installed the required ECCS equipment will be available.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES (After completing Modification)

Preparer: M. E. HillDate 3-28-89Reviewer RayeldandDate 4-5-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-IIC. ACTUATED EQUIPMENT UNDERVOLTAGE RELAY 480-V SWGR. BUS 19

DESCRIPTION: 480-V Bus 19 undervoltage auxiliary relays are energized upon a loss of bus voltage. This in turn will trip all non-safety-related electrically operated feeder breakers of Bus 19. This 125-Vdc circuit provides the power to the undervoltage auxiliary relay coils.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318 Sh. 1 Rev. B  
4E-1318B Rev. C, 4E-1318 Sh. 2 Rev. C,  
4E-1306 Rev. U, 4E-1349 Sh. 1 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Upon loss of 125 Vdc the Bus 19 load shedding logic could not perform its intended function. The inability of the auxiliary relays to trip the loads can cause an overload on Diesel Generator #1. The other diesel generator (DG #1/2) and its redundant ECCS loads will be available.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1A, RHR Pumps 1A and 1B  
Auto-Blowdown System, HPCI System

Preparer: J.E. HillDate 3-28-89Reviewer Rayel daveDate 4-5-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT 480-V SWGR 19 FEED BREAKER TO RX. BLDG.  
ESS. SERV. 480-V MCC 19-1, CUB. #195A

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed. The following essential or important loads are fed from this MCC:

480-V Loads

- 1) Motor-Operated Valves Associated with Core Spray Pump 1B
- 2) Motor-Operated Valves Associated with RHR Pump 1C & 1D Heat Exchanger
- 3) Diesel Room HVAC Supply Fan #1 - Normal Feed (pt #1-5727)
- 4) Core Spray Emergency Air Handling Unit #1B (pt #1-5748)
- 5) RHR Emergency Air Handling Unit #1B - Normal Feed (pt #1-5746B)
- 6) Diesel Oil Transfer Pump #1 - Normal Feed (pt #5203-1)
- 7) Diesel Gen. #2 Fuel Oil Transfer Pump - Alternate Feed (pt #5203-1)
- 8) HPCI Emergency Air Handling Unit (pt #1-5747)
- 9) HPCI Cooling Water Gland Seal Condenser Pump (pt #2301-57)
- 10) RHR Emergency Air Handling Unit 2B - Alternate Feed (pt #2-5746B)
- 11) Diesel Room HVAC Supply Fan #2 - Alternate Feed (pt# 2-5727)
- 12) HPCI Oil Tank Heater
- 13) Post LOCA H<sub>2</sub>O<sub>2</sub> Sample Pump 1B
- 14) Motor Operated Isolation Valves (several systems)
- 15) Standby Liquid Control Pump 1B

120-V/208-V loads (via transformer)

- 1) ACAD/CAM SYS.
- 2) Analog Trip Sys. (A75) Logic

D. REFERENCE DRAWINGS: 4E-1306 Rev. U  
4E-1311 Rev. AG  
4E-1318B Rev. C  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: A failure in an upstream dc circuit could impair the above circuits. Some of the air handling units have backup feeds. The Diesel Generator #1 auxiliary equipment listed above has feeds from both Division II Unit 1 and Division II Unit 2. The failure of the HPCI auxiliaries (i.e., oil tank heater, condenser pump) is such that they will not prevent the HPCI system from injecting water into the vessel under LOCA conditions. In any case, the total failure of the above components cannot affect the redundant Division I ECCS equipment from Division I sources (e.g., DG #1/2).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: M. E. Hill

Date 3-28-89

Reviewer Rayelaudi

Date 4-5-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT 480-V SWGR 19 FEED BREAKER TURB. BLDG. ESS.  
SERV. 480-V MCC 19-2, CUB. #194A

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed. The following essential or important loads are fed from this MCC:

### 480-V Loads

- 1) 125-Vdc Battery Charger #1
- 2) 250-Vdc Battery Charger #1
- 3) RHR Serv. Wtr. Pump #1C Cooler Fans
- 4) RHR Serv. Wtr. Pump #1D Cooler Fans
- 5) Diesel Generator #1 Clg. Wtr. Pump Cooler Fans (A & B)
- 6) Diesel Starting Air Compressor 1A & 1B
- 7) Diesel Generator #2 Clg. Wtr. Pump Cooler Fans (A & B) - alternate feed

- D. REFERENCE DRAWINGS: 4E-1360 Rev. U  
4E-1310 Rev. Y  
4E-1318B Rev. C  
4E-1318 Sh. 2 Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE: A failure in an upstream dc circuit could impair the above circuits. The Diesel Generator #1 cooling water pump cooler fans have backup feeds from Unit 2. In addition, one of the two battery chargers available for the Unit 1, 125-Vdc battery system and one of the two chargers available for the Unit 1, 250-Vdc battery system would be

inoperable. In any case, the total failure of the above circuits cannot affect the redundant Division I ECCS equipment from Division I sources.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill

Date 3-28-89

Reviewer Ray el dandi Date 4-5-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT 480-V SWGR 19 FEED BREAKER TO RX. BLDG. ESS. SERV. 480-V MCC 19-4, CUB. #196C

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed. The following essential or important loads are fed from the MCC:

480-V Loads

- 1) Motor-Operated Valves Associated with RHR Pumps 1C & 1D
- 2) Standby Gas Treatment System (SBGTS) Train B Fan, Heater and Dampers
- 3) ACAD Air Compressor

- D. REFERENCE DRAWINGS: 4E-1306 Rev. U, 4E-1318B Rev. C  
4E-1312 Sh. 2 Rev. Q, 4E-1318 Sh. 2 Rev. C
- E. DISPOSITION/CONSEQUENCES OF FAILURE: A failure in an upstream dc circuit could impair the above circuits. Motor-operated valves associated with RHR pumps 1C & 1D would not be electrically functional. In any case, the total failure of the above equipment cannot affect the redundant Division I ECCS equipment from Division I sources.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill

Date 3-28-89

Reviewer Rayeldand Date 4-5-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 2 DIV. ESS-IIC. ACTUATED EQUIPMENT 480-V SWGR 19 FEED BREAKER TO TURB. BLDG.  
480-V MCC 19-3, CUB. #193A

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed.

D. REFERENCE DRAWINGS: 4E-1306 Rev. U  
4E-1310 Rev. Y  
4E-1318B Rev. C  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: A dc failure upstream can disable this MCC and its loads. A review of the loads connected to this MCC shows that none of them are safety related.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: J. E. HillDate 3-28-89Reviewer Rayelaudi Date 4-5-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT 480-V SWGR 19 FEED BREAKER TO RX. BLDG.  
480-V MCC 19-6, CUB. #196D

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed.

- D. REFERENCE DRAWINGS: 4E-1306 Rev. U  
4E-1312 Sht. 2, Rev. Y  
4E-1318B Rev. C  
4E-1318 Sh. 2 Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE: A dc failure upstream can disable this MCC and its loads. A review of the loads connected to this MCC shows that none of them are safety-related.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: A.E. Hill

Date 3-28-89

Reviewer Rayelaud

Date 4-5-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 1 DIV. ESS-II
- C. ACTUATED EQUIPMENT 480-V SWGR 19 FEED BREAKER TO RX. BLDG. LIGHTING 1B.

DESCRIPTION: This breaker is a manually operated breaker and as such does not utilize dc control power. This breaker is normally closed.

- D. REFERENCE DRAWINGS: 4E-1306 Rev. U  
4E-1318B Rev. C  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE: A dc failure upstream can affect the general (non-safety-related) area lighting in the Reactor Building.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: M. E. Hill

Date 3-28-89

Reviewer Rayelaud Date 4-5-89

DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 2 DIV. ESS-II
- C. ACTUATED EQUIPMENT 480-V SWGR. BUS 18 RESERVE FEED

DESCRIPTION: This 125 Vdc circuit provides control power for electrically operating the 480V breakers at Bus 18. This feed is normally open and serves as a reserve source of 125-Vdc power for 480-V SWGR. Bus 18.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1660E Rev. K  
4E-1660A Rev. Q

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). But since a normal source of 125-Vdc power is available to SWGR. Bus 18 from 125-Vdc Reactor Building Panel #1, there is no impact on ECCS availability if this circuit is lost.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: M. E. Hill

Date 3-28-89

Reviewer Rayeldawd, Date 4-5-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 3 DIV. ESS-II
- C. ACTUATED EQUIPMENT 4-KV SWGR. BUS 13-1 RESERVE FEED

DESCRIPTION: This 125 Vdc circuit provides control power for electrically operating the 4 kV breakers at Bus 13-1. This feed is normally open and serves as an alternate reserve source of 125 Vdc power.

- D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1318A & B Rev. J  
4E-1318B Rev. C  
4E-1686 Rev. V

- E. DISPOSITION/CONSEQUENCES OF FAILURE: But since the normal supply of 125 Vdc is available from Reactor Building Panel #1 (Ckt1), there is no impact on ECCS if this circuit is not functional.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill

Date 3-28-89

Reviewer Rayoldaud Date 4-5-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 4 DIV. ESS-IIC. ACTUATED EQUIPMENT BUS TIE BREAKER TO BUS 24-1  
4-KV SWGR. BUS 14-1 CUB #1 ACB-152-1421

DESCRIPTION: 125 Vdc is used for closing, tripping and breaker indication.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C  
4E-1318A Rev. J  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1304 Rev. R  
4E-1346 Sh. 1 Rev. AG

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc to this cubicle would prevent closing and tripping of the breaker. Breaker 152-1421 is a normally open breaker. This breaker is provided for the capability of cross-tying between units and therefore is not normally utilized. To connect between units would require 2 normally open breakers to be closed. In any case, the loss of control power for this breaker could not impact ECCS availability.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 3-30-89Reviewer RayellaDate 4-6-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 4 DIV. ESS-IIC. ACTUATED EQUIPMENT STANDBY DIESEL GEN. 1 BREAKER  
4-KV SWGR. BUS 14-1 CUB #2 (ACB-152-1429)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1429. This breaker connects the output of Diesel Generator #1 to Bus 14-1.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B,  
4E-1318A Rev. J, 4E-1304 Rev. R  
4E-1318 Sh. 2 Rev. C  
4E-1346 Sh. 1 & 2, Rev. AG & Rev. AH

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of indication and the ability to trip and close). If this single failure would happen concurrently with a LOOP and LOCA condition, then RHR pumps IC & ID and Core Spray Pump 1B would not be immediately available. In no way will this inhibit Diesel Generator #1/2 and the other redundant ECCS equipment from performing their required functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1A, RHR Pumps 1A and 1B  
HPCI System, Auto-Blowdown System

Preparer: M. E. HillDate 3-30-89Reviewer Rayeldand Date 4-6-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 4 DIV. ESS-IIC. ACTUATED EQUIPMENT 4160-480-V TRANSFORMER-19 FEED BREAKER  
4-KV SWGR. BUS 14-1 CUB #3 (ACB-152-1423)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker #152-1423. This breaker is connected to transformer #19 which steps the voltage from 4160 to 480 V. The output of this transformer is fed to 480 V Bus 19. This bus contains safety-related loads.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. C  
4E-1318A Rev. J, 4E-1304 Rev. R  
4E-1318 Sh. 2 Rev. C, 4E-1349 Sh. 2 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of indication and the ability to trip and close). This breaker is normally closed. This transformer and its loads are not shed on bus undervoltage. Since no breaker actions are required under a LOOP/LOCA condition and since the diesel generator is sized to handle these transformer loads, there is no adverse condition created.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: A.E. HillDate 3-30-89Reviewer S.K. Laha Date 4-6-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 4 DIV. ESS-IIC. ACTUATED EQUIPMENT RHR PUMP 1002D BREAKER  
4-KV SWGR. BUS 14-1 CUB #4 (ACB-152-1424)

DESCRIPTION: The Residual Heat Removal System (RHR) performs 2 specific safety functions. Namely,

- a) to restore and maintain the coolant inventory in the reactor vessel after a LOCA so that the core is cooled to prevent fuel clad melting (LPCI mode).
- b) to limit suppression pool water temperatures after a LOCA blowdown (containment cooling mode).

This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1424 which feeds RHR main system pump 1D motor. There are four main system pumps in the RHR system. When the plant is at full power, this breaker is open.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1304 Rev. R  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1318 Sh. 1 Rev. B, 4E-1438Q Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability to close this breaker when required would disable only RHR pump 1D (i.e., 3 other RHR pumps are unaffected).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pumps 1A, 1B

RHR Pumps 1A, 1B, 1C

Auto-Blowdown System

HPCI System

Preparer: M. E. Hill

Date 3-30-89

Reviewer Rayel Dawch Date 4-6-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 4 DIV. ESS-IIC. ACTUATED EQUIPMENT SAFE SHUTDOWN NORMAL FEED CONTROL  
BREAKER 4-KV SWGR. BUS 14-1 CUB #5 (ACB-152-  
1425)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker #152-1425. This breaker feeds the safe shutdown pump and associated equipment.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C  
4E-1318A Rev. J  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1304 Rev. R  
4E-1346A Rev. D

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of indication and the ability to trip and close). This breaker is normally open. The safe shutdown equipment is utilized for a 10 CFR Part 50 Appendix R type fire. Therefore, under a LOOP/LOCA condition this breaker and its loads are not utilized.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: A.E. KielDate 3-30-89Reviewer Rayelaudi Date 4-6-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 4 DIV. ESS-II
- C. ACTUATED EQUIPMENT GATE HOUSE AUX. TRANSFORMER FEED DEVICE  
BREAKER 4-KV SWGR. BUS 14-1 CUB #6 (ACB-152-  
1426)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker #152-1426. This breaker feeds an auxiliary transformer at the gatehouse. No safety-related loads are fed from this transformer.

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C, RE-55Q Rev. B  
4E-1318A Rev. J, 4E-1304 Rev. M, RE-53Q Rev. E  
4E-1318 Sh. 1 Rev. B, 4E-1318 Sh. 2 Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., the ability to trip and close and loss of breaker status indication). This breaker is normally closed. The inability of this circuit to trip when required (i.e., on bus undervoltage) has been reviewed. The results are that Diesel Generator #1 will be overloaded. In no way will this dc failure inhibit the other diesel generator (DG #1/2) and its ECCS loads from performing the required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump A, RHR Pumps 1A and 1B HPCI System, Auto Blowdown System.

Preparer: J. E. Hill

Date 3-30-89

Reviewer S. R. Saha Date 4-6-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 4 DIV. ESS-II
- C. ACTUATED EQUIPMENT 4-KV BUS 14-1 MAIN FEED BREAKER 4-KV SWGR.  
BUS 14-1 CUB #7 (ACB-152-1427)

DESCRIPTION: 125 Vdc is used for closing, tripping and breaker indication. This breaker is normally closed. Breaker #1427 is utilized in series with Breaker #1410 to tie Bus 14 to Bus 14-1.

