Analysis

Sheet 5 shows the present configuration of the power supply in 1H13-P651 and 1H13-P652 based on modifications made by ECN N53566 as authorized by FOI SKSO.

An open circuit at either or both 1H22-P071 or 1H22-P072 will not have any effect on the Class 1E power supply. Only the loss of power to these panels could result.

A short circuit at either or both panels will cause 15A fuse F1 to interrupt the fault resulting in loss of power to the multiplexing panels only. If a single failure is considered, one of the F1's in either 1H13-P651 or 1H13-P652 would fail to clear the fault (assuming simultaneous faults on 1H22-P071 and 1H22-P072). This would cause the 15A circuit breaker S3, which is upstream of the constant voltage transformer in either circuit to clear the fault. Thus, there is no effect to the power supplies to other components in 1H13-P651 and 1H13-P652 respectively.

Conclusion

The failure of either or both multiplexer panels 1H22-P071 and 1H22-P072 would only result in the loss of power to the faulted panel(s). No other upstream circuits are affected.

Form GD 3081 Rev 2

14-2070
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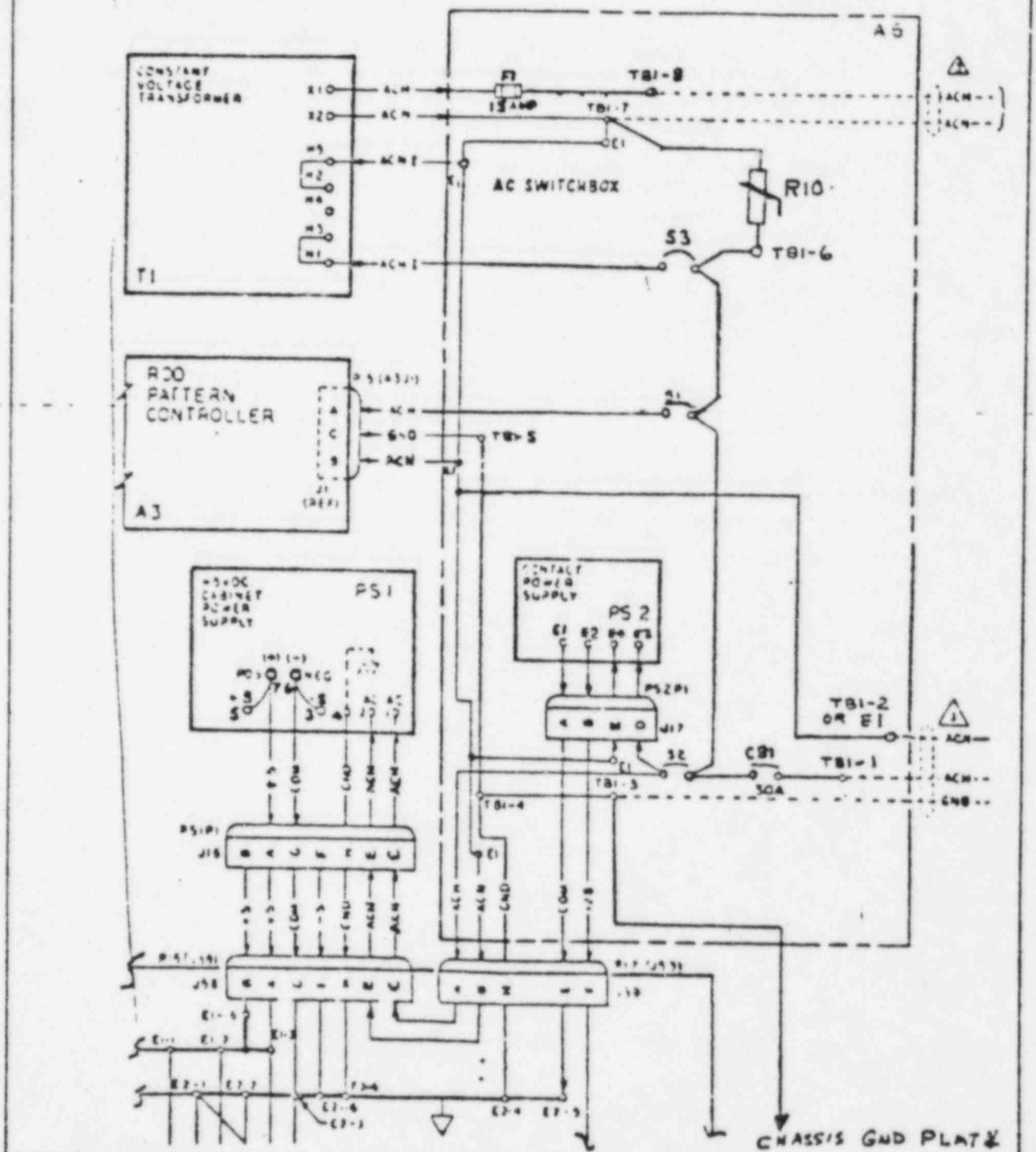
Page 5 of 5

