REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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AUTH.NAME AUTHOR AFFILIATION
UTLEY,E.E. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Forwards util responses to NRC 800207 questions re dedicated shutdown sys.Graphs & fire protection drawings encl.

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CP&L
Carolina Power & Light Company

June 2, 1980

File: NG-3514(R)

Serial No.: NO-80-813

Office of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
United States Nuclear Regulatory Commission
Washington, D. C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
DEDICATED SHUTDOWN SYSTEM

Dear Mr. Varga:

Attached is Carolina Power & Light Company's (CP&L) response to questions S7, S8, S9, S11, and S12 which were telecopied to CP&L by the NRC staff on February 7, 1980. Responses to questions S1, S2, S3, S4, S5, S6, and S10 were supplied to the NRC by CP&L on April 1, 1980. In addition, you will find attached a revised response to question S5. This revised response corrects an error in the stated normal position of certain breakers.

We trust this information is suitable for your use. If you have any questions on this subject, please contact our staff.

Yours very truly,

E. E. Utley
Executive Vice President
Power Supply and
Engineering & Construction

JJS/jc (121-670)
Attachment

cc: Mr. J. D. Neighbors (NRC)

A001
S
1/1

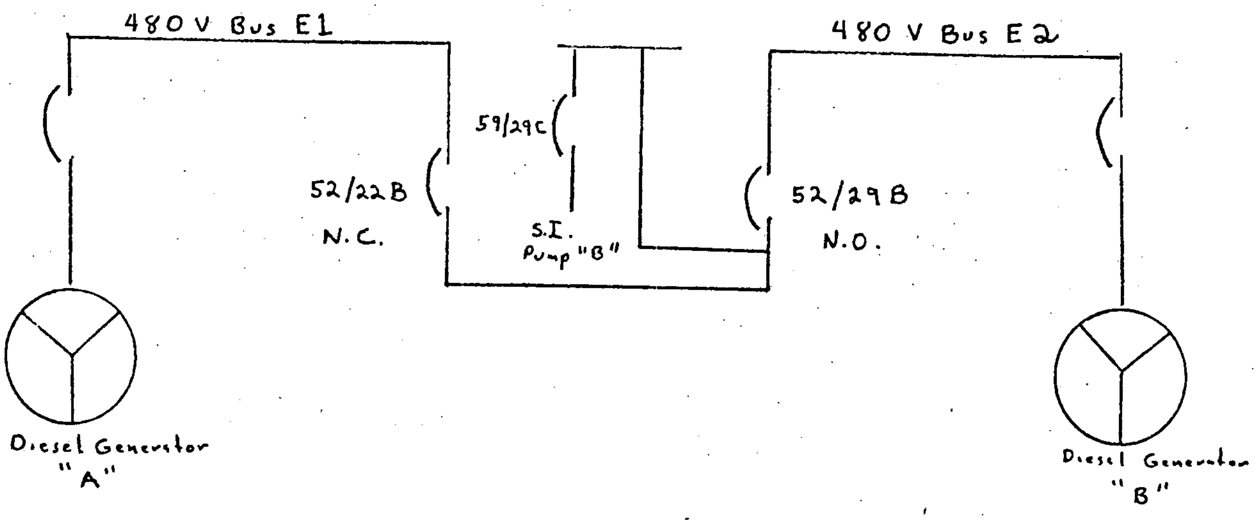
411 Fayetteville Street • P. O. Box 1551 • Raleigh, N. C. 27602

8006090310

S5. Clarify the discrepancy between the first and fourth paragraphs of FSAR page 8.2-13 with regard to the transfer of loads from one diesel generator to the other.

CP&L Response

The following is a one-line diagram of the E1-E2 cross tie as mentioned on page 8.2-13 of the FSAR.



Breakers 52/22B and 52/29B have automatic interlocks which prevent both breakers from being closed at the same time. The first paragraph on page 8.2-13 of the FSAR refers to the case where one of the emergency diesel generators does not start and come on line as required. The automatic interlock could be manually defeated so that both tie breakers could be manually closed at the same time, thus feeding both E1 and E2 from one diesel generator.

The fourth paragraph on page 8.2-13 of the FSAR refers to assuring a power supply to Safety Injection (S.I.) Pump "B". Normally, S.I. Pump "B" is fed from 480 V. Bus E1. If there was a loss of off-site power concurrent with a safety injection actuation and diesel generator "A" did not start up, breaker 52/29B would automatically close, thus ensuring a power supply to S.I. Pump "B" from 480 V. Bus E2. 480 V. Busses E1 and #2 are <u>not</u> tied together in this case because breaker 52/22B would have previously opened on undervoltage.

S7. The response to Question 8c indicates that Regulatory Guide 1.75 is a design criterion for your safe shutdown systems. The response to Question 8c also indicates that fuses are to be used as isolation devices. Clarify the discrepancy between the use of fuses as isolation devices and Regulatory Position 1 in Regulatory Guide 1.75 (which expressly forbids the use of fault current actuated devices as isolation devices).

CP&L Response

The existing design is in compliance with the intent of the separation criteria defined by Regulatory Guide 1.75. The isolation criteria applied in this design are consistent with those of the existing plant designs and with the requirements of IEEE-279 and IEEE-384-1977.

It should be noted that the referenced fuses are only used for protection of control circuits. In the event of a postulated "hot short" to one of these control circuits, it is possible that the control power fuse in the associated motor control center (or switchgear) would be blown, requiring that the fuse be replaced before the local controls can be used. This would cause an unacceptable delay in operation of the equipment, and could require the exposure of personnel to hazardous (fire) conditions. Consequently, an additional set of fuses has been provided, on all control circuits (affected by the safe-shutdown modification) to protect the existing control power fuses located in the MCC or switchgear. The new fuses have been coordinated with the existing control power fuses, to ensure that, in the event of a fault condition, they will open before the control power fuses are affected. Refer to NUS calculation 5137-EE-A2, attached.

S8. The discussion of the single failure criterion, on page 12 of your February 1, 1980 submittal, states that your "modifications generally affect only one of redundant equipment trains." Identify and justify all exceptions to this general rule.

CP&L Response

In accomplishing the referenced modifications, in only one case were redundant safety-related equipment trains modified; this occurred in providing a redundant power and control configuration for service water discharge valve V6-12D (refer to Figure S8-1).

Alternate power source connection to MCC 5 or MCC 6 is now possible, thus interfacing both power divisions with a single device. However, simultaneous connection of both sources to the valve circuit is prevented by means of a mechanical interlock on the MCC circuit breakers. (One breaker must be tripped before the alternate power source breaker can be closed.)

As valve V6-12D is presently configured, the independence of safety-related power sources MCC 5 and MCC 6 is not compromised.

S9. In several instances within the text of your response to Question 8e, credit is taken for "isolation fuses" that are coordinated with the fuses in the controls for a particular subsystem that is a part of the safe shutdown design. For each such instance, please:

a. Identify the subsystem

b. Provide the short circuit analysis for:
   1. Maximum motor supply voltage
   2. Nominal motor supply voltage
   3. Minimum motor supply voltage

c. Provide the coordination curves for each protective device.

CP&L Response

a. As discussed in the response to the previous Question 8e, properly coordinated fuses have been installed for protection of the control circuits in the following subsystems:

   1. Steam-driven feedwater pump shutoff valves V1-8A, V2-14A
   2. Component cooling pump A
   3. Charging pump A
   4. Circuit breaker control panel ("mimic" panel)

b. As shown by the figures enclosed with the previous response, and as described in the response to Question 7 above, the referenced fuses are used only for protection of control circuits. The scenario for which these fuses are intended to provide protection is that of a postulated (nonmechanistic) "hot short" to a control circuit. These fuses have been selected with appropriate characteristics, so that they will open before the control power fuse in the associated switchgear or MCC is damaged.

Because the referenced fuses have only been installed for the protection of control circuits, it was not necessary to perform (or utilize existing) distribution system short-circuit analyses.

c. NUS calculation number 5137-EE-A2, attached, provides the coordination curves for all of the fuses utilized, and provides justification for the selection of each of the protecting fuses.

S11. With regard to the responses to Question 8k, please provide the following additional information:

a. Describe how the new pressurizer instrumentation is isolated from the existing safety equipment.

b. Identify the power source and control scheme for the steam dump valves when they are in local control.

c. Describe the method and qualification of the device that permits one source range detector to feed two separate and isolated neutron monitoring channels.

d. Because only one service water pump is available for the safe shutdown, justify operation of Unit 2 when this pump is out of service.

CP&L Response

a. Pressurizer Instrumentation

The new pressurizer instrumentation is provided with separate and independent impulse lines, connected to the existing process taps. These lines are routed separately from the existing impulse lines, and feed into separate and independent transmitters which are physically remote from the existing transmitters. In addition, electrical cables from these transmitters are routed separately from the existing instrumentation cables, and are routed through electrical penetrations that do not contain any of the existing pressurizer instrumentation cables.

b. Steam Dump Valves

In the local control mode, the steam dump valves are operated by manually adjusting the pneumatic setpoint controllers. Consequently, electrical power is not required for operation of valves RV1-1, RV1-2, and RV1-3 when in the local control mode.

c. Source Range Detectors

Only one source range neutron monitoring channel has been provided for dedicated shutdown use. This dedicated channel is fed by a single detector, which had been previously designated as a "spare." In no case has one detector been used to feed more than one source range channel.

d. Service Water Pump

Providing only one Service Water Pump for the dedicated shutdown system is consistent with the system design criteria. Similarly, only one charging pump, one component cooling water pump, and one auxiliary feedwater pump are controlled by the dedicated shutdown system. A failure of any one of these pumps coincidental with an event requiring the use of the dedicated shutdown system is not consistent with the single failure criteria. In addition, the dedicated shutdown system itself is merely a backup to the existing redundant plant shutdown systems. It is, therefore, not felt that there should be any further restrictions placed on the operability requirements of Service Water Pump "D" beyond those already required by the H. B. Robinson Unit No. 2 Technical Specifications.

S12. With regard to Figures 2 and 3, in the February 1, 1980 submission, explain why fuses were added to the limit switch circuits in the local position but not the remote even when fuses were added to both local and remote circuits of the other motor controls.

CP&L Response

The referenced control circuits and the fusing configuration are shown in detail on the following NUS drawings:

Valve V1-8A: Drawings No. 5137-E-6101, Sh. 1-3
Valve V2-14A: Drawing No. 5137-E-6115, Sh. 1-3

With the valve control selector switch in the "remote" position, the only interface between the limit switch and the motor control center is through the main control panel and the transfer switch panel. The associated conductors are each provided with protective fuses. Consequently, fuse protection is provided for the limit switch circuits in both the local and remote control modes of operation.