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C  
4E-1318A Rev. J  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1304 Rev. R  
4E-1344 Sh. 4 Rev. A

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc to this cubicle would prevent closing and tripping of the breaker. There will be no impact on ECCS availability, since Breaker #1410 will operate to isolate Bus 14 from Bus 14-1 and its diesel generator source.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: M.E. Hill

Date 3-30-89

Reviewer Rayeldandi

Date 4-6-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 4 DIV. ESS-II
- C. ACTUATED EQUIPMENT RHR PUMP 1002 C BREAKER 4-KV SWGR. BUS 14-1 CUB #8 (ACB-152-1428)

DESCRIPTION: The Residual Heat Removal System (RHR) performs 2 specific safety functions. Namely,

- a) to restore and maintain the coolant inventory in the reactor vessel after a LOCA so that the core is cooled to prevent fuel clad melting (LPCI mode).
- b) to limit suppression pool water temperatures after a LOCA blowdown (containment cooling mode).

This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker #152-1428 which feeds RHR main system pump 1C motor. There are four main system pumps in the RHR system. During normal full power operation this breaker is open.

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C  
4E-1318A Rev. J  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1304 Rev. R  
4E-1438Q Rev. M

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status

indication and the ability to trip and close). The inability to close this breaker when required would disable only RHR pump 1C (i.e., 3 other RHR pumps are unaffected).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pumps 1A, 1B

RHR Pumps 1A, 1B, 1D

Auto-Blowdown System

HPCI System

Preparer: M. E. Hill

Date 3-30-89

Reviewer Rayeldandi

Date 4-6-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 4 DIV. ESS-IIC. ACTUATED EQUIPMENT UNDERVOLTAGE RELAYS 4-KV SWGR. BUS 14-1

DESCRIPTION: 4-kV Bus 14-1 undervoltage auxiliary relays are energized upon a loss of bus voltage. This in turn will energize the Diesel Generator #1 auto start relay, trip the tie breaker (#1410) to Bus 14 and send a trip signal to all feeder breakers of Bus 14-1. This 125-Vdc circuit provides the power to the undervoltage auxiliary relay coils.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B,  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1304 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Upon loss of 125 Vdc the Bus 14-1 load shedding logic and diesel start logic could not perform its intended function. (Note: Bus 14 undervoltage auxiliary relays will start the diesel.) The inability of the auxiliary relays to trip their load can cause an overloading of Diesel Generator #1. In no way will this inhibit the other diesel generator (D.G. #1/2) and the other redundant ECCS equipment from performing the required safety functions.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1A, RHR Pumps 1A &amp; 1B

Auto-Blowdown System, HPCI System

Preparer: J. E. SelfDate 3-30-89Reviewer Raymond Date 4-6-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 4 DIV. ESS-IIC. ACTUATED EQUIPMENT CORE SPRAY PUMP 1B 1401B BREAKER 4-KV SWGR. BUS 14-1 CUB #10 (ABC-152-1422)

DESCRIPTION: The Core Spray System operates to prevent fuel clad melting by restoring and maintaining the coolant inventory in the reactor vessel following a LOCA. This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1422 which feeds Core Spray Pump 1B motor. There are two 100% capacity core spray pumps. When the plant is operating, the breaker is open.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1304 Rev. R, 4E-1429 Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability to close this breaker when required would disable only Core Spray Pump 1B (i.e., the other core spray pump is unaffected).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1A, RHR Pumps 1A and 1B

RHR Pumps 1C and 1D

HPCI System, Auto-Blowdown System

Preparer: J. E. HillDate 3-30-89Reviewer Rayelclaud Date 4-6-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 5 DIV. ESS-II
- C. ACTUATED EQUIPMENT 4-KV SWGR. BUS 13 RESERVE FEED

DESCRIPTION: This 125 Vdc circuit provides control power for electrically operating the 4 kV breakers at Bus 13. This feed is normally open and serves as an alternate reserve source of 125 Vdc power.

- D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1318A Rev. C  
4E-1318B Rev. J  
4E-1653A Rev. M

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Since the normal supply of 125 Vdc is available from TB Main Bus 1A (Ckt 1), there is no impact on ECCS if this circuit isn't functional.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill

Date 3-30-89

Reviewer Ray Eldon

Date 4-6-89

DC POWER FAILURE ANALYSIS

A. STATION Quad Cities

UNIT 1

B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-II

C. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT 4-KV SWGR. BUS 14 CUB #1  
(ACB 152-1401)

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C  
4E-1318A Rev. J  
4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1303 Rev. L

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: A. E. Hill

Date 3-30-89

Reviewer Raymond Date 4-6-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-II
- C. ACTUATED EQUIPMENT CONDENSATE AND BOOSTER PUMP 1D BREAKER  
4-KV SWGR. BUS 14 CUB #2 (ABC 152-1402)

DESCRIPTION: The condensate and condensate booster pumps are run with a common motor. The condensate pumps take their suction from the condenser hotwells. The condensate is used to cool the steam jet air ejector condensers, the gland steam condensers, and the off-gas condenser before entering the demineralizer system. The condensate booster pumps are provided to raise the pressure of the condensate before passing through the low-pressure heaters and into the suction of the reactor feedwater pumps. There are four motors provided but only three are necessary for the dual-pumps to deliver the required flow. This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1402 which feeds condensate and booster pump 1D motor.

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1370 Rev. H, 4E-1303 Rev. L
- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The condensate booster pumps serve an important but non-safety-related service.

When the onsite emergency ac source of power (i.e., diesel generator) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: A. E. Hill

Date 4-3-89

Reviewer Rayel danda Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-IIC. ACTUATED EQUIPMENT CONTROL ROD HYDRAULIC PUMP 1B BREAKER  
4-KV SWGR. BUS 14 CUB #3 (ABC-152-1403)

DESCRIPTION: The CRD drive pump provides water for charging the scram accumulators, for normal drive operation and cooling each CRD mechanism. Two 100% capacity CRD pumps are provided (one is considered a spare). This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1403 which feeds CRD Pump 1B.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1303 Rev. L, 4E-1416 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). There is an alternate CRD Pump No. 1A fed from Division I which is available. ECCS is not impacted by this circuit's failure.

When the onsite emergency ac source of power (i.e., Diesel Generator #1) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: A. E. HillDate 4-3-88Reviewer RayeldandrDate 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-IIC. ACTUATED EQUIPMENT 4160-480-V TRANSFORMER 17 FEED BREAKER  
4-KV SWGR. BUS 14 CUB #4 (ACB 152-1404)

DESCRIPTION: This 125 Vdc circuit provides the control power to electrically operate 4 kV breaker 152-1404 which feeds 4 kV/480 V Transformer #17.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1303 Rev. L, 4E-1348 Rev. D

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This transformer feeds 480-V Switchgear #17 which is a nonessential switchgear.

When the onsite emergency ac source of power (i.e., Diesel Generator #1) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 4-3-89Reviewer Rayel DandiDate 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-IIC. ACTUATED EQUIPMENT 4160 to 480-V TRANSFORMER 16 FEED BREAKER  
4-KV SWGR. BUS 14 CUB #15 (ACB 152-1414)

DESCRIPTION: This 125 Vdc circuit provides the control power to electrically operate 4 kV breaker 152-1414 which feeds 4 kV/480 V transformer #16.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1303 Rev. L, 4E-1348 Rev. D

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125 Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This transformer feeds 480-V Switchgear # 16 which is a nonessential switchgear.

When the onsite emergency ac source of power (i.e., Diesel Generator #1) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: J. E. HillDate 4-3-89Reviewer Raymond Date 4-7-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-II
- C. ACTUATED EQUIPMENT 4-KV BUS 14, RESERVE FEED BREAKER 4-KV SWGR. BUS 14 CUB #6 (ACB 152-1405)

DESCRIPTION: 125-Vdc supply is used for closing, tripping and breaker indication. 4160-Vac power is fed through this breaker from Reserve Aux. Transformer #12. This breaker is usually open, since Unit Aux. Transformer #11 is the preferred source of power to Bus 14.

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1343 Rev. Q

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). On loss of offsite power Bus 14 can be fed from Diesel Generator #1 via Bus 14-1. The only equipment on Bus 14 required for ECCS is the RHR Service Water Pumps 1C and 1D. This equipment is not utilized during the Low-Pressure Coolant Injection mode but only during the postaccident Containment Cooling mode. In addition there are 4 RHR service water pumps.

When the onsite emergency ac source of power (i.e., Diesel Generator #1) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill

Date 4-3-89

Reviewer Rayeldand Date 4-7-89

When the onsite emergency ac source of power (i.e., Diesel Generator #1) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: M. E. Hill

Date 4-3-89

Reviewer Rayel dandi Date 4-7-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-II
- C. ACTUATED EQUIPMENT SERVICE WATER PUMP 1B BREAKER 4-KV SWGR.  
BUS 14 CUB #7 (ACB 152-1406)

DESCRIPTION: The service water system provides strained river water for cooling the reactor and turbine building closed cooling water system and other building services. The station service water system consists of five service water pumps total for both units. During normal operation there will be four pumps operating with the fifth in standby. This 125-Vdc circuit provides the control power to electrically operate 4-kV Breaker 152-1406 which feeds Service Water Pump 1B motor.

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1391 Rev. F

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Assuming a condition where all offsite power is lost and a loss-of-coolant accident on Unit 1, the running of one service water pump is sufficient to satisfy the needs of both units. The loss of offsite power will result in both reactors being scrammed. Since Unit 1 has experienced a LOCA, service water supply to Unit 1 is not required, and Unit 2 requires only one pump to handle the heat load from the primary containment. Two of the service water pumps are powered from Unit 1 buses and two others are from Unit 2 buses with the fifth pump being able to be powered from both units. Therefore more than enough service water pumps would be available. ECCS is not impacted by not being able to electrically operate the subject breaker.

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-IIACTUATED EQUIPMENT CONDENSATE BOOSTER PUMP 1C BREAKER 4-KV  
SWGR. BUS 14 CUB #8 (ACB 152-1407)

DESCRIPTION: The condensate and condensate booster pumps are run with a common motor. The condensate pumps take their suction from the condenser hotwells. The condensate is used to cool the steam jet air ejector condensers and the off-gas condensers before entering the demineralizer system. The condensate booster pumps are provided to raise the pressure of the condensate before passing through the low-pressure heaters and onto the suction of the reactor feedwater pumps. There are four motors provided, but only three are necessary for the dual-pumps to deliver the required flow. This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1407 which feeds Condensate and Booster Pump 1C motor.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1370 Rev. H, 4E-1303 Rev. L

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The condensate booster pumps serve an important but non-safety-related service.

When the onsite emergency ac source of power (i.e., Diesel Generator #1) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: M.E. Hill

Date 4-3-89

Reviewer Raymond Date 4-7-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-II
- C. ACTUATED EQUIPMENT SERVICE WATER PUMP 1/2 BREAKER 4-KV SWGR.  
BUS 14 CUB #9 (ACB 152-1408)

DESCRIPTION: The service water system provides strained river water for cooling the reactor and turbine building closed cooling water systems and other building services. The station service water system consists of five service water pumps total for both units. During normal operation there will be four pumps operating with the fifth in standby. This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1408 which feeds Service Water Pump 1/2. This pump can also be powered from Unit 2 (4-kV Swgr. #24).

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1303 Rev. L, 4E-1391 Rev. F
- E. DISPOSITION/CONSEQUENCES OF FAILURE: Assuming a condition where all offsite power is lost and a loss-of-coolant accident on Unit 1, the running of one service water pump is sufficient to satisfy the needs of both units. The loss of offsite power will result in both reactors being scrammed. Since Unit 1 has experienced a LOCA, service water supply to Unit 1 is not required, and Unit 2 requires only one pump to handle the heat load from the primary containment. Two of the service water pumps are powered from Unit 1 buses and two others are from Unit 2 buses with the fifth pump (i.e., Pump 1/2) being able to be powered from both units. Therefore, more than enough service water pumps would be available. ECCS is not impacted by not being able to electrically operate the subject breaker.

When the onsite emergency ac source of power (i.e., Diesel Generator #1) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer:

M. E. Hill

Date 4-3-89

Reviewer

Rayel Dawd

Date 4-7-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-II
- C. ACTUATED EQUIPMENT RHR SERVICE WATER PUMP 1C (1001-65C)  
BREAKER 4-KV SWGR. BUS 14 CUB #10 (ACB 152-1409)

DESCRIPTION: The Residual Heat Removal System (RHR) performs 2 specific safety functions. Namely:

- a. to restore and maintain the coolant inventory in the reactor vessel, after a LOCA, so that the core is cooled to prevent fuel clad melting (LPCI mode),
- b. to limit suppression pool water temperatures after a LOCA blowdown (containment cooling mode).

This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1409 which feeds RHR Service Water Pump 1C motor. There are 4 RHR Service Water Pumps and 2 RHR Heat Exchangers (i.e., 2 pumps per heat exchanger). Service water flow to the RHR heat exchangers is not required immediately after a LOCA because heat rejection from the containment is not necessary during the time it takes to flood the reactor. Therefore, the RHR Service Water system is needed only during the postaccident Containment Cooling Mode of the RHR system.

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1303 Rev. L, 4E-1438P Rev. M

E.

DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability to close this breaker when required would disable only RHR Service Water Pump 1C (i.e., the 3 other RHR Service Water Pumps are unaffected).

When the onsite emergency ac source of power (i.e., Diesel Generator #1) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer:

M. E. HillDate 4-3-89

Reviewer

RayelandaDate 4-7-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-II
- C. ACTUATED EQUIPMENT 4-KV BUS 14-1 FEED BREAKER 4-KV SWGR. BUS 14 CUB #11 (ACB 152-1410)

DESCRIPTION: Breaker #152-1410 is utilized as a bus tie breaker that connects Bus 14-1 to Bus 14 and therefore to the reserve auxiliary transformer or unit auxiliary transformer. This 125-Vdc circuit provides the control power to electrically operate breaker #152-1410.

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 2 Rev. C  
4E-1318A Rev. J, 4E-1344 Sh. 2 Rev. A  
4E-1318 Sh. 1 Rev. B, 4E-1344 Sh. 4 Rev. A  
4E-1303 Rev. L
- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip or close). Breaker 1410 is designed to be auto tripped on undervoltage such that 4-kV Bus 14-1 and its loads will be the only bus fed initially from diesel generator #1. However, all loads fed from Bus 14 are shed on bus undervoltage and not sequenced back onto the bus. Thus there are no extra loads tied to the diesel generator if breaker #152-1410 is electrically inoperable.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill

Date 4-3-89

Reviewer Rayel David Date 4-7-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-II
- C. ACTUATED EQUIPMENT CIRCULATING WATER PUMP 1C BREAKER 4-KV SWGR. BUS 14 CUB #12 (ACB 152-1411)

DESCRIPTION: The circulating water system utilizes three pumps to deliver water to the condenser waterboxes. This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1411 which feeds circulating water pump 1C motor.

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1303 Rev. L, 4E-1308 Rev. G
- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The circulating water system is utilized for normal station operations and does not serve any design-basis purpose for reducing the consequences of postulated accidents.