Project No. 4536 SAFETY RELATED

ENGINEERING CHANGE NOTICE NUCLEAR ENERGY BUSINESS OPERATIONS GENERAL ELECTRIC CO., SAN JOSE, CALIFORNIA	INSTRUCTIONS, DESCRIPTION OF CHANGE ADDITIONAL APPROVAL ENDORSEMENTS AS REQUIRED.	ECN NO. NJ53566 SHEET 4 OF 4

3456

—TO—



NEO-345A (REV 9/81)

CONTINUATION SHEET

SARGENT & LUNDY ENGINEERS CHICAGO

Calcs. For FAILURE EFFECTS MODE ANALYSIS OF NON IE COMPONENTS IN DC MCC 1A, 1B, 1D	Calc. No. 19-BD-11	
	Rev. 0	Date 10-19-84
X Safety-Related / Non-Safety-Related	Page 1	of 6

Client ILLINOIS POWER CO	Prepared by R R Beavers	Date 10-19-84
Project CLINTON Power Station - Unit 1	Reviewed by S. K. Sahu	Date 10-19-84
Proj. No. 4536-CC Equip No. 1DC13E-1A, 1DC14E-1B, 1DC15E-1D	Approved by W. J. Schwartz	Date 10-19-84

RESPONSIBLE DIVISION: EPED FILE NO.: 19BD

PURPOSE: TO PROVIDE A FAILURE EFFECTS MODE ANALYSIS OF THE NON-CLASS 1E ESTERLINE ANGUS RECORDING GROUND DETECTOR AND CONTACT MAKING VOLTMETER, UNDERVOLTAGE RELAY GE 12NGV19A1A, PUSHBUTTONS AND VOLTMETER LOCATED IN DC MCC'S 1A, 1B, & 1D

FOR REFERENCE ONLY

REFERENCES: K-2976 GOULD DWG WD-58453-C-12 REV 0 (SUPERCEDES S&L DWG E03-1DC00 SHT 6 REV C DETAIL C-12
S&L KEY DIAGRAMS: E02-1DC01 REV L
1DC02 REV L
K-2976 INSTR. BOOK TAB M
K-2976 SC-153 SEISMIC REPORT
CC-323, 74-24 ENVIRO. REPORT
SC-638, REV 0 SEISMIC ADDENDA } FUSE BLOCK & FUSE QUAL REPORT
CC-346 REV 0 ENVIRO. ADDENDA }
NRC REG GUIDE 1.75
FSAR 8.1.6.1.14

ASSUMPTIONS: THE EQUIPMENT IN QUESTION IS SIESMICALLY MOUNTED. THE VENDOR HAS STATED THAT THE ANALYSIS WILL TAKE UP TO 4 MONTHS, BUT THEY ARE SURE OF THE RESULTS THAT WILL BE OBTAINED

UNCONTROLLED COPY

REVIEW METHOD: detailed analysis

Form GQ 3081 Rev 2

SARGENT & LUNDY ENGINEERS CHICAGO

Calc. For Failure Effects Mode Analysis of Non 1E Components in DC MCC 1A, 1B, 1D	Calc. No. 19-BD-11
X Safety-Related / Non-Safety-Related	Rev. 0 Date 10-19-84
	Page 2 of 6

Client Illinois Power Company	Prepared by / Date
Project Clinton Power Station - Unit 1	Reviewed by / Date
Proj. No. 4536-00 Equip. No. 1DC13E-1A 1DC14E-1B 1DC15E-1D	Approved by / Date

CONCLUSION:

ALTHOUGH DCDR No 7 STATES THAT AN APPARENT DEVIATION FROM THE FSAR COMMITMENT TO HAVING TWO (2) INTERRUPTING DEVICES IN SERIES, THIS DEVIATION DOESN'T EXIST SINCE BOTH POLARITIES ARE FUSED AND THE SYSTEM IS UNGROUNDED.