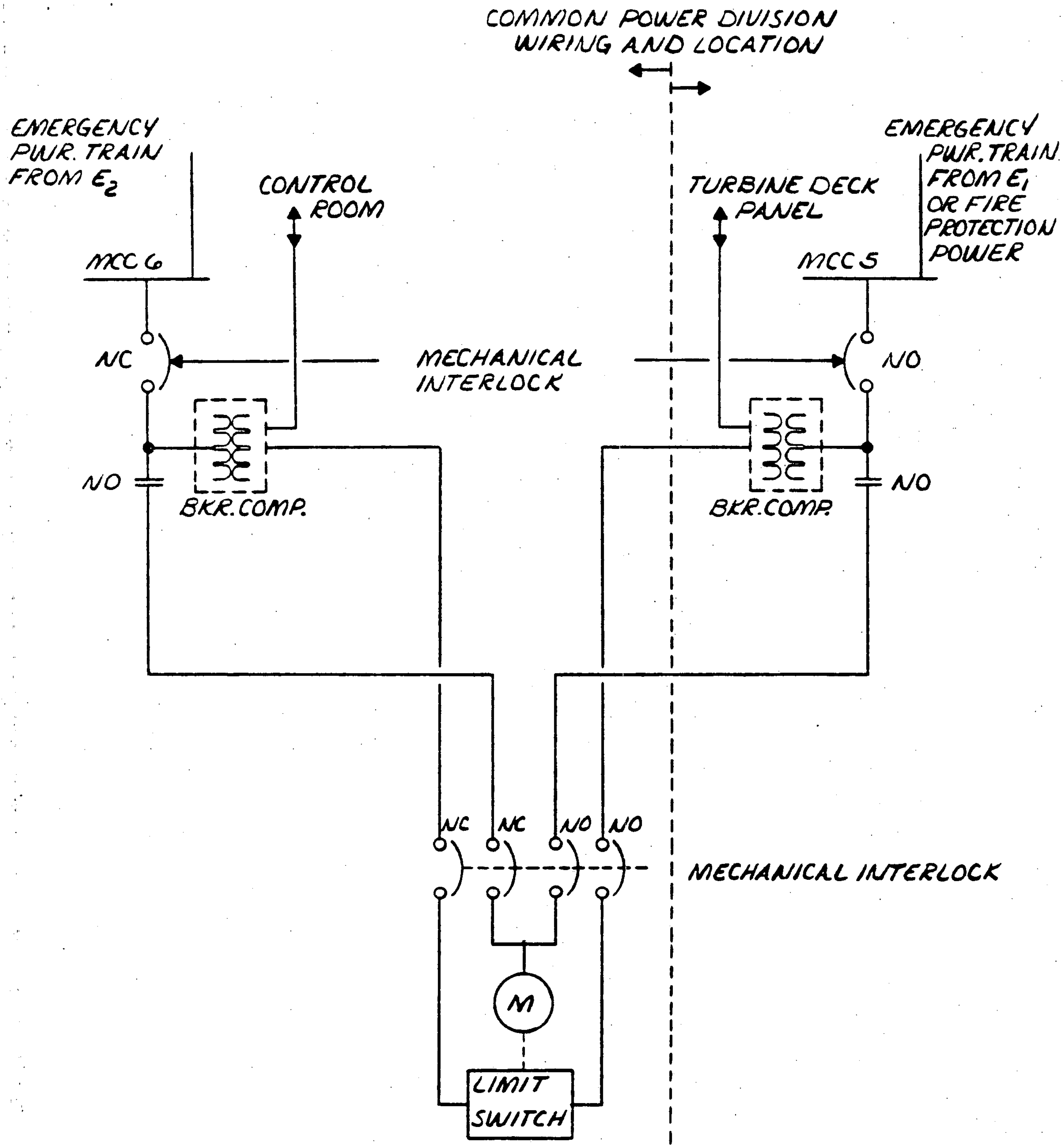


FIGURE 58-1
SERVICE WATER DISCHARGE VALVE V6-12D

NUS CORPORATION
ENGINEERING DIVISION

RECORD OF SYSTEM/COMPONENT ANALYSES

(1) FILE NUMBER	(2) NUMBER OF PAGES	(3) NUMBER OF VOLUMES OF COMPUTER OUTPUT
5137-EE-A2	12	NA

(4) CLIENT	(5) ACCOUNT NUMBER
CAROLINA POWER & LIGHT	5137

(6) ANALYSIS TITLE FUSE COORDINATION

(7) AUTHOR R.T. LINTNER

(8) PURPOSE OF ANALYSIS DESIGN A FUSE COORDINATION SCHEME TO PROVIDE ISOLATION FOR VARIOUS EQUIPMENT IN THE EVENT OF FIRE.

(9) SUMMARY OF ANALYSIS PROCEDURE AND RESULTS CURVES OF CLEARING TIME VS MELTING TIME WERE PLOTTED. RESULTS [illegible] ISOLATION CAN BE ACHIEVED BY USING FAST ACTING FUSE IN CONJUNCTION WITH TIME DELAY FUSES.

QUALITY ASSURANCE RECORD

(10) DATE COMPLETED 1-24-79

(11) VERIFICATION REQUIRED ☒ YES ☐ NO
BY ANALYSIS

(12) ANALYSIS REVIEWED AND ACCEPTED F E Venter [signature] — DISCIPLINE MANAGER; Feb 15 — DATE

(13) ANALYSIS ☐ SUPERSEDED ☐ SUPPLEMENTED BY ____ FILE NUMBER ____ DISCIPLINE MANAGER ____ DATE ____

QUALITY ASSURANCE RECORD
CHECKLIST NO. 1
[signature] APPROVED 2/16/79 DATE

ED-914 (8/76)

NUS CORPORATION
ENGINEERING DIVISION

RECORD OF ANALYSIS VERIFICATION

(1) FILE NUMBER 5137-EE-A2

(2) ANALYSIS TITLE FUSE CO-ORDINATION

(3) AUTHOR R. T. LINTNER

(4) NUMBER OF PAGES ELEVEN

(5) VERIFICATION SCOPE (CHECK AS APPLICABLE)

- ☑ METHOD OF ANALYSIS
- ☑ ASSUMPTIONS
- ☑ INPUT INFORMATION
- ☐ COMPUTER CODE APPLICATION
- ☐ CHECK OF SAMPLE CALCULATION
- ☑ SPOT CHECK OF MATHEMATICS
- ☑ REASONABLENESS OF RESULTS
- ☐ COMPLETE CHECK OF MATHEMATICS
- ☐ PARTIAL INDEPENDENT ANALYSIS

(6) BUDGET (APPROXIMATE) 1 MANDAYS

(7) DESCRIPTION OF VERIFICATION – ACTIVITIES, FINDINGS AND RESOLUTION

① This is the accepted method used in the power industry for checking the coordination of over current and overload protective devices in power systems

NUS CORPORATION
ENGINEERING DIVISION

VERIFICATION CHECKLIST

Analysis Title: FUSE COORDINATION

Analysis File Number: 5137-EE-A2

INDICATE "YES, NO, OR N/A (NOT APPLICABLE)," FOR EACH ITEM AND INCLUDE IN ANALYSIS PACKAGE WITH RECORD OF ANALYSIS VERIFICATION

	YES	NO	N/A
METHOD OF ANALYSIS			
1. IS THE METHOD USED APPROPRIATE CONSIDERING THE PURPOSE AND TYPE OF ANALYSIS AND THE USE AND ACCEPTABILITY OF THE RESULTS (i.e., MARGIN TO LIMITS)?	☑	☐	☐
2. IS THE METHOD IN ACCORDANCE WITH CODES, STANDARDS AND REGULATORY REQUIREMENTS?	☐	☐	☑
3. HAS THE METHOD BEEN EMPLOYED ELSEWHERE IN INDUSTRY OR IN LICENSE APPLICATIONS?	☑	☐	☐
ASSUMPTIONS			
1. ARE ASSUMPTIONS NECESSARY TO PERFORM THE ANALYSIS ADEQUATELY DESCRIBED AND REASONABLE?	☑	☐	☐
2. WHERE NECESSARY, ARE THE ASSUMPTIONS IDENTIFIED FOR SUBSEQUENT RE-VERIFICATIONS WHEN THE DETAILED DESIGN ACTIVITIES ARE COMPLETED?	☐	☐	☑
INPUT INFORMATION			
1. ARE THE INPUTS INTO THE ANALYSIS STATED AND THEIR SOURCE IDENTIFIED?	☑	☐	☐
2. IS THE INPUT INFORMATION FROM THE LATEST AVAILABLE REVISION TO THE SOURCE DOCUMENT?	☑	☐	☐
3. IS THE STATUS (PRELIMINARY, CONCEPTUAL, ETC.) OF THE INPUT SOURCE IDENTIFIED FOR LATER CONFIRMATION OF THE VALIDITY OF THE INPUT?	☐	☐	☑
4. ARE THE INPUTS SUFFICIENT CONSIDERING THE PURPOSE OF THE ANALYSIS?	☑	☐	☐
COMPUTER CODE APPLICATION			
1. ARE ALL CODES USED IDENTIFIED ALONG WITH SOURCE, COMPUTER TYPE, INPUTS, AND OUTPUTS?	☐	☐	☑
2. HAS THE CODE BEING USED BEEN ADEQUATELY VERIFIED?	☐	☐	☑
3. IS THE CODE SUITABLE FOR THE PRESENT ANALYSIS?	☐	☐	☑
4. DOES THE COMPUTER MODEL (NODING, TIME STEPS, ETC.) ADEQUATELY REPRESENT THE PHYSICAL SYSTEMS?	☐	☐	☑
REASONABLENESS OF RESULTS			
1. IS THE MAGNITUDE OF THE RESULT REASONABLE?	☑	☐	☐
2. ARE THE DIRECTION OF TRENDS REASONABLE?	☐	☐	☑

J. E. Coutts — Prepared By

1-18-79 — Date

ED-816 (8/76)

(8) R. J. Yamenes (signature) — 2/12/79

VERIFIER'S SIGNATURE — DATE

(9) ACCEPTANCE BY J. E. Roberts (signature) — 1-18-79

DISCIPLINE MANAGER — DATE

CLIENT CP+L FILE NO. 5137-EE-A2 BY R. LINTNER

SUBJECT FUSE COORDINATION Checked By RF Yamrus 2/12/79

INDEX

NUS CORPORATION

DATE 1-24-79

CLIENT CP+L FILE NO. 5137-EE-A2 BY R. LINTNER

SUBJECT FUSE COORDINATION Checked By RF Yamaus 2/12/79

I CLIENT

CAROLINA POWER AND LIGHT

II ANALYSIS FILE NUMBER

5137-EE-A2

III ANALYSIS TITLE

FUSE COORDINATION

IV AUTHOR

R. T. LINTNER

V PURPOSE OF ANALYSIS

DESIGN A fuse COORDINATION scheme TO PROVIDE EQUIPMENT ISOLATION IN THE EVENT OF FIRE IN THE BATTERY ROOM, EMERGENCY EQUIPMENT ROOM, CONTROL ROOM, OR CABLE SPREAD ROOM.