When the onsite emergency ac source of power (i.e., Diesel Generator #1) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: J. E. Hill

Date 4-3-89

Reviewer Ray, Idand Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-IIC. ACTUATED EQUIPMENT 4-KV BUS 14 MAIN FEED BREAKER 4-KV SWGR.  
BUS 14 CUB #13 (ACB 152-1412)

DESCRIPTION: 125-Vdc supply is used for closing, tripping and breaker indication. 4160-Vac power is fed through this breaker from Unit Auxiliary Transformer #11. This breaker is normally closed, since Unit Auxiliary Transformer #11 is the preferred source for Bus 14.

D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1343 Rev. Q, 4E-1303 Rev. L

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., the loss of breaker status indication and the ability to trip or close). Bus 14 feeds RHR Service Water Pumps 1C and 1D. This equipment is not utilized during the Low-Pressure Coolant Injection mode but only during the Containment Cooling Mode.

When the onsite emergency ac source of power (i.e., Diesel Generator #1) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus. This failure does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: J. E. HillDate 4-3-89Reviewer Ray Eldand Date 4-7-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-II
- C. ACTUATED EQUIPMENT RHR SERVICE WATER PUMP 1D (1001-65D)  
BREAKER 4-kV SWGR. BUS 14 CUB #14 (ACB 152-1413)

DESCRIPTION: The Residual Heat Removal System (RHR) performs 2 specific safety functions. Namely:

- a. to restore and maintain the coolant inventory in the reactor vessel, after a LOCA, so that the core is cooled to prevent fuel clad melting (LPCI mode), and
- b. to limit suppression pool water temperatures after a LOCA blowdown (containment cooling mode).

This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152 1/13 which feeds RHR Service Water Pump 1D motor. There are 4 RHR service water pumps and 2 RHR heat exchangers (i.e., 2 pumps per heat exchanger). Service water flow to the RHR heat exchangers is not required immediately after a LOCA because heat rejection from the containment is not necessary during the time it takes to flood the reactor. Therefore, the RHR service water system is needed only during the Postaccident Containment Cooling Mode of the RHR system.

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1303 Rev. L, 4E-1438P Rev. M

E.

DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The inability to close this breaker when required would disable only RHR Service Water Pump 1D (i.e., the 3 other RHR Service Water Pumps are unaffected).

When the onsite emergency ac source of power (i.e., Diesel Generator #1) is in operation, Bus 14 is shed. Operator action is then required to restore power to this bus.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer:

M. E. HillDate 4-3-89

Reviewer

RayeldandDate 4-7-89

DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 6 DIV. ESS-II
- C. ACTUATED EQUIPMENT UNDERVOLTAGE AUXILIARY RELAYS AT 4-kV  
SWGR. BUS 14 CUB #15

DESCRIPTION: 4-kV Bus 14 undervoltage auxiliary relays energize upon a loss of bus voltage. This in turn will trip the tie breaker from Bus 14 to Bus 14-1 and energize the Diesel Generator #1 auto start relay. (This is a backup scheme to a similar undervoltage relay function on Bus 14-1.) Also, all loads fed from 4-kV Bus 14 are tripped. This 125-Vdc circuit provides the power to the undervoltage auxiliary relay coils.

- D. REFERENCE DRAWINGS: 4E-1318B Rev. C, 4E-1318 Sh. 1 Rev. B  
4E-1318A Rev. J, 4E-1318 Sh. 2 Rev. C  
4E-1343 Rev. Q
- E. DISPOSITION/CONSEQUENCES OF FAILURE: Upon loss of 125 Vdc the Bus 14 load shedding logic and diesel start logic will not perform its intended function on bus undervoltage at Bus 14. The undervoltage logic at Bus 14-1 is available and will auto start Diesel Generator #1 and perform the necessary load shedding of Bus 14 (via opening the tie breakers) to maintain a source of power for the Division II ECCS pumps and valves. Operator action is then required if power is to be restored to Bus 14.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: A. E. Hill

Date 4-3-89

Reviewer Ray Eldred Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 7 DIV. ESS-IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-26-88Reviewer S.P. Peroney Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 8 DIV. ESS-IIC. ACTUATED EQUIPMENT CAM/CAD Annunciator System B Panel 901-56

DESCRIPTION: 125 Vdc is used for annunciator system and interlocking relays.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-6558, Rev. C  
4E-6560, Rev. K

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent annunciation and interlocking to drywell isolation valve, torus air isolation valve, drywell air control valve and containment pressure check valve.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-26-88Reviewer S.P. Penney Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 9 DIV. ESS-IIC. ACTUATED EQUIPMENT CORE SPRAY INJECTION (MAN. OPER.) VALVE  
1402-6B

DESCRIPTION: 125 Vdc is used to indicate valve position.

D. REFERENCE DRAWINGS: 4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1428, Rev. VE. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent  
indication of valve position.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rajeldandi Date 2-26-88Reviewer J.P. Penney Date 3-9-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 10 DIV. ESS-II
- C. ACTUATED EQUIPMENT PLANT EVACUATION SIREN CONTROL PANEL  
1257

DESCRIPTION: 125 Vdc is used for controlling and operating plant evacuation system at Panel 1257.

- D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1844G, Rev. E
- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent operating plant evacuation sirens.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 2-22-88

Reviewer J.P. Penning Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 11 DIV. ESS-IIC. ACTUATED EQUIPMENT BULK HYDROGEN SYSTEM LOCAL PANEL 2212-40DESCRIPTION: 125 Vdc used to energize solenoid-operated valves (S0-1-5301, 2)  
Unit 1 and Unit 2.D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1632, Rev. FE. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent  
operation of the above valves.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer:

RayeldandiDate 2-19-88

Reviewer

J. P. LevequeDate 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 12 DIV. ESS-IIC. ACTUATED EQUIPMENT CHANNEL "B" REACTOR PROTECTION SYSTEM  
BACKUP SCRAM VALVE (PNL. 901-17)

DESCRIPTION: 125 Vdc is used for energizing backup scram valve "B".

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, 2, Rev. B, Rev. C  
4E-1318A, B, Rev. J, Rev. C  
4E-1467 Sh. 3, Rev. V

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent operation of this back up scram valve. There is an "A" backup scram valve (ESS-I) which is available.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayoldandi Date 2-22-88Reviewer J.P. Bingham Date 3-9-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 13 DIV. ESS-II
- C. ACTUATED EQUIPMENT RELAY METERING AND EXCITATION OF DIESEL GEN. 1

DESCRIPTION: 125 Vdc is used for the initial excitation of DG 1, its starting ckt. and relay and metering.

- D. REFERENCE DRAWINGS: 4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1336, Rev. Q  
4E-1350A Sh. 1, Rev. Z  
4E-1350B Sh. 2, Rev. A, C
- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent starting of DG 1. Standby DG 1/2 would be available.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1A, RHR Pumps 1A and 1B  
HPCI System  
Auto-Blowdown System

Preparer: Royeldandi Date 2-26-88

Reviewer L.P. Perry Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 14 DIV. ESS-IIC. ACTUATED EQUIPMENT STANDBY CONDENSATE PUMP AUTOSTART  
PANEL 901-6

DESCRIPTION: 125 Vdc is used for indication and autostart interlock to condensate and booster pumps 1A, 1B, 1C and 1D which are fed from Swgr. Bus 13 and Bus 14.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1370 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent automatic start of condensate and booster pumps 1A, 1B, 1C and 1D. These pumps are not safety-related equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 4-3-89Reviewer RayeldandDate 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 15 DIV. ESS-IIC. ACTUATED EQUIPMENT PRIM. CONT. OXYGEN ANALYZER

DESCRIPTION: 125 Vdc is used for power input to Prim. Cont. Oxygen Analyzer Panel 912-7.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1848H, Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent operation of oxygen analyzer.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-23-88Reviewer L.P. Serrano Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 16 DIV. ESS-IIC. ACTUATED EQUIPMENT RX BLDG. HVAC SYS. PANEL 2251-24X

DESCRIPTION: 125 Vdc is used to energize interlocking relays to start the Reactor Bldg. supply fans automatically. Also to operate air-operated butterfly isolation valves.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1387B Rev. F  
4E-1387C Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent starting the Reactor Bldg. supply fans automatically. This source is a reserve supply. Normal supply is fed from Bus 1A-1. (CKT. 6).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: *J. E. Hill*Date 4-3-89Reviewer *Rayelands* Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 17 DIV. ESS-IIC. ACTUATED EQUIPMENT RADWASTE CONTROL PANEL ANNUNCIATORS  
2212-4

DESCRIPTION: 125 Vdc is used for annunciation at radwaste control panel.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1543S, Rev. UE. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent  
annunciation of signals at radwaste control panel.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-22-88Reviewer S.P. Penney Date 3-9-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 18 DIV. ESS-II
- C. ACTUATED EQUIPMENT RHR PANEL 901-33

DESCRIPTION: 125 Vdc is used for energizing interlocking relays on high drywell pressure, to operate the auto blowdown valves.

- D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B      4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J      4E-1318B, Rev. C  
4E-1462 Sh. 1, Rev. AC  
4E-1462 Sh. 2, Rev. AC  
4E-1462 Sh. 3, Rev. AD  
4E-1461, Rev. AD  
4E-1462A, Rev. B  
4E-1461A, Rev. B

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the operation of auto blowdown valves by the relays of this circuit. There are other circuits where interlocking relays will energize and operate auto blowdown valves.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1A, RHR Pumps 1A and 1B

Core Spray Pump 1B, RHR Pumps 1C and 1D

HPCI Systems, Auto-Blowdown System

Preparer: Rayeldandi Date 2-23-88

Reviewer J.P. Perry Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 19 DIV. ESS-IIC. ACTUATED EQUIPMENT AUTO-BLOWDOWN (Part I) PANEL 2201-32

DESCRIPTION: 125 Vdc is used for energizing target rock valve and electromatic relief valves and interlocking relays.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1462 Sh. 1, Rev. AC  
4E-1462 Sh. 2, Rev. AC  
4E-1462 Sh. 3, Rev. AD  
4E-1462A, Rev. B  
4E-1461A, Rev. B  
4E-1461, Rev. AF

E. DISPOSITION/CONSEQUENCES OF FAILURE: This source works as a reserve, the normal supply is available from RX Bldg. Panel 1 (Ckt. 10).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1A, RHR Pumps 1A and 1B

Core Spray Pump 1B, RHR Pumps 1C and 1D

Auto-Blowdown System, HPCI System.

Preparer: Rayeldandi Date 2-23-88Reviewer L.P. Penney Date 3-9-88

DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 20 DIV. ESS-II
- C. ACTUATED EQUIPMENT AUTO-BLOWDOWN SYSTEM (PART II) PANEL  
901-32

DESCRIPTION: 125 Vdc is used to energize interlocking relays on high drywell pressure and low reactor pressure vessel level. The interlocking relays energize electromatic valves and target rock valve.

- D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1461, Rev. AF  
4E-1462 Sh. 1, Rev. AC  
4E-1462 Sh. 2, Rev. AC  
4E-1462 Sh. 3, Rev. AD  
4E-1462A, Rev. B

- E. DISPOSITION/CONSEQUENCES OF FAILURE: This source is the main supply, a reserve source is automatically available from TB Main, Bus 1A-1 (CKT. 3).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1A, RHR Pumps 1A and 1B  
Core Spray Pump 1B, RHR Pumps 1C and 1D  
Auto-Blowdown System  
HPCI System

Preparer: M. E. Hill

Date 4-3-89

Reviewer Rayeland

Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 21 DIV. ESS-IIC. ACTUATED EQUIPMENT SOLENOID FOR MAIN VALVE 4722A AND B  
DRYWELL PNEUMATIC DISCHARGE (OUTBOARD)  
VALVE

DESCRIPTION: 125 Vdc is used for energizing this solenoid and for the valve position indicating lights.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1510, Rev. Z

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent energizing the solenoids and indicating lights.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 4-3-89

Reviewer \_\_\_\_\_

Date 4-7-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 22 DIV. ESS-II
- C. ACTUATED EQUIPMENT PCI SYSTEM OUTBOARD PILOT SOLENOIDS-MAIN STEAM VALVES (PANEL 901-41)

DESCRIPTION: 125 Vdc is used for the outboard main steam isolation valve (MSIV) position indicators and pilot solenoids. Each MSIV has two solenoids (i.e., an ac solenoid and a dc solenoid). If either of the two solenoids is energized, the pilot valve will open the MSIV. Deenergizing both solenoids will close the MSIV. In addition, there is a separate third solenoid used for testing purposes.

- D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B, 4E-1318A Rev. J,  
4E-1318B Rev. C, 4E-1318 Sh. 2 Rev. C, 4E-1502  
Rev. J, 4E-1505B, Rev. V
- E. DISPOSITION/CONSEQUENCES OF FAILURE: Upon a loss of 125 Vdc the "DC" main steam valve solenoids deenergize, and the MSIV position cannot be indicated. The four outboard MSIVs are still open and capable of closing when they receive an isolation signal.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: *M. E. Hill*

Date 2-23-88

Reviewer *Rayfield*

Date 3-9-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 23 DIV. ESS-II
- C. ACTUATED EQUIPMENT HPCI SYSTEM RELAY PANEL 901-39

DESCRIPTION: 125 Vdc is used for energizing the interlocking relays to operate HPCI valves.

- D. REFERENCE DRAWINGS: 4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1527A, Rev. E  
4E-1527 Sh. 1, 2, 3, Rev. B

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the interlocking relays from operating the HPCI valves. This is the main supply to the HPCI circuitry. A reserve supply from 125-Vdc TB main Bus 1A-1 (CKT. 6) is automatically available upon loss of the main supply.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Core Spray Pump 1A, RHR Pumps 1A and 1B  
Core Spray Pump 1B, RHR Pumps 1C and 1D  
HPCI System, Auto-Blowdown System

Preparer: Rayeldandi Date 2-25-88

Reviewer A.P. Perry Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 24 DIV. ESS-IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B

4E-1318 Sh. 2, Rev. C

4E-1318A, Rev. J

4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-26-88Reviewer L. Penney Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 25 DIV. ESS-IC. ACTUATED EQUIPMENT UNASSIGNED CIRCUIT

DESCRIPTION: This circuit is not used.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. CE. DISPOSITION/CONSEQUENCES OF FAILURE: Not applicable this is an  
unassigned circuit.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 4-3-89Reviewer RayeldasDate 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 26 DIV. ESS-IC. ACTUATED EQUIPMENT 345-KV CONTROL PANEL 2212-4

DESCRIPTION: 125 Vdc supply to 345-kV control panel.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc is not going to affect ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 3-2-88Reviewer J. P. Bergney Date 3-9-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 27 DIV. ESS-II
- C. ACTUATED EQUIPMENT FIRE PROTECTION EQUIPMENT PT. 4 (TURBINE BEARING LIFT PUMPS, RECIRC. PUMP. MG. SETS FLUID DRIVES AND OIL COOLERS. REACTOR FEEDWATER PUMPS SERV. BLDG. STOREROOM)

DESCRIPTION: 125 Vdc is used to detect fire and send alarm signal.