THEREFORE NO ACTION IS REQUIRED

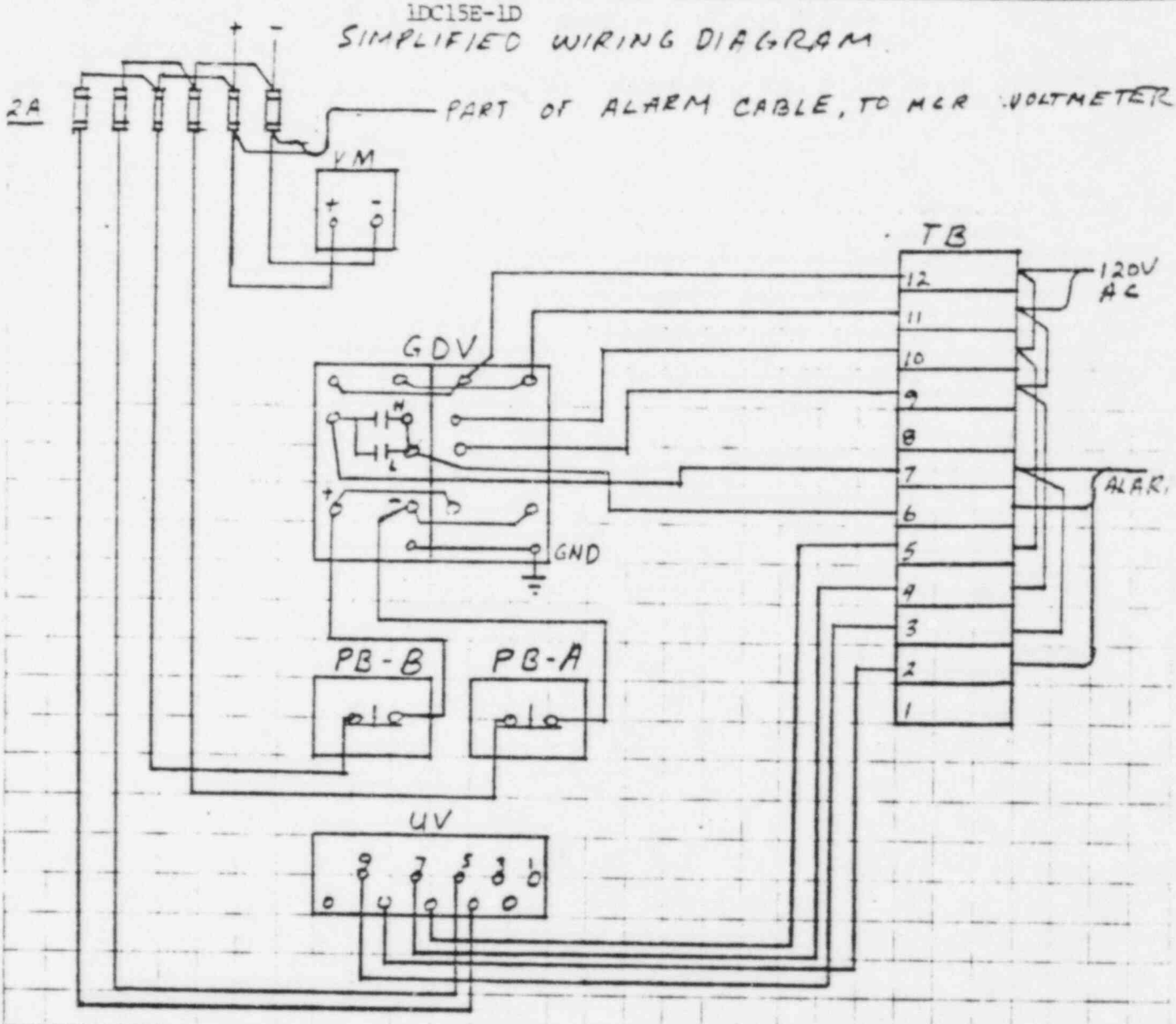
Form GO 3 08 1 Rev. 2

SARGENT & LUNDY ENGINEERS CHICAGO

Calc. For Failure Effects Mode Analysis of Non 1E Components in DC MCC 1A, 1B, 1D		Calc. No. 19-BD-11
		Rev. 0 Date 10-19-84
X Safety-Related	Non-Safety-Related	Page 3 of 6

Client Illinois Power Company	Prepared by	Date
Project Clinton Power Station - Unit 1	Reviewed by	Date
Proj. No. 4536-00 Equip No. 1DC13E-1A 1DC14E-1B 1DC15E-1D	Approved by	Date