NUS CORPORATION

DATE 1-24-79

CLIENT CP&L FILE NO. 5137-EE-A2 BY R. LINTNER

SUBJECT FUSE COORDINATION Checked By RF YAMRUS 2/12/79

VI METHOD OF ANALYSIS

COORDINATION WILL REQUIRE THAT THE NEAREST OVERCURRENT PROTECTIVE DEVICE TO A OVERCURRENT WILL CLEAR BEFORE ANY OF THE LARGER UPSTREAM PROTECTIVE DEVICES BEGIN TO OPEN.

ONLY THE FAULTED CURRENT IS ISOLATED FROM THE SYSTEM BY THE NEAREST PROTECTIVE DEVICE AND THE OTHER PARTS OF THE SYSTEM WILL NOT BE AFFECTED.

VII INPUT INFORMATION

1. FROM FIELD INVESTIGATIONS IT WAS DETERMINED THAT FUSES (MAINS) ARE DUAL ELEMENT TIME DELAY OF 30 AMP AND 10 AMP TYPE FRN FOR SWITCHGEAR CIRCUITS, AND 4 AMP TIME DELAY TYPE FNM FOR MOTOR OPERATED VALVE CIRCUITS. FUSE MANUFACTURER IS BUSSMANN MFG. CO.

2. MELTING AND CLEARING TIME CURRENT CURVES FOR BUSSMAN TYPE SC-2, 10, 6, FRN-10, 15 FUSES. (REFERENCE CURVES I, II, III.)

CLIENT CP+L FILE NO. 5137-EE-A2 BY R. LINTNER

SUBJECT FUSE COORDINATION Checked By RF YAMIEUS 2/12/79

VIII ASSUMPTIONS

A FUSE SYSTEM IS NOT NECESSARILY "SELECTIVELY COORDINATED" JUST BECAUSE THE MAIN PROTECTIVE DEVICE HAS A LARGER AMPERE RATING THAN THE BRANCH CIRCUIT DEVICE.

FUSES CAN BE SELECTIVELY COORDINATED BY MAINTAINING AT LEAST A MINIMUM AMPERE RATING RATIO BETWEEN THE MAIN FUSE AND BRANCH CIRCUIT.

IX REFERENCES

McGRAW EDISON CO.
HANDBOOK OF FUSES
BUSSMAN MFG DIVISION
(REF. CURVES I, II, III)

McGRAW EDISON CO.
SELECTIVITY RATIO GUIDE
(REF. CHART I)

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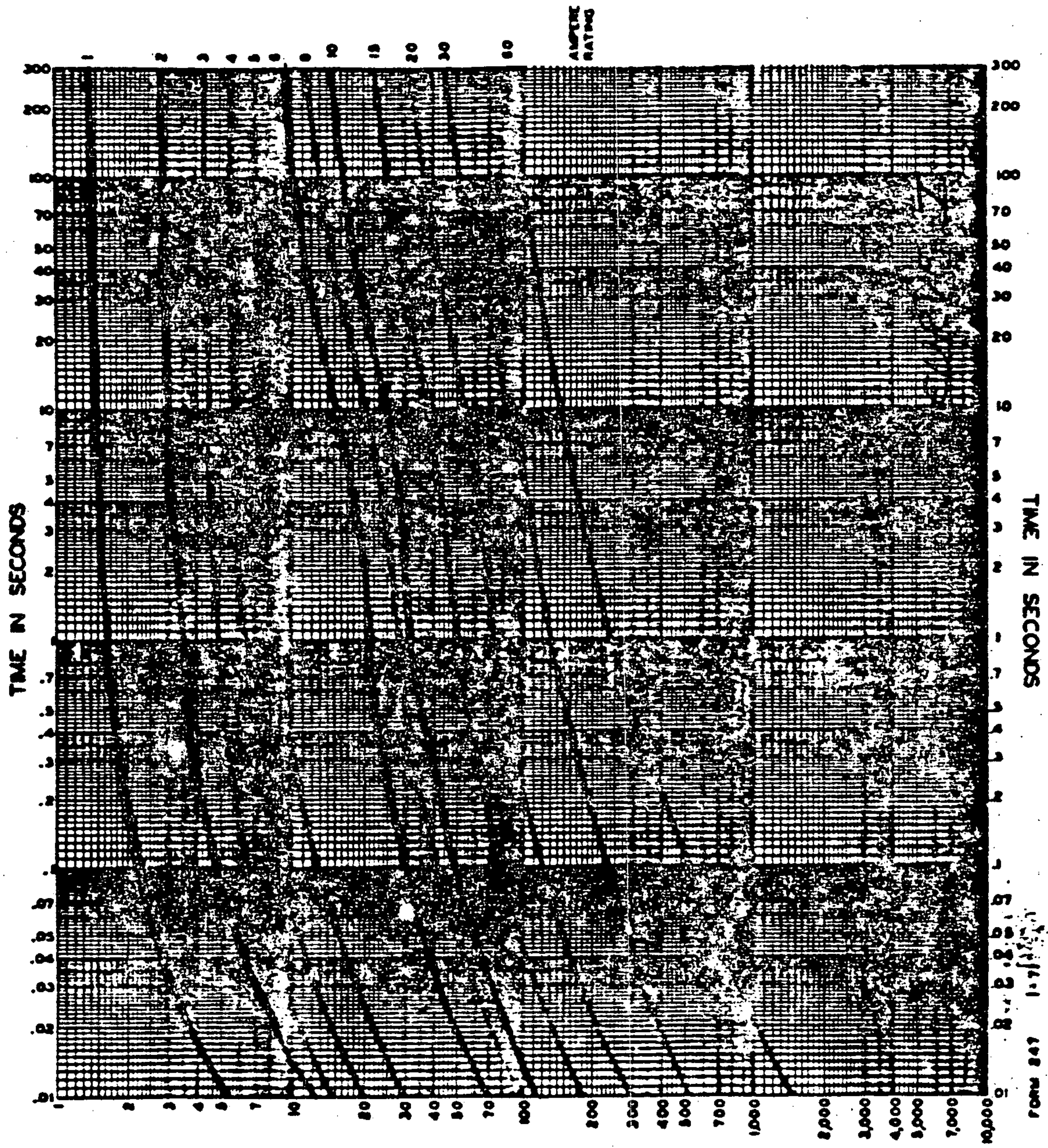
SUBJECT FUSE COORDINATION Checked By RF Yamarus 2/2/79

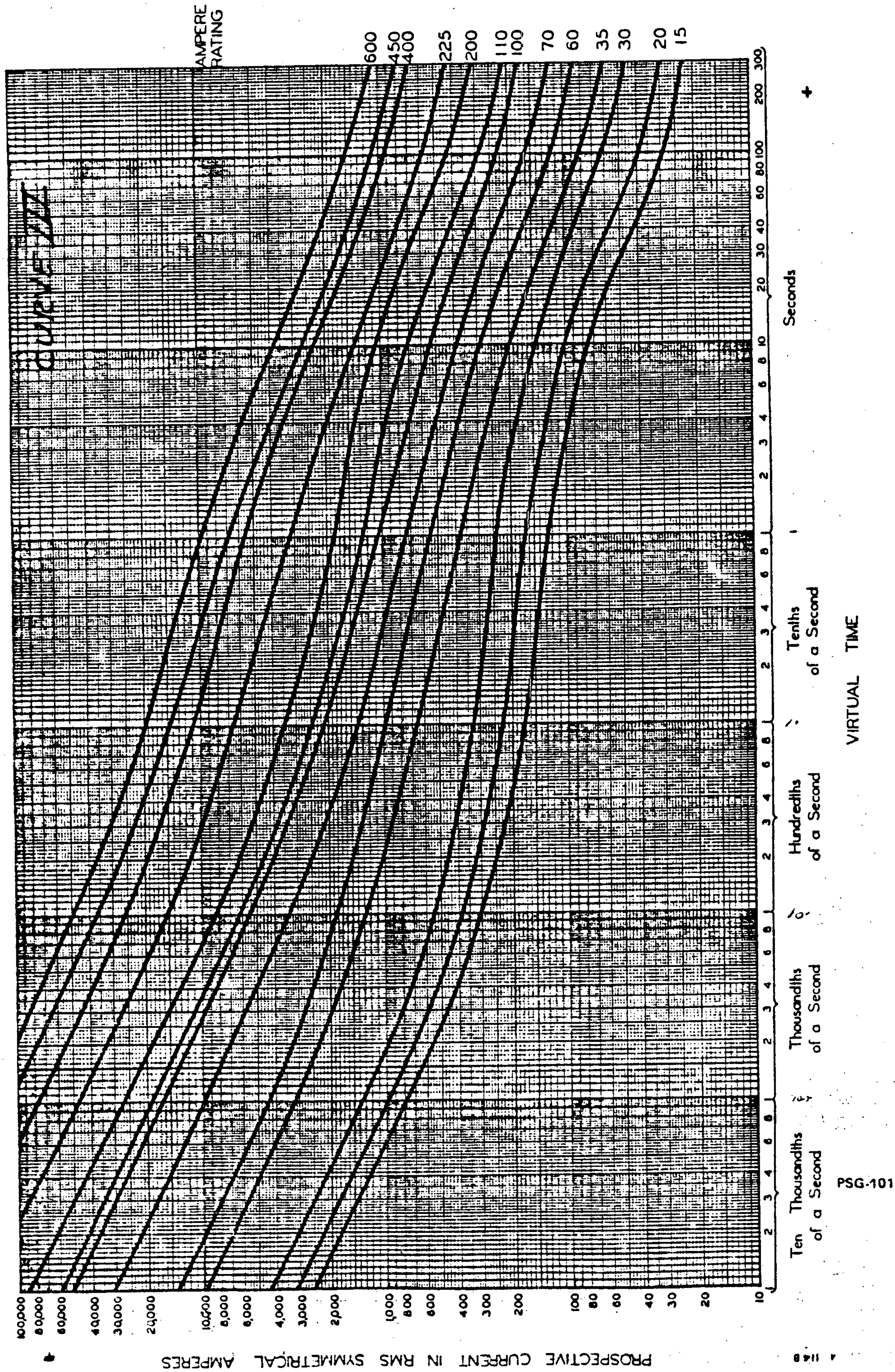
5911600 MC GRAW-EDISON CO, 48A 0443 A-11-1