- D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1597, Rev. U

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent an alarm signal upon a fire at the above equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 2-19-88

Reviewer J. P. Perry Date 3-9-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 28 DIV. ESS-II
- C. ACTUATED EQUIPMENT CO<sub>2</sub> SYSTEM AND DIESEL GENERATOR ROOM  
FIRE PROTECTION PANEL #2212-47

DESCRIPTION: 125 Vdc is used to detect a fire in the diesel generator rooms and for the CO<sub>2</sub> system control circuitry.

- D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, 2, Rev. B, Rev. C  
4E-1595, Rev. L

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent detection of a fire and prevent the CO<sub>2</sub> system from operating properly.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 2-19-88

Reviewer J. P. Perry Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 29 DIV. ESS-IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned 125 Vdc Circuit.

D. REFERENCE DRAWINGS: 4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned Circuit

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer:

RayeldandiDate 3-2-88

Reviewer

J.P. PenneyDate 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 30 DIV. ESS-IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-26-88Reviewer J. P. Perry Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 31 DIV. ESS-IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B

4E-1318 Sh. 2, Rev. C

4E-1318A, Rev. J

4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-26-88Reviewer D.A. Perry Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 32 DIV. ESS-IIC. ACTUATED EQUIPMENT ATWS RECIRC. PUMP TRIP SYSTEM

DESCRIPTION: 125 Vdc is used for the power supplies of ATWS recirc. pump trip system.

D. REFERENCE DRAWINGS: 4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-6577C, Rev. F

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent power supply to ATWS recirc. pump trip system. There is a redundant ESS-I system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 2-26-88Reviewer D.P. Burquey Date 3-9-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 33 DIV. ESS-II
- C. ACTUATED EQUIPMENT FIRE PROTECTION EQUIPMENT PT. 3 (MAIN TRANS. T1, UAT, T11, RAT T12, H<sub>2</sub> SEAL OIL AND TURBINE OIL TANK)

DESCRIPTION: 125 Vdc is used to detect a fire, send an alarm and operate deluge valves for the above equipment.

- D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1596, Rev. F  
4E-1597, Rev. U

- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent alarming of a fire and the actuation of deluge valves at the above equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 2-19-88

Reviewer: D.P. Riquelme Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 34 DIV. ESS-IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer:

RayeldandiDate 2-26-88

Reviewer

J.P. PerryDate 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 35 DIV. ESS-IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer:

RayeldandiDate 2-26-88

Reviewer

J. P. PurgnyDate 3-9-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 36 DIV. ESS-II
- C. ACTUATED EQUIPMENT TELEPHONE DEMARCATION PANEL FOR DAC EQUIPMENT
- DESCRIPTION: 125-Vdc feeds an internal 24-Vdc power supply which powers the telephone equipment apparatus case.
- D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, 2, Rev. B, Rev. C  
4E-1318A, B, Rev. J, Rev. C  
4E-260, Rev. C
- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would result in interruption of power supply to the telephone equipment apparatus case.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE - YESPreparer: Rayeldandi Date 2-24-88Reviewer J. P. Perry Date 3-9-88

DC POWER FAILURE ANALYSIS

A. STATION Quad Cities

UNIT 1

B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 37 DIV. ESS-II

C. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 2-26-88

Reviewer J.P. Burkey Date 3-9-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. 38 DIV. ESS-IIC. ACTUATED EQUIPMENT MASTER SUPERVISORY PANEL 912-8

DESCRIPTION: 125 Vdc is used for power supply of master supervisory panel.

D. REFERENCE DRAWINGS: 4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-465B, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent proper operation of Master Supervisory Panel.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: RayeldandiDate 2-26-88Reviewer S.P. Perry Date 3-9-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. B01 DIV. ESS-II
- C. ACTUATED EQUIPMENT MAIN FEED FROM UNIT 2 125-VDC MAIN BUS 2A  
(VIA TB RES. BUS 1B)

DESCRIPTION: 125 Vdc is used to energize Bus 1B-1. Bus 1B-1 supplies power to 4160V SWGR. Bus 14-1, 4160V SWGR. Bus 14, 480V SWGR. Bus 19, HPCI System Relay Panel, and Auto-Blowdown Panels.

- D. REFERENCE DRAWINGS: 4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C

- E. DISPOSITION/CONSEQUENCES OF FAILURE: For the HPCI system relay panel and ADS panels there are alternate sources immediately available. 4160V Buses 14, 14-1 and 480V Bus 19 will be lost, but redundant ECCS equipment is available from 4160V Bus 13-1, Bus 13 and 480V Bus 18.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

RHR Pumps 1A and 1B

Core Spray Pump 1A

HPCI System

Auto-Blowdown System

Preparer: Rajchdandi Date 3-1-88

Reviewer J. P. Purgiey Date 3-7-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. A01 DIV. ESS-IC. ACTUATED EQUIPMENT RES. FEED FROM 125-VDC MAIN BUS 1A

DESCRIPTION: 125 Vdc from Bus 1A is used as a reserve source of power.

D. REFERENCE DRAWINGS: 4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: The regular source of power to TB RES Bus 1B-1 is available from TB Main Bus 2A (Ckt. B03) via TB Res. Bus 1B.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeland Date 3-2-88Reviewer J.P. Benney Date 3-7-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. A02 DIV. ESS-IIC. ACTUATED EQUIPMENT RESERVE FEED TO RX BLDG. 125 VDC PNL 1

DESCRIPTION: 125 Vdc is used for the essential loads of Reactor Bldg. Dist. Pnl. #1.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1, Rev. B  
4E-1318 Sh. 2, Rev. C  
4E-1318A, Rev. J  
4E-1318B, Rev. C  
4E-1686, Rev. X

E. DISPOSITION/CONSEQUENCES OF FAILURE: This source works as a reserve supply. The regular supply to Reactor Bldg. Dist. Pnl. #1 is from TB Main Bus 1A (Ckt. B02).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: RayeldandiDate 2-26-88Reviewer J.P. RungrenDate 3-7-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-1 CKT. C01 DIV. ESS-IC. ACTUATED EQUIPMENT MAIN FEED TO 125 VDC RES. BUS 1B-2 (NON-ESS.)

DESCRIPTION: 125 Vdc supply is used for supplying non-ESS loads on Bus 1B-2.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 2, Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc supply is not going to affect ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 3-2-88Reviewer J. P. Perry Date 3-7-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 1 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

4-kV SWGR BUS 11, MAIN FEED BREAKER  
4-kV SWGR BUS 11 CUB #1 (ACB #152-1101)

## DESCRIPTION:

125 Vdc is used for closing, tripping, and breaker indication. This breaker supplies power to 4-kV Bus 11 from Unit Aux. Transformer #11. If this source is lost, the bus will be fed from Reserve Aux. Transformer #12 via ACB #152-1104.

## D. REFERENCE DRAWINGS:

4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1303 Rev. K,  
4E-1340 Rev. N, 4E-1338 Rev. W, 4E-1338A Rev. M

## E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The loads connected to this bus are non-safety-related. In addition, Bus 11 is not connected to the onsite emergency ac power sources (i.e., diesel generators).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer:

A. E. HillDate 4-3-89

Reviewer

Rayel David Date 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 1 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

REACTOR FEED PUMP 1C BREAKER  
4-kV SWGR BUS 11 CUB #3  
(ACB #152-1102)

## DESCRIPTION:

This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1102 which feeds reactor feed pump 1C motor.

## D. REFERENCE DRAWINGS:

4E-1318 Rev. J, 4E-1318B Rev. C, 4E-1303 Rev. K,  
4E-1394 Rev. K, 4E-1395 Rev. M

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The reactor feed pumps serve an important but non-safety-related service. Bus 11 is not connected to the onsite emergency ac sources of power (i.e., diesel generators).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 4-3-89Reviewer: RayeldauerDate 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 1 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

4-kV RECIRC. PUMP M/G SET 1A BREAKER  
4-kV SWGR BUS 11 CUB #4 (ACB #152-1103)

## DESCRIPTION:

This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1103 which feeds recirculation pump M/G Set 1A.

## D. REFERENCE DRAWINGS:

4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1303 Rev. K, 4E-1422 Rev. Q

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The recirculation pumps serve an important but non-safety-related service. Bus 11 is not connected to the onsite emergency ac sources of power (i.e., diesel generators).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 4-3-89Reviewer RayeldansDate 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 1 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

4-kV SWGR BUS 11 RESERVE FEED BREAKER  
4-kV SWGR BUS 11 CUB #5 (ACB #152-1104)

## DESCRIPTION:

125 Vdc is used for closing, tripping, and breaker indication. This breaker allows Swgr Bus 11 to be fed from Reserve Aux. Transformer #12 if its normal source Unit Aux. Transformer #11 is lost.

## D. REFERENCE DRAWINGS:

4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1303 Rev. K,  
4E-1340 Rev. N, 4E-1339 Rev. K, 4E-1341 Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The loads connected to Bus 11 are non-safety-related. Also, Bus 11 is not connected to the onsite emergency ac power system (i.e., diesel generators).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: A. E. HillDate 4-3-89Reviewer: RayeldandDate 4-7-89

125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIES

UNIT 1

B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 1 DIV. NON ESS-I

C. ACTUATED EQUIPMENT 4-kV REACTOR FEED PUMP 1A BREAKER,  
4-kV SWGR BUS 11 CUB #6 (ACB #152-1105)

DESCRIPTION: The 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1105 which feeds reactor feed pump 1A motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1303 Rev. K,  
4E-1394 Rev. K

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The reactor feed pumps serve an important but non-safety-related service. Bus 11 is not connected to the onsite emergency ac sources of power (i.e., diesel generators).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: M.E. Hill

Date 4-3-89

Reviewer Rayelaud, Date 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 1 DIV. NON ESS-IC. ACTUATED EQUIPMENT UNDervOLTAGE RELAY 4160-V SWGR BUS 11

## DESCRIPTION:

125 Vdc is used to energize interlocking relays upon undervoltage at Bus 11. Contacts of these relays are used to trip several breakers (e.g., Rx Feed Pump 1A and 1C and Recirc. Pump 1A).

## D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1340 Rev. N

## E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125-Vdc would prevent the operation of these relays, but will not affect ECCS availability. None of the loads connected to Bus 11 are safety-related.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 4-3-89Reviewer RayeldandDate 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 2 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT 4-kV SWGR BUS 12 RESERVE FEED

## DESCRIPTION:

125 Vdc is used for the control circuits of 4-kV Swgr Bus 12 breakers. This source acts as a reserve supply of power and is normally open.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1318 Sht. 2  
Rev. C

## E. DISPOSITION/CONSEQUENCES OF FAILURE:

Loss of 125 Vdc would prevent closing and tripping of Swgr 12 breakers. Normal source of 125 Vdc would be available from TB main bus 1B-2 Ckt 2. The loss of this 125-Vdc source would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayclaud Date 3-31-88Reviewer J.P. Purpura Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 3 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

480-V SWGR BUS 15 MAIN FEED BREAKER  
480-V SWGR BUS 15 CUB #152B (ACB 252-MF15)

## DESCRIPTION:

This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which is the main feed incoming breaker which connects Bus 15 to 4-kV/480 Transformer #15.

## D. REFERENCE DRAWINGS:

4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1305 Rev. U,  
4E-1347 Rev. F

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The equipment on this bus does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 4-3-89Reviewer RayeldandDate 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 3 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

480-V BUS 15-16, TIE BREAKER480-V SWGR BUS 15 CUB #153A (ACB #252-1516)

## DESCRIPTION:

This 125-Vdc circuit provides the control power to electrically operated the 4-kV breaker which is a cross-tie to connect Bus 15 to Bus 16.

## D. REFERENCE DRAWINGS:

4E-1318 Rev. J, 4E-1318B Rev. C, 4E-1305 Rev. U,  
4E-1347 Rev. F

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This breaker is normally open. Bus 15 or 16 does not serve safety-related equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: A. E. HillDate 4-3-89Reviewer RaymondDate 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 3 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

480-V SWGR BUS 15-17 TIE BREAKER480-V SWGR BUS 15 CUB #153B (ACB 252-15/15-17)

## DESCRIPTION:

This 125-Vdc circuit provides the control power to electrically operate the 4-kV breaker which serves as a cross-tie to connect Bus 15 to Bus 17.

## D. REFERENCE DRAWINGS:

4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1305 Rev. U,  
4E-1347 Rev. F

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This breaker is normally open. Bus 15 and Bus 17 do not serve safety-related equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 4-3-89Reviewer Rayeldand Date 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 3 DIV. NON ESS-IC. ACTUATED EQUIPMENT 480-V SERVICE AIR COMPRESSOR #1B BREAKER  
480-V SWGR BUS 15 CUB #154D

## DESCRIPTION:

This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which feeds service air compressor #1B motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1305 Rev. U,  
4E-1372A Rev. T

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: A.E. HillDate 4-3-89Reviewer RayelaudDate 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 3 DIV. NON ESS-IC. ACTUATED EQUIPMENT E.H.C. HYDRAULIC FLUID PUMP 1A  
480-V SWGR Bus 15 CUB #155B

## DESCRIPTION:

This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which feeds the EHC fluid pump 1A motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1305 Rev. U,  
4E-1362 Rev. G

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M.E. HillDate 4-3-89Reviewer Rayeland Date 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 3 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

MAIN POWER TRANSFORMER 1 COOLING FEED 1B  
BREAKER  
480-V SWGR BUS 15 CUB #156C

## DESCRIPTION:

This 125-Vdc circuit provides the control power to electrically operate the shunt trip of the 480-V breaker which feeds the main power transformer cooling equipment 1B.