SIMPLIFIED WIRING DIAGRAM



NOTE ALL WIRING BETWEEN DEVICES IS 1E. THE FUSE BLOCK, FUSES & TERMINAL BLOCKS ARE 1E THE WIRING IS 14 AWG

Form GD 308 1 Rev. 2

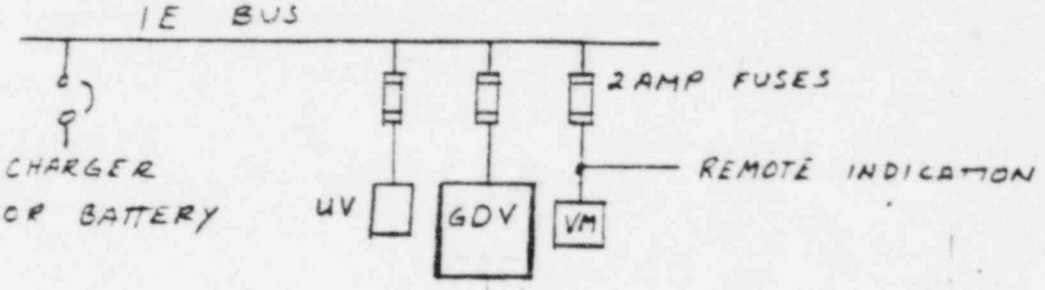
SARGENT & LUNDY ENGINEERS CHICAGO

Calcs. For	Failure Effects Mode Analysis of Non 1E Components in DC MCC 1A, 1B, 1D
	X Safety-Related ☐ Non-Safety-Related
Calc. No.	19-BD-11
Rev. 0	Date 10-19-84
Page 4	of 6

Client	Illinois Power Company
Project	Clinton Power Station - Unit 1
Proj. No. 4536-00	Equip. No. 1DC13E-1A, 1DC14E-1B, 1DC15E-1D

Prepared by	Date
Reviewed by	Date
Approved by	Date

SIMPLIFIED ONE-LINE



ANALYSIS

THE FOLLOWING RELATES TO SPECIFIC ITEMS REGARDING THE APPLICATION OF THE NON-1E INSTRUMENTATION USED IN THE 1E 125V DC MCCS

1) THE MCC STRUCTURE IS SEISMICALLY QUALIFIED (SC-153 K-2976)

2) THE SWITCHBOARD WIRE #14 AWG USED IN MAKING CONNECTIONS TO THESE COMPONENTS HAS BEEN ENVIRONMENTALLY QUALIFIED TO THE REQUIREMENTS OF IEEE 323.1974. GE VULKENE SUPREME (REF ATTACHMENT E TO CC-323.74-24)

3. ALL OF THE INSTRUMENTS ARE LOCATED IN ONE DEDICATED VERTICAL SECTION AT EACH MCC.

4. THE VENDOR WILL ANALIZE THE MOUNTING COMPONENTS TO VERIFY THAT THEY ARE MOUNTED TO THE SEISMIC REQUIREMENTS OF THE PROJECT

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5. THE TERMINAL BLOCKS UTILIZED FOR TERMINATION OF SWITCHBOARD WIRE AND FIELD CABLES HAS BEEN QUALIFIED TO THE REQUIREMENTS OF IEEE 323-1974 CONNECTRON PSU-111 (REF ATTACHMENT J TO CC-323.74-24)

6. THE SWITCHBOARD WIRE CONNECTION TO DEVICES IS MADE USING HOLLINGSWORTH RING TONGUE LUGS ON SCREW TYPE TERMINALS. (REF ATTACHMENT N4, N42 TO CC-323.74-24

7. THERE IS A QUALIFIED INTERRUPTING DEVICE ON EACH POLARITY. IE. FUSES (REF SC-638 AND CC-346)

8. THE SYSTEM IS UNGROUNDED, BUT IS TIED TO GROUND THROUGH 300K OHM RESISTORS. (REF TAB M OF K-2976 INSTR. BOOK.)

ITEMS 1, 2, 3, 4, 5, AND 6 ABOVE DEMOSTRATE THAT THE SWITCHBOARD WIRING MINIMIZES THE PROBABILITY FOR A POLARITY TO POLARITY SHORT CIRCUIT BY USING QUALIFIED TERMIAL BLOCKS, TERMINAL LUGS, SWITCHBOARD WIRE, AND SEISMICALLY MOUNTED EQUIPMENT.

ITEM 7 & 8 DEMONSTRATES THAT IN ACTUALITY THERE ARE TWO QUALIFIED INTERRUPTING DEVICES IN THE CIRCUIT. IF THERE IS A POLARITY TO POLARITY SHORT CIRCUIT, THEN EITHER OF THE FUSES CLEARING WILL INTERRUPT THE FAULT. IF THE SHORT CIRCUIT ALSO INVOLVES GROUND, THE HIGH IMPEDANCE OF THE GROUND DETECTING VOLTMETER WILL LIMIT THE CURRENT AND WILL EITHER ALARM AND/OR PROVIDE PROVIDE INDICATION OF THE SITUATION.

IF A SHORT CIRCUIT APPEARED ON THE ALARM SIDE OF THE DEVICES ONLY A SPURIOUS ALARM WOULD RESULT. NO SAFETY FUNCTION IS AFFECTED.

IF THE N.C. CONTACTS OF THE PUSHBUTTON CHATTER EITHER THE TIME DELAY WILL PREVENT AN ALARM OR A SPURIOUS ALARM WOULD OCCUR. IN EITHER CASE, SAFETY IS NOT COMPROMISED.