Average Total Clearing Time-Current Characteristic Curves BUSS SC Fuses*



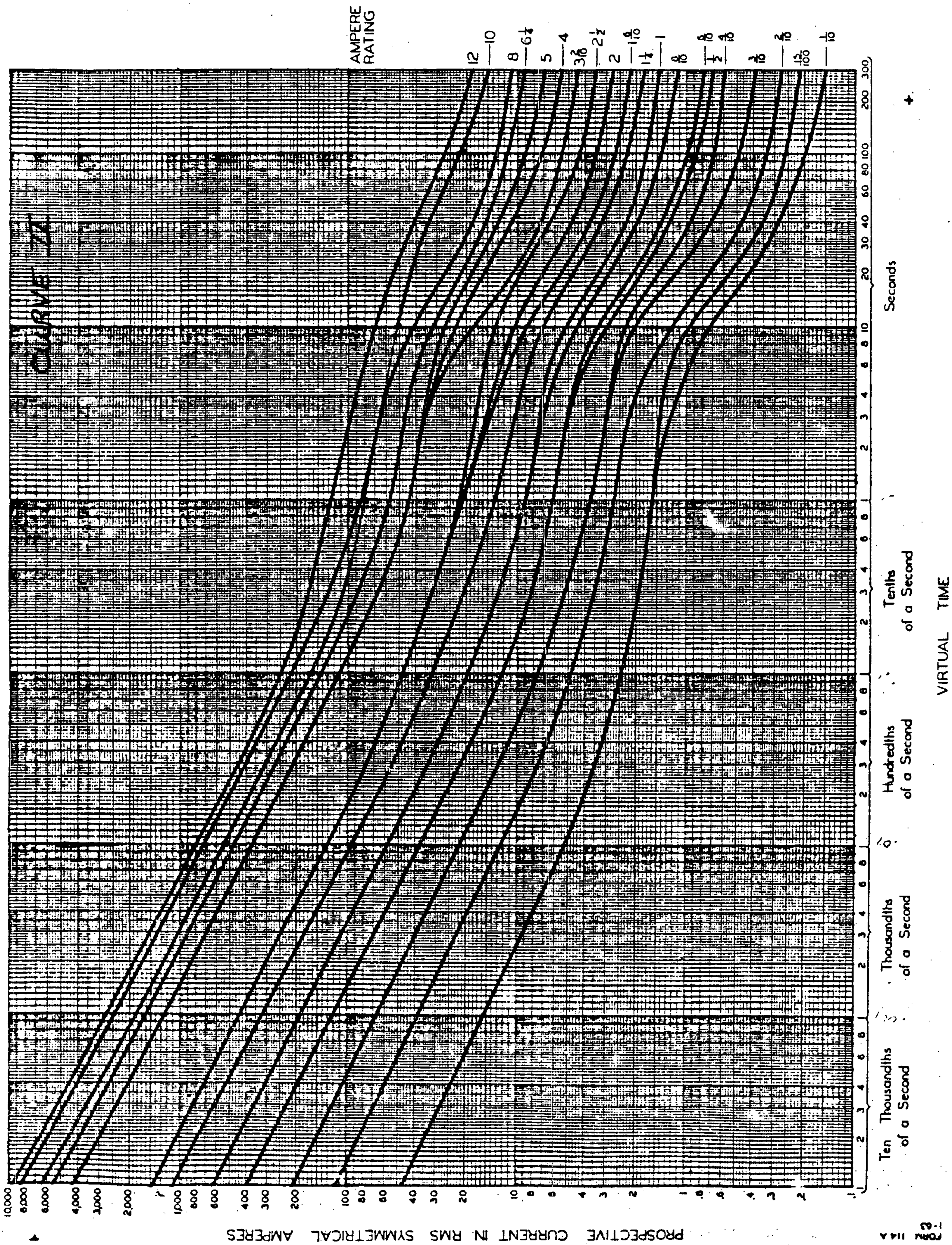
SUBJECT *FUSE COORDINATION* Checked By *KF YAMI[illegible]* [illegible]

Average Melting Time Current Characteristic Curves 15 to 600 ampere FRN FUSETRON Fuses (250 volt)



SUBJECT FUSE COORDINATION Checked By R F YAMRUS 2/12/77

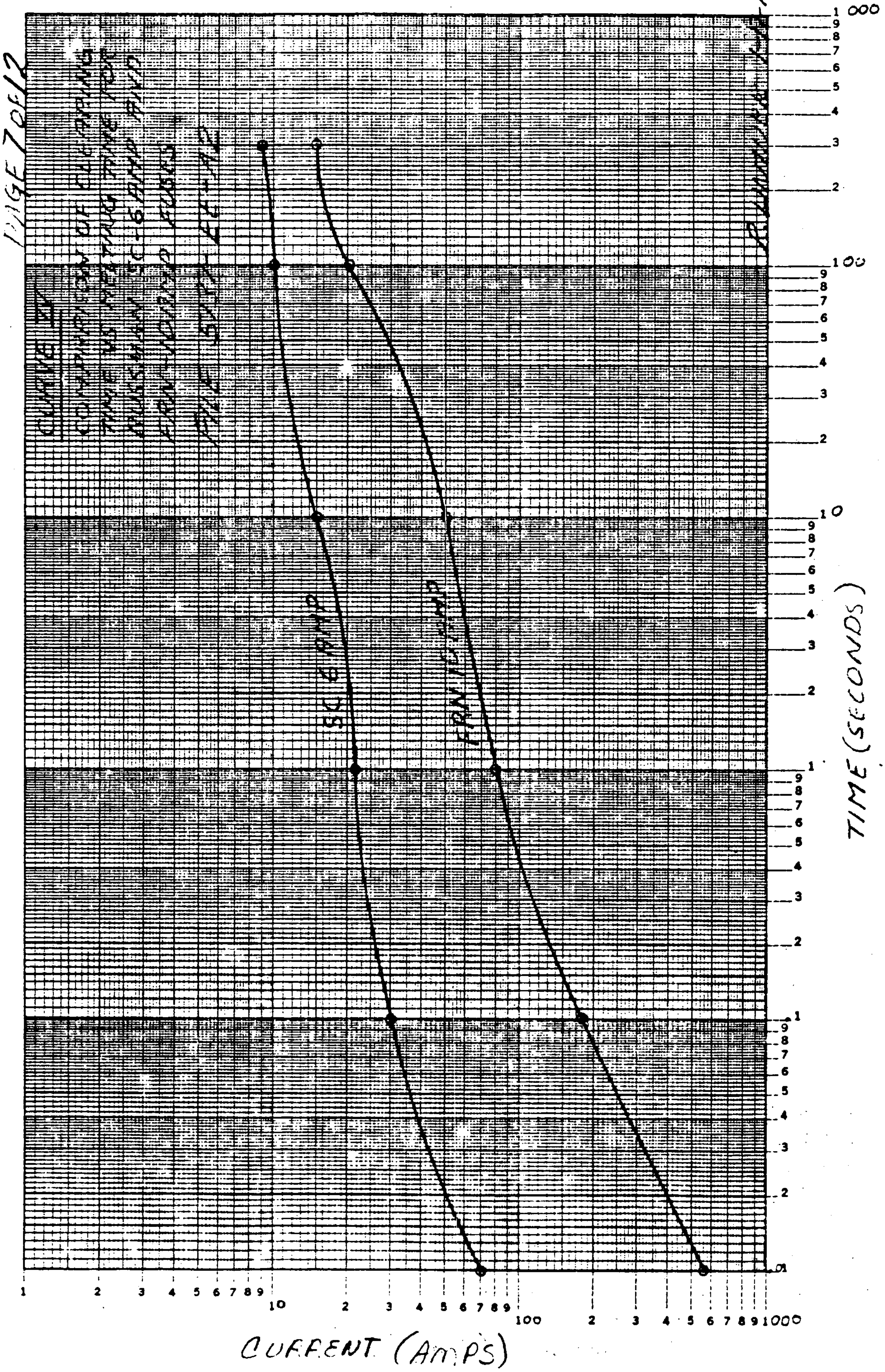
Average Melting Time Current Characteristic Curves
0 to 12 ampere FRN FUSETRON Fuses (250 volt)



46 7602

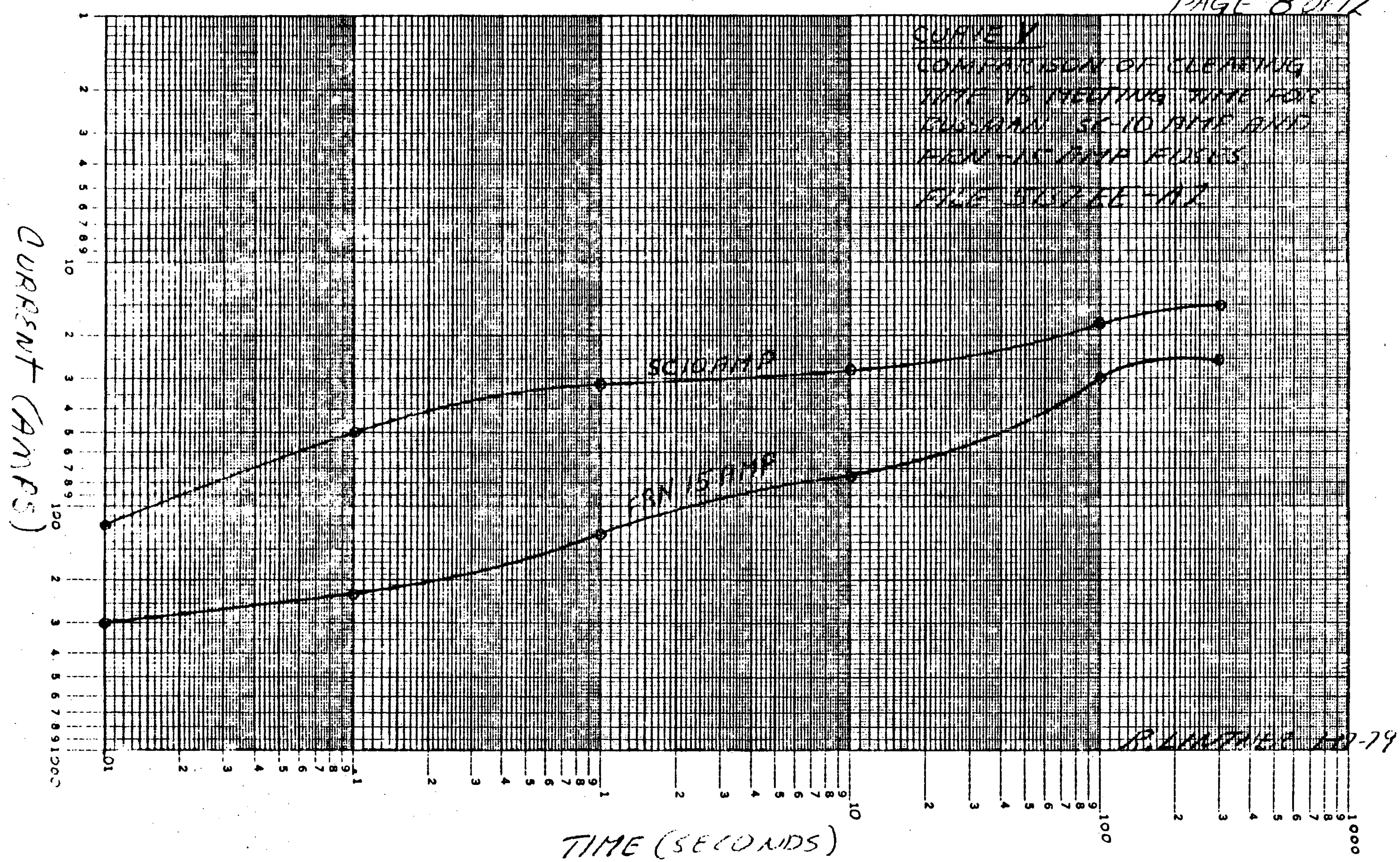
K•E LOGARITHMIC 5 x 3 CYCLES KEUFFEL & ESSER CO. MADE IN U.S.A.