## D. REFERENCE DRAWINGS:

4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1305 Rev. U,  
4E-1376 Rev. E

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: J. E. HillDate 4-3-89Reviewer Rayeldand Date 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 3 DIV. NON ESS-IC. ACTUATED EQUIPMENT UNDERVOLTAGE RELAYS  
480-V SWGR BUS 15

## DESCRIPTION:

125 Vdc is used to energize an interlocking relay on undervoltage at Bus 15. The interlocking relay trips Bus 15 Main Feed Breaker ACB 152-1301.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1305 Rev. U,  
4E-1347 Rev. F

## E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125-Vdc would prevent tripping of breaker 152-1301 on undervoltage at the bus. This would not affect the availability of ECCS equipment, since all loads that feed from this bus are non-safety-related.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: M. E. HillDate 4-3-89Reviewer RayeldandiDate 4-7-89

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 4 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT 480-V SWGR BUS 16 RES. FEED

## DESCRIPTION:

125 Vdc is used for closing and tripping of swgr breakers. This source is used as a reserve supply of power and is normally not connected.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1318 Sht. 2 Rev. C

## E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent closing and tripping of the breakers if on the reserve source. The normal source of 125 Vdc to 480 V Bus 16 is from Turb. Bldg. Bus 1B-2 (CKT. 5). Failure of this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 3-31-88Reviewer J.P. Perry Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 5 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT 480-V SWGR BUS 17 RES FEED

## DESCRIPTION:

125 Vdc is used for closing and tripping of breakers.

This 125 Vdc source is used as reserve supply of power and is not normally connected.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C,  
4E-1318 Sht. 2 Rev. C

## E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent closing and tripping of swgr breakers if powered from the reserve source. The normal source of 125 Vdc to 480-V Swgr Bus 17 is from Turb Bldg Bus 1B-2 (CKT-5). Failure of this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 3-31-88Reviewer J.P. Penney Date 4-26-88

125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIES

UNIT 1

B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 6 DIV. NON ESS-I

C. ACTUATED EQUIPMENT VOLTAGE REGULATOR AND EXCITATION MAIN  
FEED - PART 1 CABINET #2251-6

DESCRIPTION:

125 Vdc is used for voltage regulator auto-manual  
relaying, excitation control relaying.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1353 Rev. E,  
4E-1354 Rev. H, 4E-1356A Rev. D, 4E-1356B Rev. D

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent voltage  
regulation and excitation control from working properly, but would not affect the  
availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 3-28-88

Reviewer J.P. Pungny Date 4-26-88

125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIES

UNIT 1

B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 6 DIV. NON ESS-I

C. ACTUATED EQUIPMENT VOLTAGE REGULATOR AND EXCITATION MAIN  
FEED - PART 2 CABINET #2251-6

DESCRIPTION:

125 Vdc is used for closing and tripping of exciter field  
breaker, main generator field breaker and controlling  
several auxiliary relays.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1353 Rev. E,  
4E-1354 Rev. H, 4E-1356A Rev. D, 4E-1356B Rev. D

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent operation  
of exciter field breaker and generator field breaker; but would not affect the availability  
of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 3-28-88

Reviewer: J. Pluquy Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 7 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

MAIN CONTROL ROOM ANNUNCIATOR  
(MAIN FEED) PANEL #901-34.

## DESCRIPTION:

125 Vdc is used as dc power source for the annunciator.

## D. REFERENCE DRAWINGS:

4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1579 Rev. E,  
4E-1576 Rev. A, 4E-1577 Rev. A, 4E-1575A Rev. Q,  
4E-1575D Rev. AC, 4E-1575N Rev. M, 4E-1578 Rev. A,  
4E-1575J Rev. Z, 4E-1575U Rev. Y, 4E-1575X Rev. U,  
4E-1575H Rev. Q

## E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the annunciator from operating. This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldandi Date 3-29-88Reviewer J.P. Curran Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 8 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

GENERATOR AND TRANSFORMER TRIPPING  
RELAYS PRIMARY SYSTEM PNL #901-29

## DESCRIPTION:

125 Vdc is used to power the generator, main transformer, and Unit Aux. Transformer Tripping Relays. The tripping relays provide contacts which interlock the Main Feed Breakers of Swgr Bus 11, 12, 13 and 14. In addition, relay contacts are used to trip the turbine, Generator Field breaker and 345-kV oil circuit breakers. Other tripping relays actuate deluge valves to protect the main and unit aux. transformers.

## D. REFERENCE DRAWINGS:

4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1338 Rev. W,  
4E-1596 Rev. F, 4E-1597 Rev. U, 4E-1342 Rev. T

## E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent tripping the above mentioned breakers or actuating the fire protection devices (deluge valves). ECCS availability is unaffected by losing these dc circuits.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayelaudi Date 3-29-88Reviewer J.P. Berging Date 4-26-88

125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIES

UNIT 1

B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 8 DIV. NON ESS-I

C. ACTUATED EQUIPMENT      RES AUX. TRANSFORMER 12  
TRIPPING RELAYS PRIMARY SYSTEM PNL #901-29

DESCRIPTION:

125 Vdc is used to energize relays to trip Non-ESS Swgr Bus Feed Breakers, Trip 345-kV OCBS and open Deluge Vlv for the protection of Res. Aux. Transformer 12.

D. REFERENCE DRAWINGS:      4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1338 Rev. W,  
4E-1339 Rev. H, 4E-1342 Rev. T

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent tripping of Non-ESS Swgr Bus Feed Breakers, opening of Deluge Vlvs and tripping of 345-kV OCBS for the protection of Res. Aux. Trans. 12. This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 3-29-88

Reviewer J.P. Curran Date 4-26-88

125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIES

UNIT 1

B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 9 DIV. NON ESS-I

C. ACTUATED EQUIPMENT Turbine EHC System (Cabinet #901-31)

DESCRIPTION: 125 Vdc is used for Turbine Trip and Alarm Circuit

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1358A Rev. F,  
4E-1358B Rev. G, 4E-1359A Rev. B, 4E-1359B Rev. F,  
4E-1360A Rev. A, 4E-1360B Rev. B.

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent turbine tripping and alarm circuit from functioning. This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 3-29-88 Reviewer J.P. Perry Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 10 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

GENERATOR AND TRANSFORMER TRIPPING  
RELAYS BACKUP SYSTEM PNL #901-29

## DESCRIPTION:

125 Vdc is used to energize relays to trip the main generator and energize water spray relays for the protection of generator, main transformer and unit aux. trans.

## D. REFERENCE DRAWINGS:

4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1338A Rev. L,  
4E-1338 Rev. W

## E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent tripping of the generator, and actuating the deluge valve for the protection of the generator, main transformer and UAT. The availability of ECCS equipment is unaffected.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer:

Rayeldandi

Date

3-29-88

Reviewer

J.P. Perry

Date

4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 11 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

345-kV RLY HSE 125 VDC DIST PNL #1

## DESCRIPTION:

Provides 125 Vdc power to equipment, via distribution panel in remote 345-kV Relay House.

## D. REFERENCE DRAWINGS:

4E-1318A Rev. J, 4E-1318B Rev. C

## E. DISPOSITION/CONSEQUENCES OF FAILURE: 345-kV relay house has no interconnections to ECCS equipment. This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayclaud Date 3-30-88 Reviewer A.P. Perry Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 12 DIV. NON ESS-I

C. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION:

D. REFERENCE DRAWINGS: 4E-1318 A Rev. J, 4E-1318B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned.

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldand Date 3-30-88 Reviewer J. P. Burigny Date 4-26-88

125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIES

UNIT 1

B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 13 DIV. NON ESS-I

C. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned.

D. REFERENCE DRAWINGS: 4E-1318 A Rev. J, 4E-1318 B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned.

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldandi Date 3-30-88 Reviewer: D.P. Perry Date 4-26-88

125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIES

UNIT 1

B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 14 DIV. NON ESS-I

C. ACTUATED EQUIPMENT      ESCAPE LIGHTING TURBINE ROOM

DESCRIPTION:      125 Vdc is used for emergency escape lighting.

D. REFERENCE DRAWINGS:      4E-1318A Rev. J, 4E-1318B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the escape lighting in the turbine room from being turned on.

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldand Date 3-30-88 Reviewer J.P. Beringer Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 15 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT RCIC CONDENSATE DRAIN VALVES, PANEL 901-4

DESCRIPTION: 125 Vdc is used for energizing RCIC system condensate drain valves.

## D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1484C Rev. V, 4E-1484G Rev. M

## E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent operation of RCIC condensate drain valves. RCIC is part of normal shutdown system.

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeldand Date 3-30-88 Reviewer J.P. Perry Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 16 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT CONTROL ROOM LIGHTING CAB #10

## DESCRIPTION:

125 Vdc is used to power light fixtures in the control room.

## D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C

## E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the emergency control room lighting from functioning.

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayelaudi Date 3-31-88 Reviewer J.P. Perquy Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 17 DIV. NON ESS-I

C. ACTUATED EQUIPMENT RADWASTE BLDG. LIGHTING CAB #30

DESCRIPTION: 125 Vdc is used to power light fixtures in the Radwaste Bldg.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the emergency lighting in the Radwaste Bldg. from being turned on.

This would not affect the availability of ECCS equipment

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayeland Date 3-30-88 Reviewer J.P. Perry Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 18 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned

## D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C

## E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayelaud Date 3-30-88 Reviewer S.P. Perry Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 19 DIV. NON ESS-I

C. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayeldand Date 3-30-88 Reviewer J.P. Curney Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 20 DIV. NON ESS-I

## C. ACTUATED EQUIPMENT

RCIC SYSTEM PANEL #901-48

## DESCRIPTION:

125 Vdc is used for energizing auxiliary relays to control RCIC valves and other equipment and provide alarms.

## D. REFERENCE DRAWINGS:

4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1484C Rev. V,  
4E-1484B Rev. AB

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent automatic operation of RCIC valves and other equipment. The RCIC system is part of the normal shutdown equipment.

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayel David Date 3-30-88 Reviewer J. P. Murphy Date 4-26-88

125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIES

UNIT 1

B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 20 DIV. NON ESS-I

C. ACTUATED EQUIPMENT RCIC SYS. PANEL #901-48

DESCRIPTION: 125 Vdc is used for power supply to EGM control box.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1484C Rev. V,  
4E-1484B Rev. AB, 4E-1484D Rev. AA

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the automatic operation of the RCIC equipment. The RCIC system is part of the normal shutdown equipment.

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayelda Date 3-30-88 Reviewer J. P. Carney Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 21 DIV. NON ESS-I

C. ACTUATED EQUIPMENT      HEATING BOILER GAS SUPPLY ALARMS

DESCRIPTION:      125 Vdc is used for alarms of Heating Boiler Shutoff  
Valve Rack 2212-41A and B.

D. REFERENCE DRAWINGS:      4E-1318A Rev. J, 4E-1318B Rev. C, 4E-1392A Rev. K

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the  
alarms on heating boilers 1/2 A and 1/2 B.

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Rayelaud Date 3-30-88 Reviewer J. P. Perry Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 22 DIV. NON ESS-I

C. ACTUATED EQUIPMENT H2-STATOR COOLING WTR. PNL. 2251-7

## DESCRIPTION:

125 Vdc is used for temperature and water conductivity detector alarms of H2-stator and rectifier cooling panel.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent alarms of H2-Stator Cooling Water Panel.

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Rayel David Date 3-31-88 Reviewer J.P. Pinsky Date 4-26-88

## 125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 23 DIV. NON ESS-I

C. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YESPreparer: Raymond Date 3-30-88 Reviewer D.P. Perry Date 4-26-88

125-VDC POWER FAILURE ANALYSIS

A. STATION QUAD CITIES

UNIT 1

B. DC SYSTEM 125 V BUS TB MN 1A-2 CKT. 24 DIV. NON ESS-I

C. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned

D. REFERENCE DRAWINGS: 4E-1318A Rev. J, 4E-1318B Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: Unassigned

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YES

Preparer: Ray Eldon Date 3-30-88 Reviewer J.P. Rigney Date 4-26-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 1 DIV. NON ESS-IIC. ACTUATED EQUIPMENT 4KV SWGR BUS 11 RESERVE FEED

DESCRIPTION: 125 Vdc is used for the control circuits of 4KV SWGR BUS 11 breakers. This source acts as a reserve supply of power and is normally open.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1318A Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent closing and tripping of SWGR 11 breakers. Normal source of 125 Vdc (main feed) is available from 125 Vdc TB Main BUS 1A-2 CKT. 1. This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 4-1-88Reviewer J.P. Perry Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 2 DIV. NON ESS-IIC. ACTUATED EQUIPMENT REACTOR FEED PUMP 1B BREAKER  
4-kV SWGR BUS 12 CUB #7 (ACB 152-1201)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1201 which feeds reactor feed pump 1B motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1303 Rev. K  
4E-1395 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The reactor feed pumps serve an important but non-safety-related service. Bus 12 is not connected to the onsite emergency ac sources of power (i.e., diesel generatorss).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: A. E. HillDate 4-3-89Reviewer Rayel dand Date 4-7-89

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 2 DIV. NON ESS-II
- C. ACTUATED EQUIPMENT 4-kV SWGR BUS 12 RESERVE FEED BREAKER  
4-kV SWGR BUS 12 CUB #8 (ACB #152-1202)

DESCRIPTION: 125 Vdc is used for closing, opening, tripping and breaker indication. This breaker allows 4-kV Bus 12 to be fed from Reserve Aux. Transformer #12 if its normal source Unit Aux. Transformer #11 is lost.

- D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1303 Rev. K  
4E-1341 Rev. J

- E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of the 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The loads connected to Bus 12 are non-safety-related. Also, Bus 12 is not connected to the onsite emergency ac power system (i.e., diesel generators.)

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: J. E. Hill

Date 4-3-89

Reviewer Rayell Landi

Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 2 DIV. NON ESS-IIC. ACTUATED EQUIPMENT REACTOR FEED PUMP 1C BREAKER ACB #152-1203  
4-kV SWGR BUS 12 CUB #10 (ACB #152-1203)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1203 which feeds reactor feed pump 1C motor. Feed Pump 1C is normally fed from 4-kV SWGR Bus 11, but is transferred to 4-kV Bus 12 upon losing that source.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1303 Rev. K  
4E-1395 Rev. M  
4E-1394 Rev. K

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The reactor feed pumps serve an important but non-safety-related service. Bus 12 is not connected to the onsite emergency ac sources of power (i.e., diesel generatorss).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: A. E. HillDate 4-3-89Reviewer Rayeldand Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 2 DIV. NON ESS-IIC. ACTUATED EQUIPMENT 4-kV RECIRC. PUMP M/G SET 1B BREAKER  
4-kV SWGR BUS 12 CUB #11 (ACB #152-1204)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate 4-kV breaker 152-1204 which feeds recirculation pump M/G set 1B.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1303 Rev. K  
4E-1426 Rev. T

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The recirculation pumps serve an important but non-safety-related service. Bus 12 is not connected to the onsite emergency ac sources of power (i.e., diesel generators).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: *M. E. Hill*Date 4-3-89Reviewer *Rayeldand*Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 2 DIV. NON ESS-IIC. ACTUATED EQUIPMENT 4-kV SWGR BUS 12 MAIN FEED BREAKER  
4-kV SWGR BUS 12 CUB #12 (ACB #152-1205)

DESCRIPTION: 125 Vdc is used for closing, opening, tripping and breaker indication. This breaker supplies power to 4-kV Bus 12 from Unit Aux. Transformer #11. If this source is lost, the bus will be fed from Reserve Aux. Transformer #12 via ACB #152-1202.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1303 Rev. K  
4E-1341 Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The loads connected to this bus are non-safety-related. In addition, Bus 12 is not connected to the onsite emergency ac power sources (i.e., diesel generators).

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 4-3-89Reviewer: Rayel dandDate 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 2 DIV. NON ESS-IIC. ACTUATED EQUIPMENT UNDERVOLTAGE RELAY  
4-kV SWGR BUS 12

DESCRIPTION: 125 Vdc is used to energize interlocking relays upon undervoltage at Bus 12. Contacts of these relays are used to trip several breakers.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1303 Rev. K  
4E-1341 Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125-Vdc would prevent the operation of these relays; but will not affect the availability of ECCS equipment. None of the loads connected to Bus 12 are safety-related.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: A. E. HillDate 4-3-89Reviewer Rayeldand Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 3 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Ray eldandi Date 4-1-88Reviewer S.P. Perry Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 4 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 4-1-88Reviewer S.P. Penney Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT 480V SWGR BUS 16 MAIN FEED BREAKER  
480V SWGR BUS 16 CUB #162B (ACB #252-MF16)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which is the main incoming feed breaker which connects Bus 16 to 4-kV/480-V Transformer #16.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1348 Rev. D

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The equipment on this bus does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. E. HillDate 4-3-89Reviewer Ray Eldred Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. BUS 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT CONDENSER VACUUM PUMP BREAKER  
480V SWGR BUS 16 CUB #163D

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which feeds the condenser vacuum pump motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1370 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 4-3-89Reviewer Raymond Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SERVICE WATER CHILLER 1/2C BREAKER  
480V SWGR BUS 16 CUB #165A

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which feeds the service water chiller #1/2C motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1374A Rev. F

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 4-3-89Reviewer Rayelaud Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT UNDERVOLTAGE RELAY  
480V SWGR BUS 16

DESCRIPTION: 125 Vdc energizes an interlocking relay on undervoltage at Bus 16.  
The interlocking relay will trip Main Feed Breaker #152-1414.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1348 Rev. D

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125-Vdc would prevent tripping of breaker #152-1414. This would not affect the availability of ECCS equipment, since all loads fed from this bus are non-safety-related.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. E. HillDate 4-3-89Reviewer RayeldandDate 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT MAIN POWER TRANSFORMER/COOLING FEED 1A  
BREAKER  
480V SWGR BUS 16 CUB #163C

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the shunt trip of the 480-V breaker which feeds the main power transformer cooling equipment 1A.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1376 Rev. E

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., lose the ability to trip). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 4-3-89Reviewer Rayeland Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT 480V SWGR BUS 17 MAIN FEED BREAKER  
480V SWGR BUS 17 CUB #172B (ACB 252-MF17)

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which is the main incoming feed breaker which connects Bus 17 to 4-kV/480-V Transformer #17.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1348 Rev. D

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). The equipment on this bus does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 4-3-89Reviewer Rayel Dand Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT TURBINE BLDG EXHAUST FAN 1A BREAKER  
480V SWGR BUS 17 CUB #173B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which feeds Turbine Building Exhaust Fan 1A motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1387A Rev. G

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. E. HillDate 4-3-89Reviewer Rayoldandi Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT RADWASTE AIR SPARGING COMPRESSOR 1/2B  
BREAKER  
480V SWGR BUS 17 CUB #173C

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which feeds the Radwaste Air Sparging Compressor 1/2B motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1546 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. E. HillDate 4-3-89Reviewer Ray EldonDate 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT EHC HYDRAULIC FLUID PUMP 1B BREAKER  
480V SWGR BUS 17 CUB #173D

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which feeds the EHC Fluid Pump 1B motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1362 Rev. G

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: *M. E. Hill*Date 4-3-89Reviewer *Ray E. Dand*Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT TURBINE BLDG EXH. FAN 1B BREAKER  
480V SWGR BUS 17 CUB #174B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which feeds Turbine Building Exhaust Fan 1B motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1387A Rev. G

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 4-3-89Reviewer Rayeldand Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT RADWASTE AIR SPARGING COMPRESSOR 1/2A  
BREAKER  
480V SWGR BUS 17 CUB #175B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which feeds Radwaste Air Sparger Compressor 1/2A motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1546 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M.E. HillDate 4-3-89Reviewer Ray EldredDate 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SERVICE AIR COMPRESSOR #1A BREAKER  
480V SWGR BUS 17 CUB #175C

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which feeds Service Air Compressor #1A motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1372A Rev. T

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 4-3-89Reviewer Rayel daudDate 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT INSTRUMENT AIR COMPRESSOR 1A BREAKER  
480V SWGR BUS 17 CUB #176B

DESCRIPTION: This 125-Vdc circuit provides the control power to electrically operate the 480-V breaker which feeds Instrument Air Compressor 1A motor.

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1372A Rev. T

E. DISPOSITION/CONSEQUENCES OF FAILURE: The loss of this 125-Vdc circuit would disable the electrical breaker controls (i.e., loss of breaker status indication and the ability to trip and close). This equipment does not serve a safety-related function.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 4-3-89Reviewer Rayeldand Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 V BUS TB RES. 1B-2 CKT. 5 DIV. NON ESS-IIC. ACTUATED EQUIPMENT UNDERVOLTAGE RELAY  
480V SWGR BUS 17

DESCRIPTION: 125 Vdc is used to energize the interlocking relay on undervoltage at Bus 17. The interlocking relay trips ACB 152-1404 (Feed to Bus 17).

D. REFERENCE DRAWINGS: 4E-1318A Rev. J  
4E-1318B Rev. C  
4E-1305 Rev. U  
4E-1348 Rev. D

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125-Vdc would prevent tripping of breaker #152-1404. This would not affect the availability of ECCS equipment, since all loads fed from this bus are non-safety-related.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: M. E. HillDate 4-3-89Reviewer Rayeland Date 4-7-89

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 6 DIV. NON ESS-IIC. ACTUATED EQUIPMENT 480V SWGR BUS 15 RESERVE FEED

DESCRIPTION: 125 Vdc is used for the control circuits of 480V SWGR Bus 15 breaker. This source acts as a reserve source of power and is normally open.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1318A Rev. J

F DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent closing and tripping of SWGR bkrs. But the normal feed is available from Bus 1A-2 CKT 3. The loss of this 125 Vdc source does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Ray eldandi Date 4-1-88Reviewer S.P. Penney Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 7 DIV. NON ESS-IIC. ACTUATED EQUIPMENT GENERATOR & TRANSFORMER RELAY PANEL  
#901-29 RESERVE FEED

DESCRIPTION: 125 Vdc is used for generator, main transformer, and aux. transformer tripping relays and to actuate deluge valves to protect this equipment.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1318A Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: If on this reserve feed the loss of 125 Vdc would prevent tripping the abovementioned breakers or actuating the fire protection devices (deluge valves). ECCS availability is unaffected by losing these dc circuits.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Ray eldandi Date 4-1-88Reviewer J.P. Perry Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 8 DIV. NON ESS-IIC. ACTUATED EQUIPMENT MAIN CONTROL ROOM ANNUNCIATOR RELAY  
CAB. 901-34 RESERVE FEED

DESCRIPTION: 125 Vdc is used as dc power source for annunciation. This source is utilized as a reserve feed.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1318A Rev. J

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the annunciator from operating. The normal feed is from Bus 1A-2 CKT 7. This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 4-1-88Reviewer D.P. Cerny Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 9 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 Sh.1 Rev. B  
4E-1318 Sh.2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 4-1-88 Reviewer D.P. Perryman Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 10 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 4-1-88Reviewer S.P. Penney Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 11 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Ray eldandi Date 4-1-88Reviewer D.P. Perry Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 12 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 SH. 1 Rev. B  
4E-1318 SH. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Ray eldandi Date 4-1-88Reviewer D.P. Perry Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 13 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 4-1-88Reviewer D.P. Canning Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 14 DIV. NON ESS-IIC. ACTUATED EQUIPMENT VOLTAGE REG. CAB. 2351-6 Reserve Feed

DESCRIPTION: 125 Vdc is used for the voltage regulator and excitation control circuits associated with the main generator and for the closing and tripping circuits of the exciter and main generator field breakers. This source is used as a reserve feed to the above circuits.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1318A Rev. J  
4E-1353 Rev. E  
4E-1354 Rev. H

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the electrical operation of the above circuits; but would not affect the availability of ECCS equipment. The normal feed, to the above circuits, is from 125 Vdc TB Main Bus 1A-2.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 4-1-88Reviewer J. P. Perry Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 15 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Ray eldandi Date 4-1-88Reviewer D. P. Penning Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 16 DIV. NON ESS-IIC. ACTUATED EQUIPMENT H2 AND STATOR CLG. WATER CONT. CAB #2251-7

DESCRIPTION: 125 Vdc is used for alarms associated with the hydrogen stator cooling water cabinet. The source is used as reserve feed to the cabinet.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1318A Rev. J  
4E-1367 Rev. K

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would disable the alarms of the H2-stator cooling panel; but would not affect the availability of ECCS equipment. The normal feed to this panel is from 125 Vdc TB Bus 1A-2 CKT. #22.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: RayeldandiDate 4-1-88Reviewer S.P. BinghamDate 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 16 DIV. NON ESS-IIC. ACTUATED EQUIPMENT AUTO TRANSFER INTERLOCKS FOR MAIN FEEDS  
PNL-901-8

DESCRIPTION: 125 Vdc is used for energizing an interlocking relay which provides autoclose permissive signals for ACBS #152-1101, 152-1205, 152-1303, and 152-1412. The interlocking relay senses the availability of the 345-kV supply.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1340 Rev. N

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the automatic closure of the above breakers; but would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldaudi Date 4-1-88Reviewer L.P. Serigny Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 17 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. CE. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE  
This would not affect the availability of ECCS equipment.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldaudi Date 4-1-88Reviewer S. P. Penning Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 18 DIV. NON ESS-IIC. ACTUATED EQUIPMENT TURBINE EHC Panel #901-31 Reserve Feed

DESCRIPTION: 125 Vdc is used for turbine trip and alarm circuits. This source is utilized as a reserve feed to EHC Panel #901-31.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B

4E-1318 Sh. 2 Rev. C

4E-1318A Rev. J

4E-1360A Rev. A

4E-1358A Rev. F

4E-1360B Rev. B

4E-1358B Rev. G

4E-1359A Rev. B

4E-1359B Rev. F

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would disable the turbine tripping and alarm circuit function; but would not affect the availability of ECCS equipment. The normal feed to the above circuits in panel #901-31 is from 125 Vdc TB MAIN 1A-2 CKT #9.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 4-1-88Reviewer S.P. Perry Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 19 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 4-1-88Reviewer D.P. Perry Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. 20 DIV. NON ESS-IIC. ACTUATED EQUIPMENT Generator & Transformer Backup Rly Panel II 901-29 Reserve Feed

DESCRIPTION: 125 Vdc is used to energize relays that trip the Main Generator and initiate a water spray of the Main and Unit Aux. Transformers. This source is used as Reserve Feed.

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C  
4E-1318A Rev. J  
4E-1338A Rev. L

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of 125 Vdc would prevent the tripping of Generator and initiating a water spray of the Main and Unit Aux. Transformers; but would not affect the availability of ECCS equipment. The normal feed to these circuits in panel #901-29 is from 125 Vdc TB Main Bus 1A-2 CKT. #10.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 4-1-88Reviewer D.P. Perry Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. A01 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes     Preparer: Rayeldandi Date 4-1-88Reviewer S.P. Pangray Date 4-27-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 125 BUS TB RES. 1B-2 CKT. A02 DIV. NON ESS-IIC. ACTUATED EQUIPMENT SPARE

DESCRIPTION: SPARE

D. REFERENCE DRAWINGS: 4E-1318 Sh. 1 Rev. B  
4E-1318 Sh. 2 Rev. C

E. DISPOSITION/CONSEQUENCES OF FAILURE: SPARE

This would not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: Rayeldandi Date 4-1-88Reviewer S.P. Parviz Date 4-27-88

250 VDC POWER FAILURE  
ANALYSIS INDEX

STATION: QUAD CITIES

UNIT: 1

BUS: TURBINE BLDG. MCC #1

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA No.</u>
B01	Recording (Ground) Voltmeter	QUA-1-250-0001
A03	*Battery Chgr. Feed to TB MCC#1	QUA-1-250-0002
A01	*Battery Feed to TB MCC#1	QUA-1-250-0003
A02	*Battery Charger #1/2 Feed to TB MCC#1	QUA-1-250-0004
C01	Main Turb. #1 Emerg. Brg. Oil Pump (EP#5613)	QUA-1-250-0005
D01	Gen. #1 Emerg. Seal Oil Pump	QUA-1-250-0006
E02	U.P.S. Panel 901-63	QUA-1-250-0007
E01	Reactor Bldg. MCC#1A	QUA-1-250-0008
E02	Stator Wtr. Cooler Serv. Wtr. Vlv. (EP#1-3905)	QUA-1-250-0009
F01	Fire Pump Discharge Vlv. EP#1/2-4101	QUA-1-250-0010
G01	Turb. Bldg. Cooling Wtr. Ht. Exch. Isol. Vlv. 1B (EP#1B-3903)	QUA-1-250-0011
F02	Turb. Bldg. Cooling Wtr. Ht. Exch. Isol. Vlv. 1A (EP#1A-3903)	QUA-1-250-0012
G02	M.G. Set Oil Coolers Serv. Wtr. Disch. Vlv. (EP#1-3904)	QUA-1-250-0013
I02	Fire Prot. Serv. Wtr. Supply Vlv. (EP#1/2-3906)	QUA-1-250-0014
H01	R.R. M.G. Set Coast Down Lube Oil Pump 1A	QUA-1-250-0015
H02	R.R. M.G. Set Coast Down Lube Oil Pump 1B	QUA-1-250-0016
I01	Rx. Bldg. MCC 2B Main Feed	QUA-1-250-0017
J01	Unassigned	QUA-1-250-0018
B02	Unassigned	QUA-1-250-0019
K01	Unassigned	QUA-1-250-0020
K02	Unassigned	QUA-1-250-0021
J02	Space	QUA-1-250-0022

NOTE: \*These entries represent source feeds to the subject buses.

250 VDC POWER FAILURE  
ANALYSIS INDEX

STATION: QUAD CITIES

UNIT: 1

BUS: REACTOR BLDG. MCC #1A

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA No.</u>
B01	HPCI Turbine Aux Oil Pump (EP#2303)	QUA-1-250-0023
C01	HPCI Turbine Emerg. Bearing Oil Pump (EP#2303)	QUA-1-250-0024
C02	HPCI Turbine Gland Stm. Cond. Exhauster	QUA-1-250-0025
D01	HPCI Turning Gear (EP#2033)	QUA-1-250-0026
L02	HPCI Turbine Gland Seal Cond. Condst. Pump to Radwaste	QUA-1-250-0027
J02	HPCI Test Bypass to Cond. Stor. Tank Vlv. (EP#2301-10)	QUA-1-250-0028
G01	HPCI Turbine Stm. Supply Vlv. to Turbine (EP#2301-3)	QUA-1-250-0029
E02	HPCI Test Bypass to Cond. Stor. Tank Vlv. (EP#2301-15)	QUA-1-250-0030
G03	Space Heaters Disconnect	QUA-1-250-0031
F01	HPCI Cooling Wtr. Rtn. Vlv. to Cond. Stor. Tank (EP#2301-49)	QUA-1-250-0032
F02	Rx. Wtr. Cleanup Sys. Recirc. Shutoff Isol. Vlv. (EP#1201-5)	QUA-1-250-0033
G02	HPCI Stm. Supply Line Isol. Vlv. (EP#2301-5)	QUA-1-250-0034
H02	HPCI Pump Discharge Vlv. (EP#2301-8)	QUA-1-250-0035
H01	HPCI Minimum Flow Bypass to Suppression Chamber Vlv (EP#2301-14)	QUA-1-250-0036
I02	HPCI Pump Discharge Vlv. (EP#2301-9)	QUA-1-250-0037
I01	HPCI Cooling Wtr. Rtn. to Pump Supply Vlv. (EP#2301-48)	QUA-1-250-0038
D02	Unassigned	QUA-1-250-0039
K01	HPCI Pump Suction from Suppression Chamber Vlv. 1A (EP#2301-35)	QUA-1-250-0040

250 VDC POWER FAILURE  
ANALYSIS INDEX

STATION: QUAD CITIES

UNIT: 1

BUS: REACTOR BLDG. MCC #1A, Cont.