2/12/79



K•E LOGARITHMIC 5 x 3 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 7602



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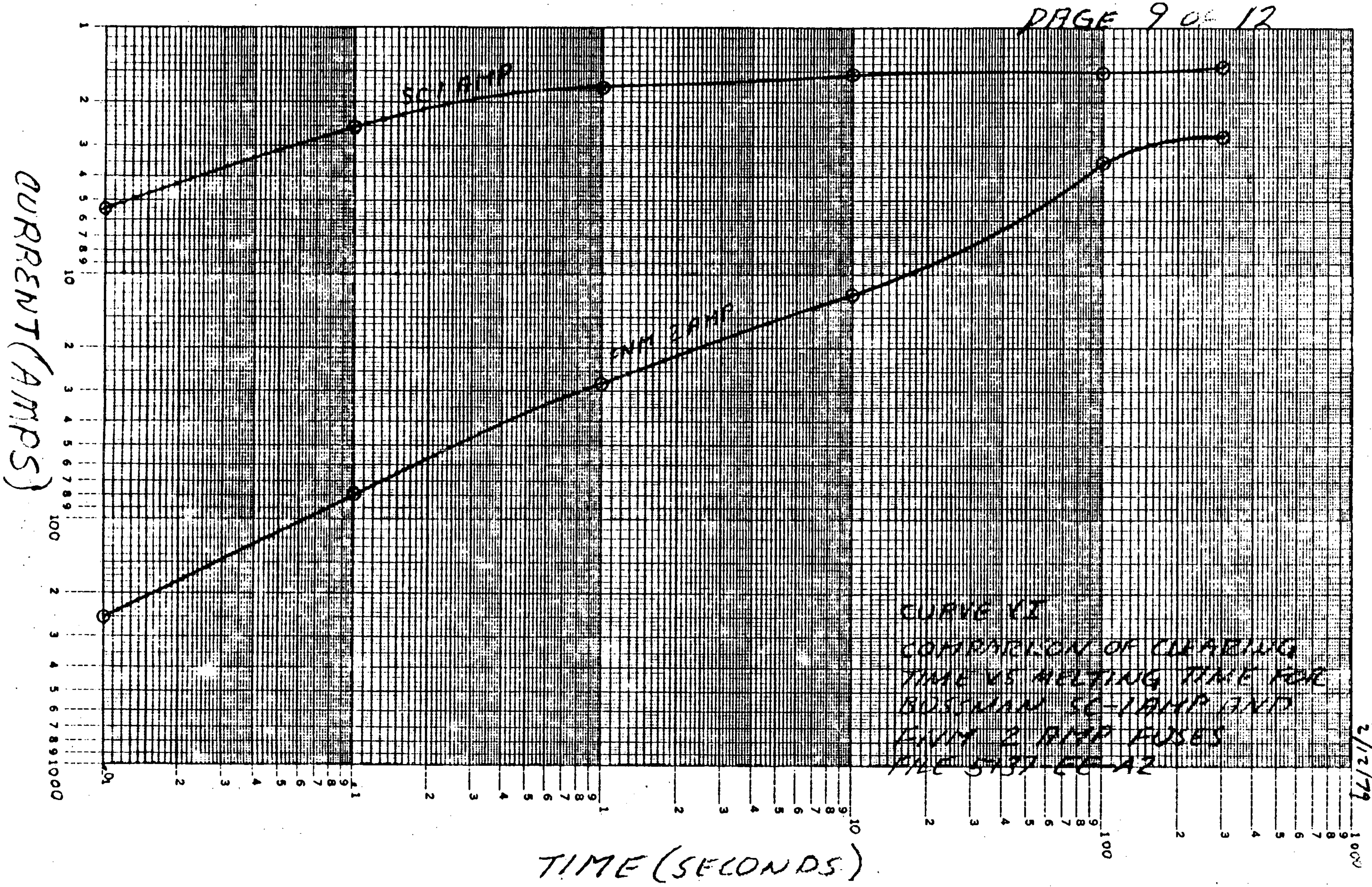

2/12/79

R LINTNER 1-18-79

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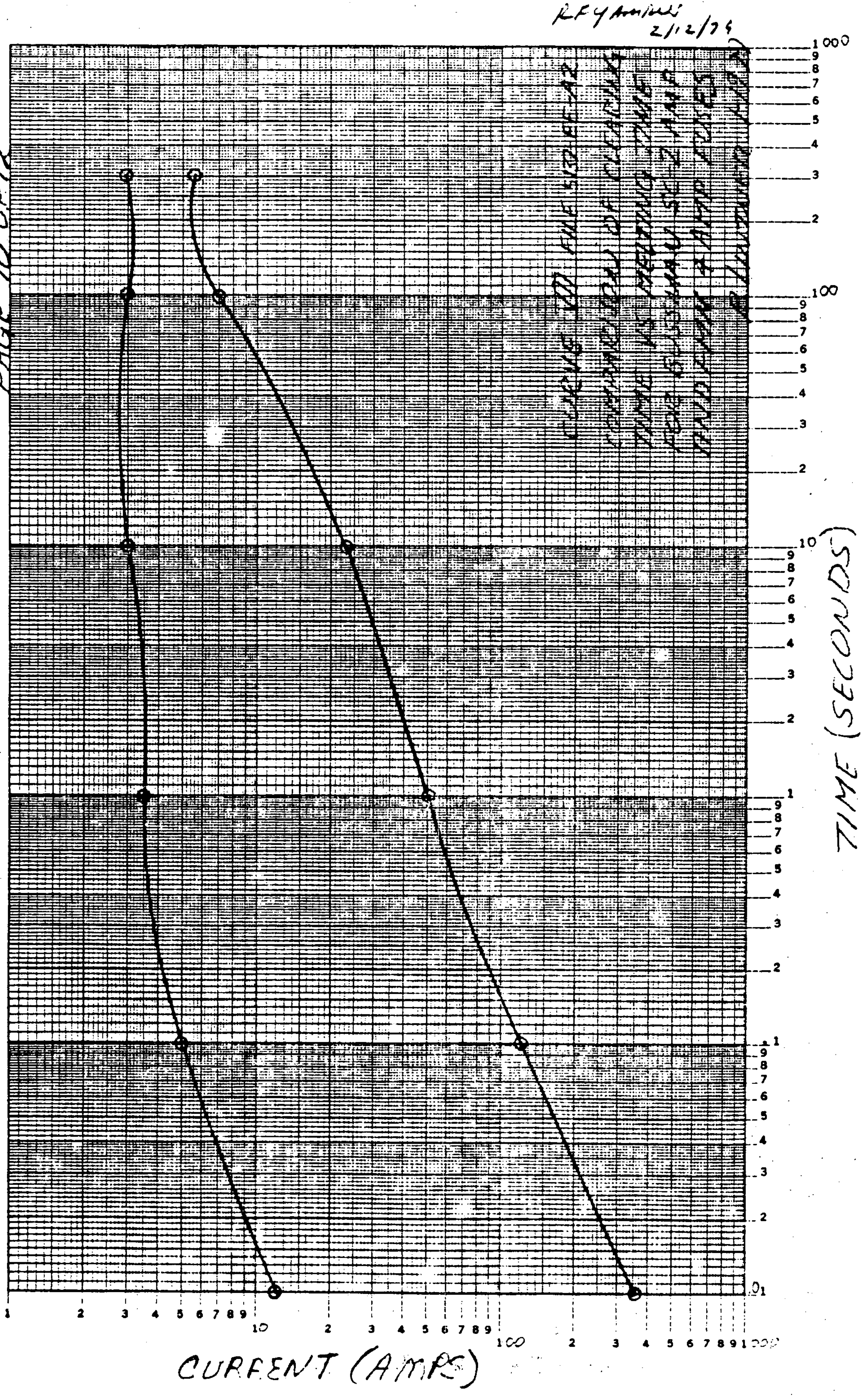
K•E LOGARITHMIC 5 x 3 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.



CLIENT CP+L FILE NO: 5137-EE-A2 BY R LINTNER

SUBJECT FUSE COORDINATION Checked By RF [illegible] 2/12/79

X COMPUTER CODES

NOT APPLICABLE

XI DETAILED CALCULATIONS/CURVES

BY ~~MAINTAINING~~ RJL 1-24-79 MAINTAINING A MINIMUM FUSE RATIO AS SHOWN FROM THE RATIO GUIDE IT CAN BE SEEN THAT A 1.5:1 RATIO WILL BE NEEDED TO PRODUCE THE CORRECT FUSE COORDINATION CONCEPT.

Selectivity Ratio Guide*

MAINS LINE SIDE FUSE ↓	LOAD SIDE FUSE KRP-C HI CAP time-delay Fuse 601-6000A	KTU LIMITRON fast acting Fuse 601-6000A	KTN, KTS KTN-R KTS-R LIMITRON fast acting Fuse 0-600A	JJN, JJS TRON fast-acting Fuse (Class T) 0-600A	JKS LIMITRON quick acting Fuse (Class J) 0-600A	FRN, FRS FRN-R FRS-R FUSETRON dual-element Fuse 0-600A	LPN, LPS LPN-R LPS-R LOW PEAK dual element Fuse 0-600A	JHC HI CAP time delay Fuse (Class J Dim.) 15-600A	BRANCH [redacted]
KRP-C HI-CAP time-delay Fuse 601-6000A	2:1	2:1	2:1	2:1	2:1	4:1	3:1	3:1	**
KTU LIMITRON fast acting Fuse 601-6000A	2:1	2:1	2:1	2:1	2:1	6:1	5:1	5:1	**
KTN, KTS, KTN R, KTS R LIMITRON fast acting Fuse, 0-600A			3:1	3:1	3:1	8:1	4:1	4:1	4:1
JJN, JJS TRON fast-acting Fuse (Class T), 0-600A			3:1	3:1	3:1	8:1	4:1	4:1	4:1
JKS LIMITRON quick-acting Fuse Class J, 0-600A			3:1	3:1	3:1	8:1	4:1	4:1	4:1
[redacted]			1.5:1	1.5:1	1.5:1	2:1	1.5:1	1.5:1	[redacted]
LPN, LPS, LPN R, LPS R LOW PEAK dual-element Fuse, 0-600A			1.5:1	1.5:1	1.5:1	4:1	2:1	2:1	2:1
JHC HI-CAP time delay Fuse (Class J Dim.), 15-600A			1.5:1	1.5:1	1.5:1	4:1	2:1	2:1	2:1
SC Type Fuse Class G, 0-60A			2:1	2:1	2:1	4:1	4:1	3:1	2:1

*Applies only to the indicated BUSS fuses

**SC Fuses available in sizes up to 60 amperes. Selectivity is not an issue here

NOTE: At some values of fault current these ratios may be lowered to permit closer fuse sizing. Check with manufacturer for lower ratio possibilities or plot fuse curves.