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA No.</u>
J01	HPCI Pump Suction from Suppression Chamber Vlv. 1B (EP#2301-36)	QUA-1-250-0041
K02	HPCI Pump Suction from Cond. Stor. Tank (EP#2301-6)	QUA-1-250-0042
E01	Unassigned	QUA-1-250-0043
L01	Unassigned	QUA-1-250-0044

BUS: TURBINE BLDG. MCC #2

A03	*Battery Charger #2 Feed to Turb. Bldg. MCC#2	QUA-1-250-0045
A01	*Battery Feed to Turb. Bldg. MCC#2	QUA-1-250-0046
A02	*Battery Charger #1/2 Feed to Turb. Bldg. MCC#2	QUA-1-250-0047
I01	Reactor Bldg. MCC#1B	QUA-1-250-0048

NOTE: \*These entries represent source feeds to the subject buses.

Bus: REACTOR BLDG. MCC #1B

<u>CKT</u>	<u>ACTUATED EQUIPMENT</u>	<u>PFA No.</u>
M01	Main Steamline Drain Vlv. (EP#220-2)	QUA-1-250-0049
Q02	RCIC Pump Discharge Vlv. (EP#1301-49)	QUA-1-250-0050
S01	RCIC Gland Seal Cond. Condst. Pump to Radwaste	QUA-1-250-0051
00	RCIC Steam Supply Line Isolation Vlv. (EP#1301-17)	QUA-1-250-0052
P01	RCIC Test Bypass to Cond. Storage Tank Vlv. (EP#1301-53)	QUA-1-250-0053
P02	RCIC Pump Suction from Suppression Chamber Vlv. 1A (EP#1301-25)	QUA-1-250-0054
N02	RCIC Pump Suction from Cond. Storage Tank Vlv. (EP#1301-22)	QUA-1-250-0055
R01	Unassigned	QUA-1-250-0056
001	RCIC Cooling Water Shutoff Vlv. (EP#1301-62)	QUA-1-250-0057
W02	RCIC Steam Supply Vlv. to Turbine 1B (EP#1301-62)	QUA-1-250-0058
102	RHR Isol. Shutoff Vlv. to Rx. Vessel Hd. Removal Pipe (EP#1001-60)	QUA-1-250-0059
U02	RCIC Pump Suction from Suppression Chamber Vlv. 1B (EP#1301-26)	QUA-1-250-0060
T01	RCIC Minimum Flow Bypass to Suppression Chamber Vlv. (EP#1301-60)	QUA-1-250-0061
T02	RHR Cross Line to Radwaste Backup Vlv. (EP#1001-21)	QUA-1-250-0062
U01	Unassigned	QUA-1-250-0063
S02	RHR Backup Shutoff Vlv. from Recirc. Line to Coolant Pump Suction (EP#1001-47)	QUA-1-250-0064
V01	RCIC Pump Discharge Vlv. 1B (EP# 1301-48)	QUA-1-250-0065
V02	RCIC Auto Start Gland Seal Vacuum Pump	QUA-1-250-0066
R03	Space Heaters Disconnect	QUA-1-250-0067
R02	Unassigned	QUA-1-250-0068
Q01	Unassigned	QUA-1-250-0069
N01	Unassigned	QUA-1-250-0070

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. B01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RECORDING AND CONTACT MAKING GROUND  
VOLTMETER

DESCRIPTION: Detects high/low bus voltage and alarms to MCB.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1683A Rev. LE. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would  
annunciate at the MCB. This does not affect the availability of ECCS equipment.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S. P. PerryDate 1-27-88Reviewer Rayeland Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION QUAD CITIESUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. A03 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT TURBINE BLDG. MCC #1

DESCRIPTION: Feed from battery charger #1 to 250 VDC Turbine Bldg. MCC #1.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1389D Rev. A

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would not affect the Unit 1 250 Vdc system. Battery charger 1/2 is the backup to battery charger #1. The Unit 1 250 Vdc system would function as designed, does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. PerrineyDate 1-27-88Reviewer Ray Eldon Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. A01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT TURBINE BLDG. MCC #1

DESCRIPTION: Feed from Unit 1 250 Vdc battery to Turbine Bldg. MCC#1. Feeds Unit 1 HPCI loads.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would disable the Unit 1 250 Vdc system. With the loss of the Unit 1 250 Vdc system Unit 1 HPCI would be completely inoperable. The relief valves of the automatic depressurization system (ADS) are a backup to the HPCI system. They enable the LPCI mode of the RHR system or LPCS to provide protection in the event of HPCI failure by depressurizing the reactor vessel rapidly enough to employ these systems. ADS is not affected by the 250 Vdc system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE. YesPreparer: J.P. PerryDate 1-27-88Reviewer Ray J. Dand Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. A02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT TURBINE BLDG. MCC #1

DESCRIPTION: Reserve feed from battery charger #1/2 to 250 Vdc Turbine Bldg. MCC #1.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1389E Rev. B

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would not affect the Unit 1 250 Vdc system. Battery charger #1 and the Unit 1 250 Vdc battery would be available to supply the Unit 1 250 Vdc loads. Availability of ECCS equipment not affected.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. CurranDate 1-27-88Reviewer Rajeldandi Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. C01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT MAIN TURBINE #1 EMERG. BRG. OIL PUMP EP#5613

DESCRIPTION: Supplies oil to the Unit 1 main turbine bearings

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1362 Rev. K

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S. P. GroggDate 1-27-88Reviewer RaylandDate 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. D01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT GENERATOR #1 EMERGENCY SEAL OIL PUMP

DESCRIPTION: Emergency hydrogen seal oil pump.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1365 Rev. J  
4E-1811C Rev. B

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. P. PerryDate 1-28-88Reviewer RayelandDate 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. D02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT 120/240-VAC UNINTERRUPTIBLE POWER SUPPLY  
PNL 901-63

DESCRIPTION: Supplies 250-Vdc to 120/240-Vac uninterruptible power supply (UPS) panel 901-63.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1811C Rev. B

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the output of the UPS. The UPS is also fed from 480-V SWGR #18 which is fed from diesel generator #1/2 upon a LOOP condition. This does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Perry Date 1-29-88Reviewer Rayeldand Date 3.3.88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. E01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT 250 VDC REACTOR BLDG. MCC #1A

DESCRIPTION: 250 Vdc feed to Reactor Bldg. MCC #1A.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would disable 250 Vdc reactor building MCC #1A. The loss of reactor building MCC #1A would completely disable Unit 1 HPCI. Unit 1 HPCI is backed up by ADS in conjunction with the LPCI mode of the RHR system or LPCS. These systems are not affected by the 250 Vdc system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerryDate 1-28-88Reviewer Ray Eldred Date 3-3-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. E02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT STATOR WATER COOLERS SERVICE WATER SUPPLY  
VLV. 1-3905

DESCRIPTION: Valve supplies service water to the stator water coolers.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1371 Rev. EE. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does  
not affect availability of ECCS equipment.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. PurigneyDate 1-28-88

Reviewer

Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. F01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT FIRE PUMP DISCHARGE VLV. 1/2-4101

DESCRIPTION: Fire pump discharge valve.

D. REFERENCE DRAWINGS: 4E-1317 Sh. I Rev. V  
4E-1594 Rev. L

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. Curran Date 1-28-88 Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. G01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT TURBINE BLDG. COOLING WATER HEAT EXCHANG-  
ER ISOLATION VALVE 1B 1B-3903

DESCRIPTION: Turbine bldg. cooling water heat exchanger isolation valve.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1371 Rev. EE. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does  
not affect availability of ECCS equipment.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerryDate 1-28-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. F02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT TURBINE BLDG. COOLING WATER HEAT EXCHANG-  
ER ISOLATION VALVE 1A 1A-3903

DESCRIPTION: Turbine bldg. cooling water heat exchanger isolation valve.

D. REFERENCE DRAWINGS: 4E-1317 Sh. I Rev. V  
4E-1371 Rev. EE. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does  
not affect the availability of ECCS equipment.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. PerryDate 1-28-88Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. G02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT MOTOR GENERATOR SET OIL COOLERS SERVICE  
WATER DISCHARGE VALVE #1-3904

DESCRIPTION: Motor generator set oil coolers service water discharge valve.

REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1371 Rev. E

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. CurranDate 1-28-88Reviewer Ray J. DandiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. 102 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT FIRE PROTECTION SYSTEM SERVICE WATER SUPPLY VALVE 1/2-3906

DESCRIPTION: Fire protection system service water supply valve.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1594 Rev. L

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Perry Date 1-29-88Reviewer Royeldand Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. H01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RECIRCULATION MOTOR GENERATOR SET COAST  
DOWN LUBE OIL PUMP 1ADESCRIPTION: Recirculation motor generator set coast down lube oil pump 1A  
(250 Vdc auxiliary oil pump C).D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1423 Rev. RE. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does  
not affect availability of ECCS equipment.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. PerryDate 1-29-88Reviewer Ray J. Dandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. H02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RECIRCULATION MOTOR GENERATOR SET COAST  
DOWN LUBE OIL PUMP 1BDESCRIPTION: Recirculation motor generator set coast down lube oil pump 1B  
(250 Vdc auxiliary oil pump D).D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1423 Rev. RF. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does  
not affect availability of ECCS equipment.REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Curney Date 1-29-88Reviewer Rayclaud Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. I01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT REACTOR BUILDING MCC #2B

DESCRIPTION: Main feed to reactor building MCC #2B.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-2317 Sh. 2 Rev. P

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. CurranDate 1-29-88Reviewer RayelaudDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. J01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V

E. DISPOSITION/CONSEQUENCES OF FAILURE: This circuit is an unassigned spare and does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. PerryDate 1-29-88Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. B02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. I Rev. V

E. DISPOSITION/CONSEQUENCES OF FAILURE: This circuit is an unassigned spare and does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. CurranDate 1-29-88Reviewer RayelaudiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. K01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V

E. DISPOSITION/CONSEQUENCES OF FAILURE: This circuit is an unassigned spare and does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

S.P. PerryDate 1-29-88

Reviewer

RayeldandDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. K02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V

E. DISPOSITION/CONSEQUENCES OF FAILURE: This circuit is an unassigned spare and does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. ParaneyDate 1-29-88

Reviewer

Rayeldand Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #1 CKT. 302 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT SPACE

DESCRIPTION: Space for future breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V

E. DISPOSITION/CONSEQUENCES OF FAILURE: This circuit is blank and does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerrymanDate 1-29-88Reviewer RayclaudDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. B01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI TURBINE AUX. OIL PUMP #2303

DESCRIPTION: Auxiliary oil pump for the main HPCI turbine.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1532 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: This pump is required to operate during HPCI turbine startup and low speed operations. Loss of power for this circuit would completely disable Unit 1 HPCI. The relief valves of the automatic depressurization system (ADS) are a backup to the HPCI system. They enable the LPCI mode of the RHR system and LPCS system to provide protection in the event of HPCI failure by depressurizing the reactor vessel rapidly enough to actuate the LPCI mode of the RHR system and/or the LPCS system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. P. PerryDate 2-3-88Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. C01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI TURBINE EMERGENCY BEARING OIL PUMP  
#2303

DESCRIPTION: This pump operates to provide lubricating oil to the turbine and main pump bearings when the turbine is on the turning gear.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1532 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. P. PerryDate 2-3-88Reviewer Rayeldand Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. C02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI TURBINE GLAND STEAM CONDENSER EX-HAUSTER

DESCRIPTION: The gland seal condenser operates to receive and condense leakage from the turbine seals, control valve and stop valve packing leakoff. This blower must operate during turbine startup, operation, shutdown and approximately 15 minutes after shutdown to avoid turbine casing of steam.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1532 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The HPCI turbine gland steam condenser exhaustor is required for HPCI operation. Loss of power for this circuit would completely disable Unit 1 HPCI. The relief valves of the automatic depressurization system (ADS) are a backup to the HPCI system. They enable the LPCI mode of the RHR system and the LPCS system to provide protection in the event of HPCI failure by depressurizing the reactor vessel rapidly enough to actuate the LPCI mode of the RHR system and/or the LPCS system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. ConwayDate 2-3-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. D01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI TURNING GEAR #2033

DESCRIPTION: HPCI turning gear must operate whenever the turbine is shut down to provide low speed turning of the turbine rotor for cooling before a complete turbine shutdown so as to prevent rotor bowing.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1532 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerryDate 2-3-88Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. L02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI TURBINE GLAND SEAL CONDENSER DRAIN PUMP TO RADWASTE

DESCRIPTION: The gland seal condenser drain pump starts when the condensate in the gland seal condenser reaches 10 inches in the hotwell and pumps the condensate to radwaste.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1532 Sh. 3 Rev. M

E. DISPOSITION/CONSEQUENCES OF FAILURE: The HPCI turbine gland steam condenser drain pump is required for HPCI operation. Loss of power for this circuit would completely disable Unit 1 HPCI. The relief valves of the automatic depressurization system (ADS) are a backup to the HPCI system. They enable the LPCI mode of the RHR system and the LPCS system to provide protection in the event of HPCI failure by depressurizing the reactor vessel rapidly enough to actuate the LPCI mode of the RHR system and/or the LPCS system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. ParneyDate 2-4-88Reviewer Rayel dandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. J02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI TEST BYPASS TO CONDENSATE STORAGE  
TANK VALVE #2301-10

DESCRIPTION: The HPCI test bypass to condensate storage tank valve is a normally closed valve which is throttled open for testing.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1529 Sh. 3 Rev. W

E. DISPOSITION/CONSEQUENCES OF FAILURE: Used for testing only, loss of power for this circuit does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. PerryDate 2-4-88Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. G01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI TURBINE STEAM SUPPLY VALVE TO TURBINE  
#2301-3

DESCRIPTION: The HPCI turbine steam supply valve to turbine is a normally closed valve which if opened supplies steam to the turbine stop valve.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1529 Sh. 1 Rev. Y

E. DISPOSITION/CONSEQUENCES OF FAILURE: This valve is required to open for HPCI to operate. Loss of power for this circuit completely disables Unit 1 HPCI. The relief valves of the automatic depressurization system (ADS) are a backup to the HPCI system. They enable the LPCI mode of the RHR system and LPCS system to provide protection in the event of HPCI failure by depressurizing the reactor vessel rapidly enough to actuate the LPCI mode of the RHR system and/or the LPCS system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes.Preparer: S. P. PerryDate 2-4-88Reviewer Rayelaud Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. E02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI TEST BYPASS TO CONDENSATE STORAGE  
TANK VALVE #2301-15

DESCRIPTION: The HPCI test bypass to condensate storage tank valve is a normally closed valve which is opened for performing testing of the system. (Redundant to valve 2301-10.)