CHART I

CLIENT CP&L FILE NO. 5137-EE-A2 BY R LINTNER

SUBJECT FUSE COORDINATION Checked By RF YAMRUS 2/12/79

XI CONT.

Therefore if a 10 AMP TYPE FRN FUSE IS USED AS THE MAIN PROTECTION, BRANCH CIRCUIT PROTECTION CAN BE ACCOMPLISHED WITH A 6 AMP TYPE "SC" FUSE.

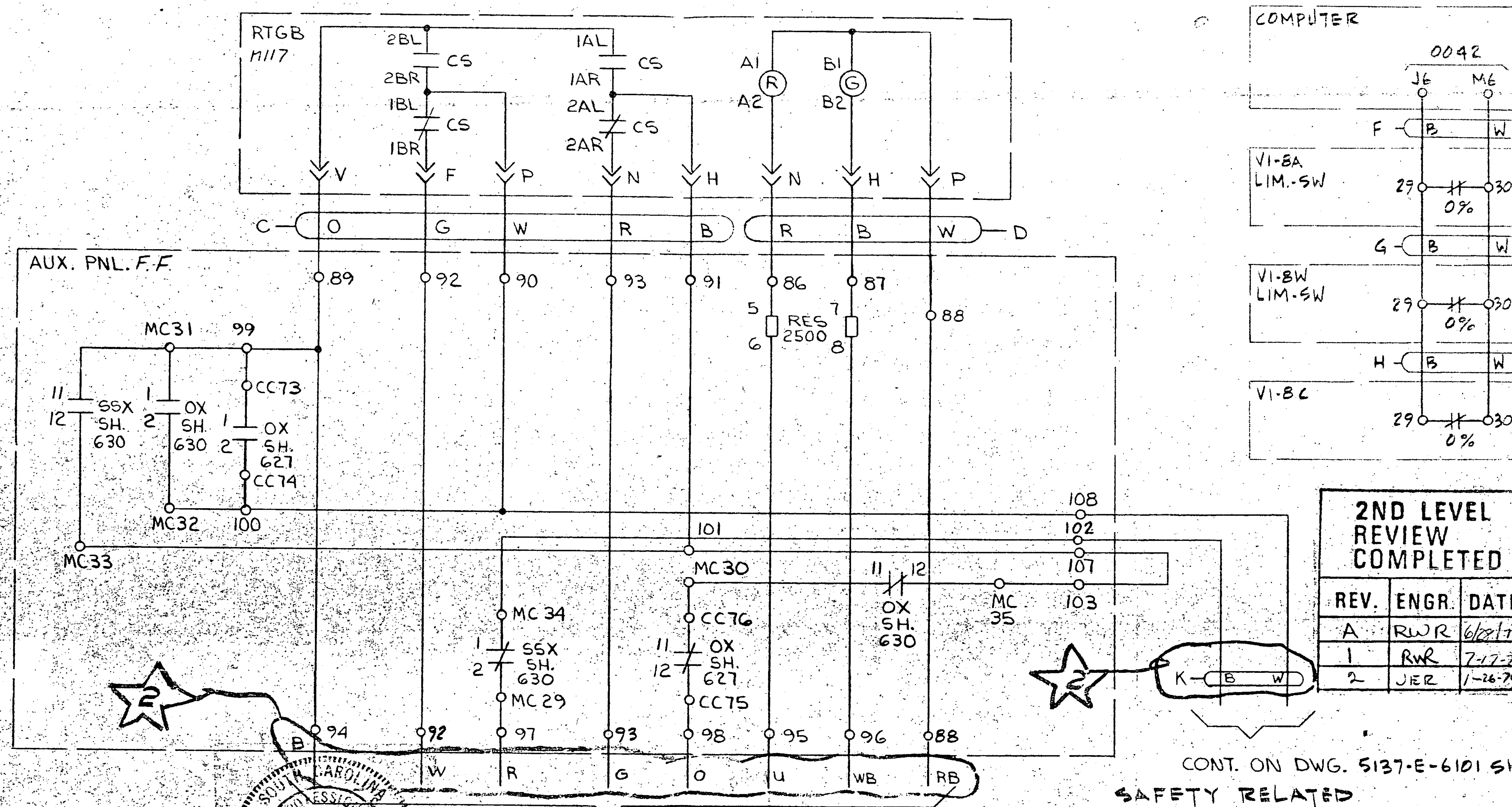
IT FOLLOWS THAT:

15 AMP FRN → 10 AMP SC
4 AMP FRN → ≈ 2 AMP SC
2 AMP FRN → ≈ 1 AMP SC

XII RESULTS

BY COMPARING THE RESPECTIVE TIME CURRENT CURVES FOR THE FUSES IT CAN BE SEEN THAT THE TYPE SC FUSES HAVE A CONSIDERABLY QUICKER INTERRUPTING TIME CHARACTERISTIC THAN THE FRN TYPE FUSE. (SEE CURVES IV - VII)

The FASTER INTERRUPTING TIME FOR THE SC FUSES MAKE THEM SUITABLE FOR THE SELECTIVE COORDINATION CONCEPT BEING APPLIED TO CIRCUITRY FOR ACCOMPLISHING THE ISOLATION EFFECT REQUIRED BY PRESENT GUIDLINES.



2ND LEVEL REVIEW COMPLETED

REV.	ENGR.	DATE
A	RWR	6/28/78
1	RWR	7-17-78
2	JER	1-26-79

CONT. ON DWG. 5137-E-6101 SH2

SAFETY RELATED

REF: EBASCO DWG B-19062B

THIS DRAWING REPLACES WESTINGHOUSE DRAWING 500B452 SH631

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 7115 JAMES EDWARD ...

CO-01282

CONT. ON DWG. 5137-E-6101 SH2

APPROVED FOR CONSTRUCTION CO-00685 7/20/78

REV.	DATE	REVISIONS	BY	ENG
2	1/20/79	ADDED COLOR CODE	DR	RL
1	7/17/78	APPROVED FOR CONSTRUCTION	CW	RL
A	6/22/78	RELEASED FOR COMMENT	CW	RL

DRAWN	D. RATH	6/14/78
CHECKED	C. Wiser	6/14/78
COG ENGR	[illegible]	6/17/78
DISCIP.	J. E. Painter, Jr.	6/28/78
APPROVAL	[illegible]	6/28/78

CAROLINA POWER & LIGHT COMPANY
H.B. ROBINSON STEAM ELECTRIC PLANT

STEAM DRIVEN FWP
STEAM SHUT OFF VALVE VI-8A

CP&L SH 1033

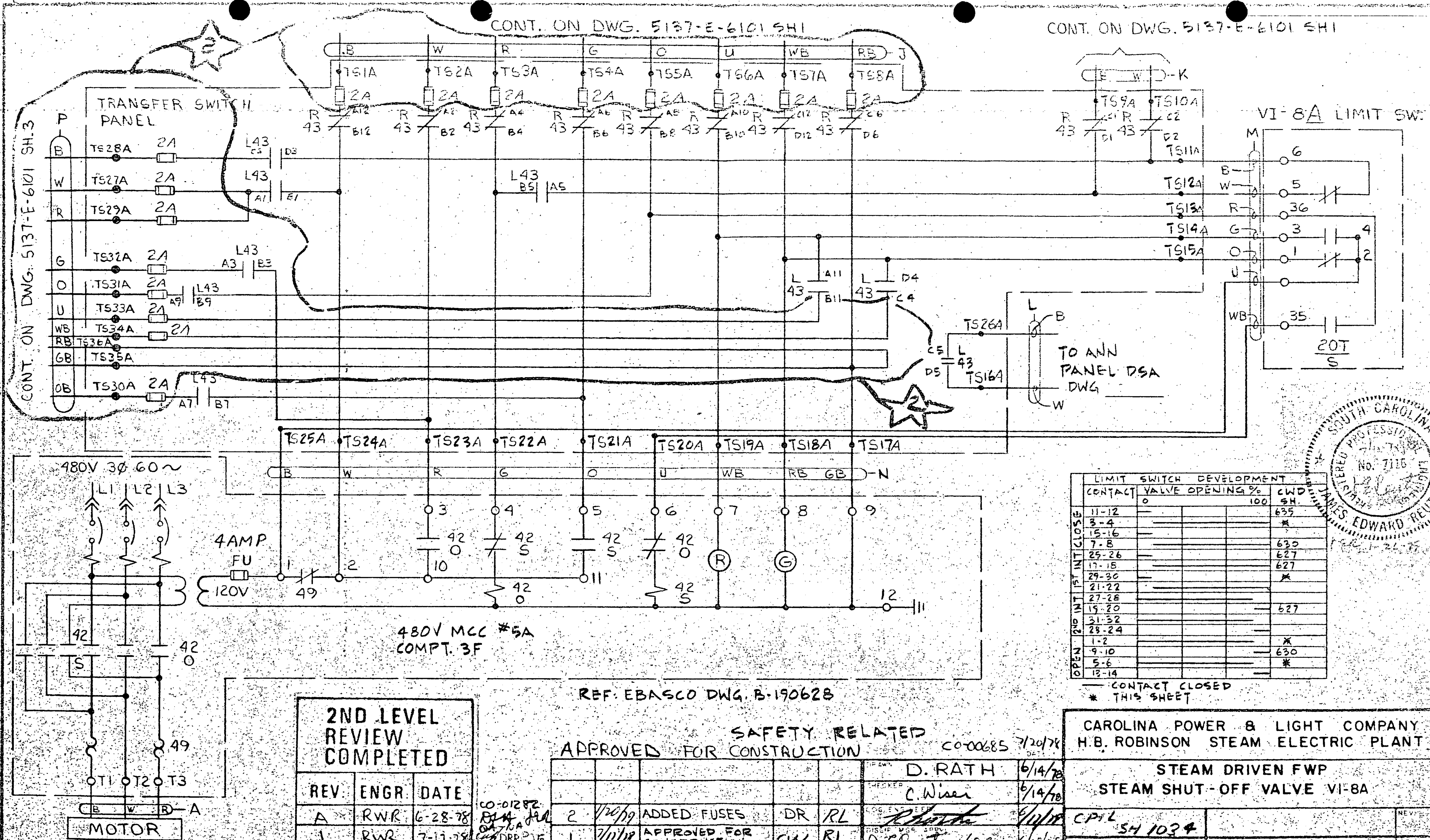
NUS CORPORATION

DRAWING NO. 5137-E-6101 REV. 2

SCALE NONE SHEET 1 OF 3

TD3

86-2



	LIMIT SWITCH DEVELOPMENT		
	CONTACT	VALVE OPENING % (0 – 100)	CWD SH.
CLOSE	11-12		635
CLOSE	3-4		*
CLOSE	15-16		
CLOSE	7-8		630
1ST INT	25-26		627
1ST INT	17-15		627
1ST INT	29-30		*
1ST INT	21-22		
2ND INT	27-28		
2ND INT	19-20		627
2ND INT	31-32		
2ND INT	23-24		
OPEN	1-2		*
OPEN	9-10		630
OPEN	5-6		*
OPEN	13-14		

— CONTACT CLOSED
* THIS SHEET

REF: EBASCO DWG. B-190628

SAFETY RELATED
APPROVED FOR CONSTRUCTION CO-00685 7/20/78

2ND LEVEL REVIEW COMPLETED		
REV.	ENGR.	DATE
A	RWR	6-28-78
1	RWR	7-11-78
2	JER	1-26-79

CO-01282 DA-A JER DRR 2-IF

REV	DATE	REVISIONS	BY	CDG ENG
2	1/20/79	ADDED FUSES	DR	RL
1	7/11/78	APPROVED FOR CONSTRUCTION	CW	RL
A	6/28/78	RELEASED FOR COMMENT	CW	RL

DRAWN: D. RATH 6/14/78
CHECKER: C. Wiser 6/14/78
COG. ENGINEER: 6/11/78
DISCIP. MGR. APPVL: J. E. Reuter, Jr. 6/28/78
APPROVAL: 6/28/78

South Carolina Registered Professional Engineer No. 7116 James Edward Reuter

CAROLINA POWER & LIGHT COMPANY
H.B. ROBINSON STEAM ELECTRIC PLANT

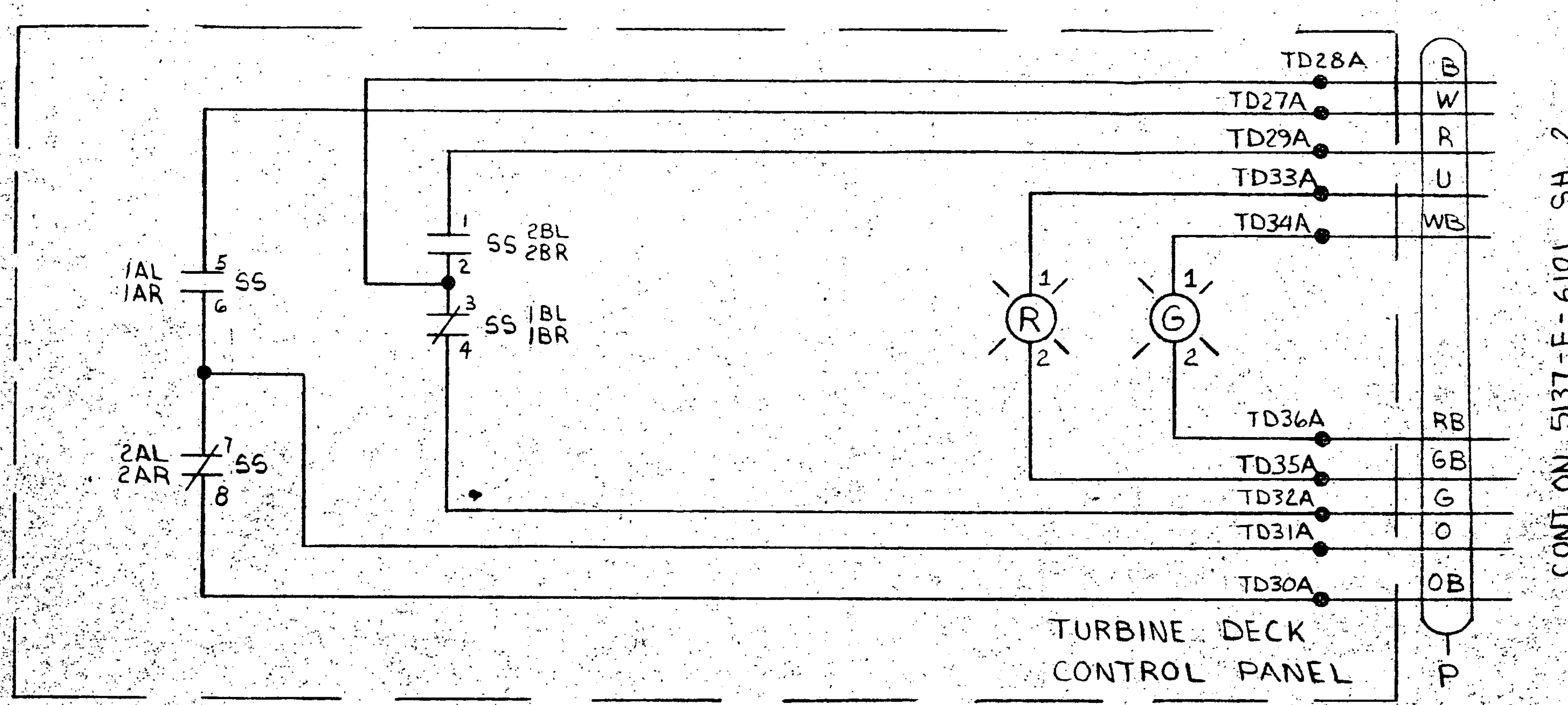
STEAM DRIVEN FWP
STEAM SHUT-OFF VALVE VI-8A

CP&L SH 1034

NUS CORPORATION

DRAWING NO. 5137-E-6101 REV. 2
SCALE NONE SHEET 2 OF 3

TD4 86-3



REF. EBASCO DWG. B-190628

FIRE PROTECTION LIST

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 7116 JAMES EDWARD REUTER
1-26-79

CO-01285 3/19/79

REV.	DATE	REVISIONS	BY	COG ENG
1	3-19-79	CLIENT APP AFC	CO-01	285
A	1/10/79	RELEASED FOR COMMENT	DR	RL

DRAWN	D. RATH	1/18/79
CHECKER	C Wiser	1/19/79
COG ENGINEER	[signature]	1/26/79
DISCIP. MGR	J E Reuter	1-26-79
APPROVAL	QA-NA	
PROJ. MGR	D J Hill	1/26/79

CAROLINA POWER & LIGHT COMPANY
H. B. ROBINSON STEAM ELECTRIC PLANT

STEAM DRIVEN FWP.
STEAM SHUT OFF VALVE VI-8A

CP&L SH. 1034A

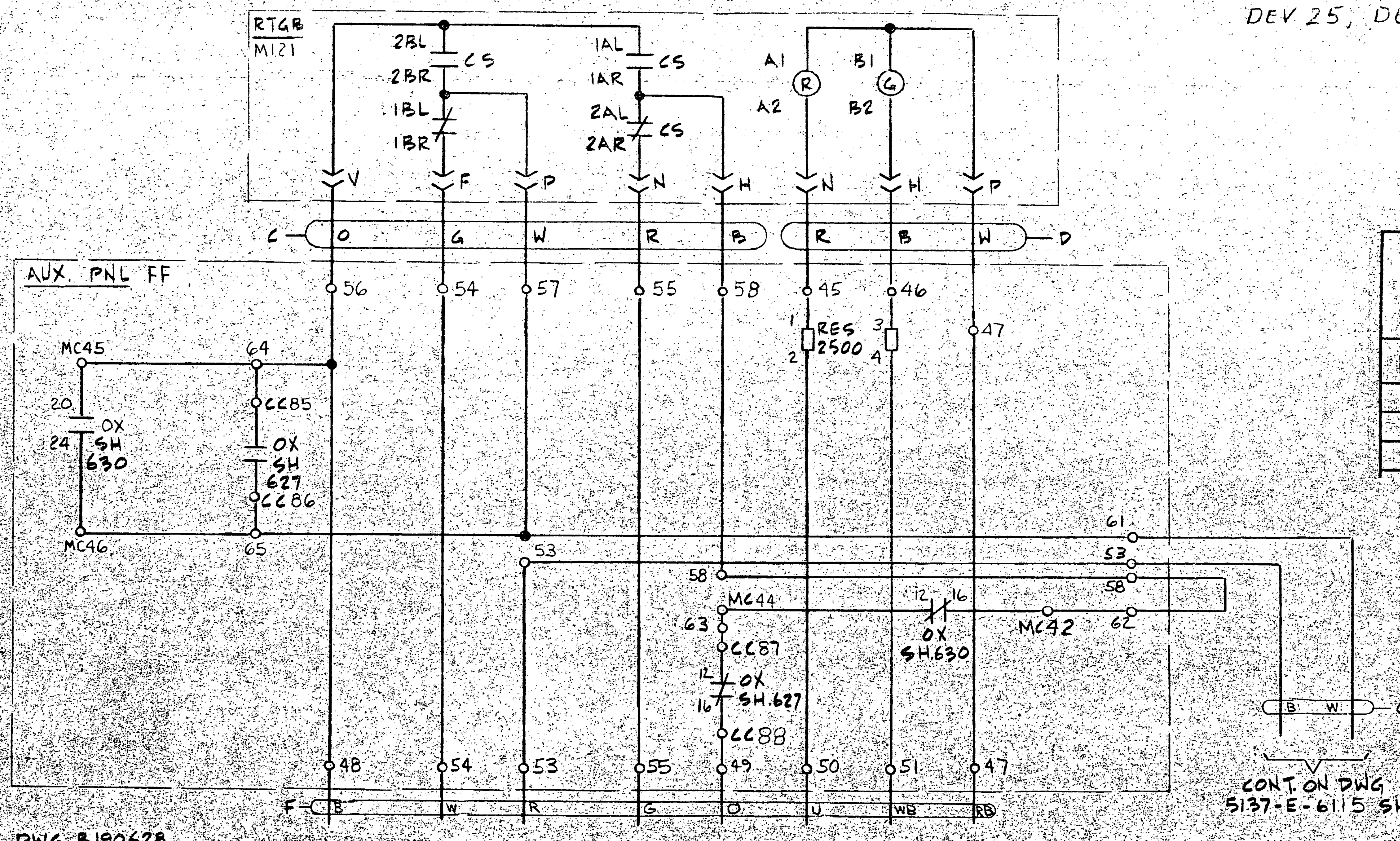
NUS CORPORATION

DRAWING NO. 5137-E-6101 REV. 1

SCALE: SHEET 3 OF 3

TD9A 86-4

CS DEVELOPMENT
DEV 25, DET H, SH 31



2ND LEVEL REVIEW COMPLETED		
REV.	ENGR.	DATE
A	JER	1-27-79

REF: EBASCO DWG B190628

THIS DRAWING REPLACES
WESTINGHOUSE DRAWING
500B452 SH 647

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 7116 JAMES EDWARD REUTER REGISTERED 1-26-79