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1530 Sh. 3 Rev. P

E. DISPOSITION/CONSEQUENCES OF FAILURE: Used for testing only, loss of power for this circuit does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. ConwayDate 2-4-88Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. G03 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT SPACE HEATER DISCONNECT

DESCRIPTION: Space heaters.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. LangneyDate 2-4-88Reviewer: RayeldrudDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. F01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI COOLING WATER RETURN VALVE TO  
CONDENSATE STORAGE TANK #2301-49

DESCRIPTION: The HPCI cooling water return valve to condensate storage tank is a normally closed valve which is opened for testing only.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1530 Sh. 3 Rev. P

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. P. CurranDate 2-4-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. F02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT REACTOR WATER CLEANUP SYSTEM RECIRCULATION SHUTOFF ISOLATION VALVE #1201-5

DESCRIPTION: The reactor cleanup system recirculating shutoff valve is a normally open valve that automatically closes on reactor low level.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1508C Rev. P

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit will not affect the operation/availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S. P. Penney Date 2-10-88 Reviewer R. J. Landi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. G02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI STEAM SUPPLY LINE ISOLATION VALVE  
#2301-5

DESCRIPTION: The HPCI steam supply isolation valve is a normally open valve and closes after HPCI has completed its function.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1529 Sh. 1 Rev. Y

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would not permit the valve to automatically close on a system isolation signal. Does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J.P. Perryman Date 2-4-88Reviewer Ray J. Danti Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. H02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI PUMP DISCHARGE VALVE #2301-8

DESCRIPTION: The HPCI pump discharge valve automatically closes on all turbine trips except overspeed and local manual trips.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. V  
4E-1529 Sh. 2 Rev. W

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would prevent the valve from auto closing after an HPCI turbine trip; this would not prevent HPCI from starting or operating. Does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. MurphyDate 2-4-88Reviewer Rayelandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. H01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI MINIMUM FLOW BYPASS TO SUPPRESSION CHAMBER VALVE #2301-14

DESCRIPTION: The HPCI minimum flow valve is a normally closed valve that opens at 600 gpm and shuts at 1200 gpm if valve 2301-3 is open.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 1 Rev. U  
4E-1530 Sh. 1 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: This valve is required to operate for the HPCI system to start properly. Loss of power for this circuit could disable Unit 1 HPCI. The relief valves of the automatic depressurization system (ADS) are a backup to the HPCI system. They enable the LPCI mode of the RHR system and the LPCS system to provide protection in the event of HPCI failure by depressurizing the reactor vessel rapidly enough to actuate the LPCI mode of the RHR system and/or the LPCS system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerryDate 2-4-88Reviewer Rayclandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. 102 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI PUMP DISCHARGE VALVE #2301-9

DESCRIPTION: The HPCI pump discharge valve # 2301-9 is a normally open valve which is used for reactor injection or for testing.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1529 Sh. 3 Rev. W

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. PerryDate 2-4-88Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. I01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI COOLING WATER RETURN TO PUMP SUPPLY  
VALVE #2301-48

DESCRIPTION: The HPCI cooling water return to pump supply valve is a normally open valve that allows cooling water from the oil cooler and gland seal condenser to go to the suction of the booster pump.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1530 Sh. 2 Rev. P

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. Perryman Date 2-4-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. D02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U

E. DISPOSITION/CONSEQUENCES OF FAILURE: This circuit is an unassigned spare and does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerryDate 2-4-88Reviewer RaymondDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. K01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI PUMP SUCTION FROM SUPPRESSION CHAMBER VALVE 1A #2301-35

DESCRIPTION: The suppression pool suction isolation valve is a normally closed valve and automatically opens whenever the torus level is above +5 in. or the contaminated condensate storage tank (CCST) level is below 10,000 gallons.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1530 Sh. 1 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. SweeneyDate 2-4-88Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. J01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI PUMP SUCTION FROM SUPPRESSION CHAM-  
BER VALVE 1B #2301-36

DESCRIPTION: The suppression pool suction isolation valve is a normally closed valve and auto opens whenever the torus level is above +5 in. or the contaminated condensate storage tank (CCST) level is below 10,000 gallons.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1530 Sh. 2 Rev. P

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: A. P. Perryman Date 2-4-88 Reviewer Rayeldand Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. K02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT HPCI PUMP SUCTION VALVE FROM CONDENSATE STORAGE TANK #2301-6

DESCRIPTION: The HPCI pump suction valve from the condensate storage tank is a normally open valve that automatically closes when valves 2301-35 and 2301-36 are both open, it is interlocked closed to prevent the possibility of draining the contaminated condensate storage tank (CCST) into the torus if the check valve fails.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1529 Sh. 2 Rev. W

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S. P. PenneyDate 2-4-88Reviewer Rayelandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. E01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U

E. DISPOSITION/CONSEQUENCES OF FAILURE: This circuit is an unassigned spare and does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerrymanDate 2-4-88Reviewer Rayel dandiDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1A CKT. L01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U

E. DISPOSITION/CONSEQUENCES OF FAILURE: This circuit is an unassigned spare and does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. PerryDate 2-4-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #2 CKT. A03 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT TURBINE BLDG. MCC #2

DESCRIPTION: Feed from battery charger #2 to 250-Vdc turbine bldg. MCC #2.

D. REFERENCE DRAWINGS: 4E-2317 Sh. 1 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would not affect the Unit 2 250-Vdc system. Does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

S. P. Penney

Date

2-5-88

Reviewer

RayelandDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #2 CKT. A01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT TURBINE BLDG. MCC #2

DESCRIPTION: Feed from Unit 2 250-Vdc battery to turbine bldg. MCC #2. Feeds Unit 1 RCIC pumps and valves, and Unit 1 RHR valves.

D. REFERENCE DRAWINGS: 4E-2317 Sh. 1 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would disable the Unit 2 250-Vdc system. With the loss of the Unit 2 250-Vdc, Unit 1 RCIC would be completely inoperable. Unit 1 RCIC is backed up by Unit 1 HPCI.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S. P. EmeryDate 2.5.88Reviewer Ray eldardDate 3.4.88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #2 CKT. A02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT TURBINE BLDG. MCC #2

DESCRIPTION: Feed from battery charger #1/2 to 250-Vdc turbine bldg. MCC #2.

D. REFERENCE DRAWINGS: 4E-2317 Sh. 1 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would not affect the Unit 2 250-Vdc system. Does not affect the availability of Unit 1 ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerryDate 2-5-88Reviewer Roy Eldandi Date 3.4.88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS TB MCC #2 CKT. 101 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT 250-VDC REACTOR BLDG. MCC #1B

DESCRIPTION: Main feed to reactor building MCC #1B.

D. REFERENCE DRAWINGS: 4E-2317 Sh. 1 Rev. R  
4E-1317 Sh. 2 Rev. U

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would completely disable the reactor building MCC #1B. With the loss of the reactor building MCC #1B, the Unit 1 RCIC system would be completely inoperable. Unit 1 RCIC is backed up by Unit 1 HPCI.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. PerryDate 2-5-88Reviewer Ray eldredDate 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. M01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT MAIN STEAMLINE DRAIN VALVE 1B #220-2

DESCRIPTION: Main steam drain valve.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1506 Sh. 2 Rev. V

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerrymanDate 2-5-88Reviewer Rayelanda Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. Q02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RCIC PUMP DISCHARGE VALVE 1A #1301-49

DESCRIPTION: The RCIC pump discharge valve 1A is a normally closed valve which opens automatically upon RCIC system startup.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484E Sh. 2 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit completely disables Unit 1 RCIC. Unit 1 RCIC is backed up by Unit 1 HPCI.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. PenneyDate 2-5-88Reviewer Rayelaudi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. S01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RCIC GLAND SEAL CONDENSER CONDENSATE PUMP TO RADWASTE

DESCRIPTION: The condensate pump takes suction from the barometric condenser and discharges back to the suction of the RCIC pump during automatic operation.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484D Rev. AA

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit completely disables Unit 1 RCIC system. The Unit 1 RCIC system is backed up by the Unit 1 HPCI.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S. P. CarriganDate 2-5-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

- A. STATION Quad Cities
- UNIT 1
- B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. O01 DIV. ESS DIV. II
- C. ACTUATED EQUIPMENT RCIC STEAM SUPPLY LINE ISOLATION VALVE  
#1301-17

DESCRIPTION: The RCIC steam supply line isolation valve is a normally open valve. The valve is an isolation valve between the main steamline and the RCIC turbine.

- D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484E Sh. 2 Rev. S
- E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: J.P. Perreault

Date 2-8-88

Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. P01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RCIC TEST BYPASS TO CONDENSATE STORAGE  
TANK VALVE #1301-53

DESCRIPTION: The RCIC test bypass to condensate storage tank valve is a normally closed valve which is used during testing only.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484F Sh. 1 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J.P. PerryDate 2-8-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. P02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RCIC PUMP SUCTION FROM SUPPRESSION CHAM-  
BER VALVE 1A #1301-25

DESCRIPTION: The RCIC pump suction from suppression chamber valve 1A is a normally closed valve. The valve is opened when the condensate storage tanks (CCST) are low.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484F Sh. 1 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J. P. CurranDate 2-8-88Reviewer Rajendran Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. N02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RCIC PUMP SUCTION FROM CONDENSATE STORAGE TANK VALVE #1301-22

DESCRIPTION: The RCIC pump suction from condensate storage tank valve is a normally open valve. The valve is shutoff for the normal supply for the RCIC system.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484E Sh. 1 Rev. S

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J.P. PerrymanDate 2-8-88Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. R01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S. P. PerryDate 2-8-88Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. 001 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RCIC COOLING WATER SHUTOFF VALVE #1301-62

DESCRIPTION: The RCIC cooling water shutoff valve is a normally closed valve. The valve opens upon system initiation and supplies pump discharge water to the turbine lube oil cooler and barometric condenser.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484F Sh. 2 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would totally disable Unit 1 RCIC system. Unit 1 RCIC is backed up by Unit 1 HPCI.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D. P. Perry Date 2-8-88Reviewer Rayel dandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. W02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RCIC STEAM SUPPLY VALVE TO TURBINE 1B  
#1301-61

DESCRIPTION: The RCIC steam supply valve to turbine 1B is a normally closed valve. This valve opens upon system initiation and supplies the main steam to the RCIC turbine.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484 Sh. 2 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit completely disables the RCIC system. The RCIC is backed up by Unit 1 HPCI.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. PerryDate 2-8-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. M02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RHR ISOLATION SHUTOFF VALVE TO REACTOR  
VESSEL HEAD REMOVAL PIPE #1001-60

DESCRIPTION: The RHR isolation shutoff valve is a normally closed valve. The valve is a reactor head spray valve and is used as a means of cooling the upper vessel components and reducing reactor pressure when in the shutdown cooling mode.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1508A Sh. 1 Rev. T

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S.P. PerryDate 2-8-88Reviewer Rayelaudi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT: U02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RCIC PUMP SUCTION FROM SUPPRESSION CHAMBER VALVE 1B #1301-26

DESCRIPTION: The RCIC pump suction from suppression chamber valve 1B is a normally closed valve. The valve is opened when the condensate storage tank (CCST) is low.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484F Sh. 2 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. CurneyDate 2-8-88Reviewer Rayeldave Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. T01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RCIC MINIMUM FLOW BYPASS TO SUPPRESSION CHAMBER VALVE #1301-60

DESCRIPTION: The RCIC minimum flow valve is a normally closed valve that opens automatically on a system initiation, then operates as a minimum flow valve, opening at 40 gpm and shutting at 80 gpm.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484F Sh. 1 Rev. R

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would prevent the RCIC system from operating properly. The Unit 1 RCIC system is backed up by the Unit 1 HPCI system.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. MurphyDate 2-8-88Reviewer Rayelbudi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. T02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RHR CROSS LINE TO RADWASTE BACKUP VALVE  
#1001-21

DESCRIPTION: The RHR cross line to radwaste backup valve is a normally closed valve. This valve is located in a connection that provides a means of rejecting water from the RHR system. The valve handles excess RHR water.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1508B Sh. 2 Rev. N

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. BuxneyDate 2-8-88Reviewer Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. U01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer:

S. P. Perry

Date

2-8-88

Reviewer

Rayeldandi

Date

3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. S02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RHR BACKUP SHUTOFF VALVE FROM RECIRCULATION LINE TO COOLANT PUMP SUCTION #1001-47

DESCRIPTION: The RHR backup shutoff valve is a normally closed valve. This valve is interlocked with reactor pressure in such a way that it cannot be opened unless reactor pressure is less than 100 psig; it is not used for emergency cooling of the reactor.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E 1484A Rev. P

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. Bergman Date 2-9-88 Reviewer Rayeldand Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. V01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RCIC PUMP DISCHARGE VALVE 1B #1301-48

DESCRIPTION: The RCIC pump discharge valve is a normally open valve. The valve is a redundant RCIC pump discharge valve.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484E Sh. 1 Rev. S

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. PerrymanDate 2-10-88

Reviewer

Rayeldandi Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. V02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT RCIC AUTO-START GLAND SEAL VACUUM PUMP

DESCRIPTION: The RCIC vacuum pump operates to remove any noncondensable gas from the barometric condenser in order to allow for efficient condensation of RCIC leakoff steam.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U  
4E-1484D Rev. AA

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit would prevent the RCIC system from operating properly. The Unit 1 RCIC system is backed up by Unit 1 HPCI.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: D.P. CunninghamDate 2-10-88Reviewer Ray Eldand Date 3-4-88

DC POWER FAILURE ANALYSIS

A. STATION Quad Cities

UNIT 1

B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. R03 DIV. ESS DIV. II

C. ACTUATED EQUIPMENT SPACE HEATERS DISCONNECT

DESCRIPTION: Disconnect for space heaters.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE Yes

Preparer: D.P. Perry Date 2-10-88 Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. R02 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: A.P. PerryDate 2-10-88Reviewer Rayeland Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. Q01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: S. P. PerryDate 2-10-88Reviewer Rayeldand Date 3-4-88

## DC POWER FAILURE ANALYSIS

A. STATION Quad CitiesUNIT 1B. DC SYSTEM 250 V BUS R.B. MCC #1B CKT. N01 DIV. ESS DIV. IIC. ACTUATED EQUIPMENT UNASSIGNED

DESCRIPTION: Unassigned breaker.

D. REFERENCE DRAWINGS: 4E-1317 Sh. 2 Rev. U

E. DISPOSITION/CONSEQUENCES OF FAILURE: Loss of power for this circuit does not affect the availability of ECCS equipment.

REQUIRED ECCS EQUIPMENT STILL AVAILABLE YesPreparer: J.P. Overney Date 7-10-88 Reviewer Rayeldand Date 3-3-88