SAFETY RELATED
CO-01285

REV.	DATE	REVISIONS	BY	COG. ENG.		DATE
					DRAWN D. RATH	1/20/79
					CHECKER C. Wise	1/24/79
					COG. ENGINEER [signature]	1-20/79
1	3-5-79	ISSUED AFC CO-01285			DISCIP. MGR. APPVL. J. E. Reuter	1/24/79
A	1/20/79	RELEASED FOR APPROVAL	DR	RL	APPROVAL QA NA [initials]	
					PROJ. APPVL. D. L. Hill	1/26/79

CAROLINA POWER & LIGHT COMPANY
H.B. ROBINSON STEAM ELECTRIC PLANT

STEAM DRIVEN FWP
STEAM SHUT-OFF VALVE V2-14A

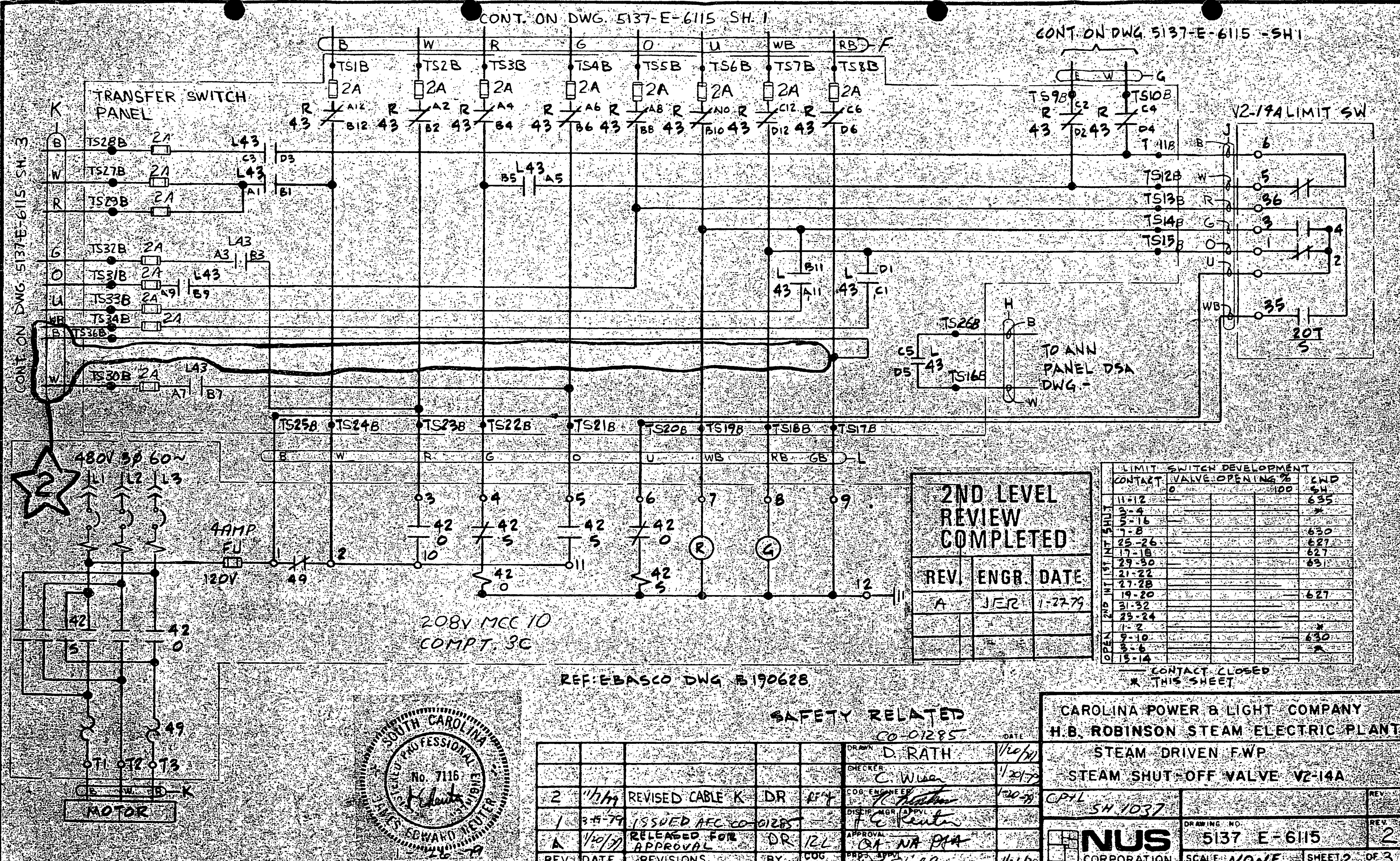
CP&L SH 1036

NUS CORPORATION

DRAWING NO. 5137-E-6115 REV. 1

SCALE NONE SHEET 1 OF 3

TD7 86-9



2ND LEVEL REVIEW COMPLETED		
REV.	ENGR.	DATE
A	JER	1-27-79

LIMIT SWITCH DEVELOPMENT

	CONTACT	VALVE OPENING % (0 – 100)	CWD SH
SHUT	11-12		635
	3-4		*
	5-16		
	7-8		630
1ST INT	25-26		627
	17-18		627
	29-30		631
	21-22		
2ND INT	27-28		
	19-20		627
	31-32		
	23-24		
OPEN	1-2		*
	9-10		630
	3-6		*
	13-14		

— CONTACT CLOSED
* THIS SHEET

REV.	DATE	REVISIONS	BY	COG. ENG.
2	11/7/79	REVISED CABLE K	DR	RFA
1	3-15-79	ISSUED AFC CO-01285		
A	1/20/79	RELEASED FOR APPROVAL	DR	RL

DRAWN: D. RATH 1/20/79
CHECKER: C. Wilson 1/20/79
COG. ENGINEER: 1/20/79
DISCIP. MGR. APPVL: F. C. Reuter
APPROVAL: QA NA
PROJ. APPVL: 1/26/79

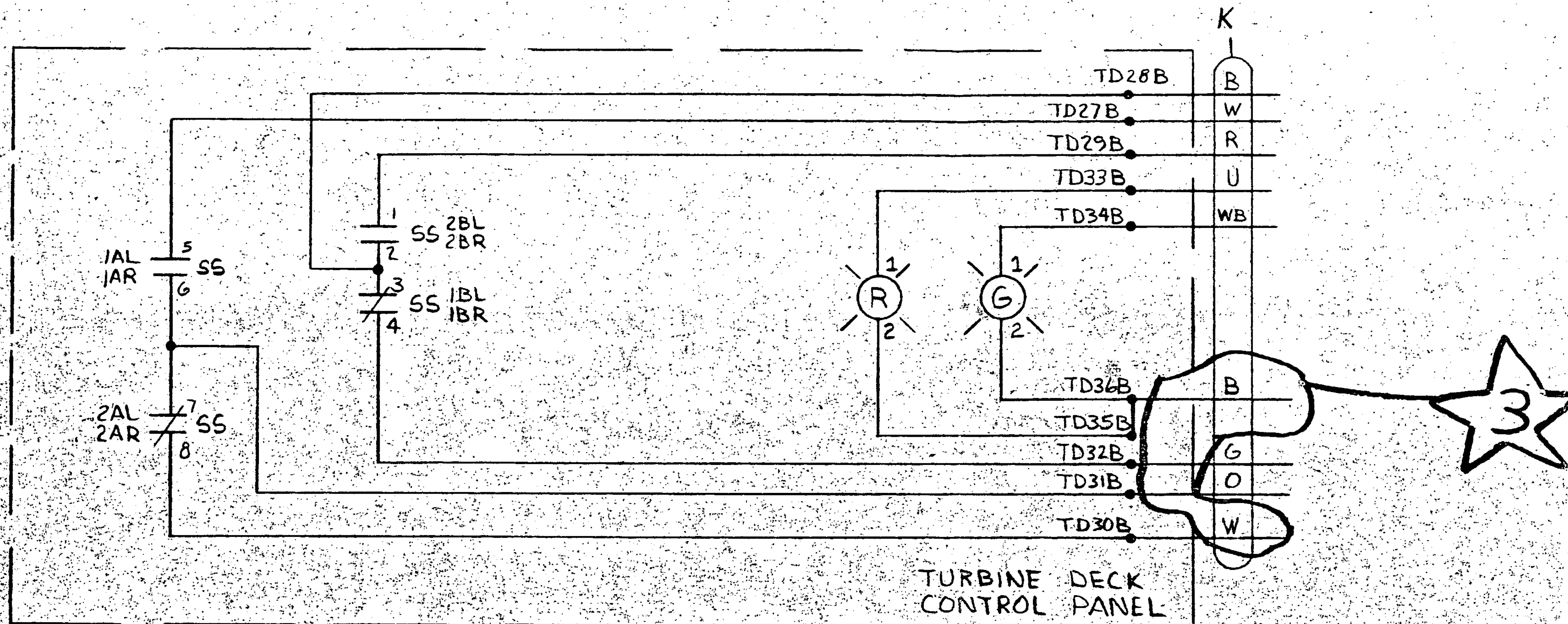
CAROLINA POWER & LIGHT COMPANY
H.B. ROBINSON STEAM ELECTRIC PLANT
STEAM DRIVEN FWP
STEAM SHUT-OFF VALVE V2-14A

CP&L SH 1037

NUS CORPORATION

DRAWING NO. 5137 E-6115
REV. 2
SCALE: NONE
SHEET 2 OF 3

TDB
8640



REF. EBASCO DWG. B-190628

FIRE PROTECTION LIST

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 7116 JAMES EDWARD REUTER 1-26-79

CO-01285

REV	DATE	REVISIONS	BY	COG ENG
3	11/7/79	REVISED CABLE K	DR	RFJ
2	6/5/79	REVISED AS SHOWN CO-01571	DR	RL
1	3-19-79	ISSUED AFC CO-01285		
A	1/10/79	RELEASED FOR APPROVAL	DR	RL

DRAWN	D. RATH	1/10/79
CHECKED	C. Wise	1/24/79
COG ENGINEER	[signature]	1-20-79
DISCIP MGR APP	J E Reuter	1-26-79
APPROVAL	QA-NA	
PROJ APP	[signature]	1/24/79

CAROLINA POWER & LIGHT COMPANY
H.B. ROBINSON STEAM ELECTRIC PLANT

STEAM DRIVEN FWP.
STEAM SHUT OFF VALVE V2-14A

NUS CORPORATION

DRAWING NO. 5137-E-6115 REV. 3

SCALE NONE SHEET 3 OF 3

TD8A 99-3