Attachment 1

PROPOSED TECHNICAL SPECIFICATION CHANGE

condensate and sampling systems where the presence of the radioactive tracer is expected to warrant such controls. VEPCO will take special precautions to minimize radiation exposure and contamination during both the handling of the radioactive tracer prior to injection and the taking of system samples following injection of the tracer. VEPCO will ensure that all regulatory requirements for liquid discharge are met during disposal of all sampling effluents and when reestablishing continuous blowdown from the steam generators after completion of the studies.

(10) No later than October 11, 1980, VEPCO shall submit a design for the backup overcurrent protection system for containment electrical penetrations for Commission review and approval. The backup system shall be installed and operational prior to resuming power operation following the ~~first~~ SECOND refueling outage.

(11) No later than November 1, 1980, VEPCO shall implement the fire protection modifications as described in the Commission Safety Evaluation Report, "Fire Protection Program for North Anna Power Station, Units 1 and 2", dated February 1979 (see Amendment No. 8 to NPF-4 for the North Anna Power Station, Unit No. 1) except implementation of the modification of the alternate shutdown system shall be implemented no later than April 1, 1981.

(12) VEPCO shall implement the following modifications related to IE Bulletin 79-27 "Loss of Non-Class IE Instrumentation and Control Power System Bus During Operation" as specified in VEPCO's letters, dated May 30 and July 9, 1980 on the following schedule:

(a) Prior to startup following the November 1, 1980 outage for Fire Protection Modifications:

Item 2 - Alternate Feed for Annunicators

Item 3, 4, 7 and 8: Alternate Power Supply for Vital SOV and Vital Instrument Panels.

Item 9 and 10: Loss of Voltage for Semi-Vital Buses

(b) Within six months from date of issuance of this license:

Item 6: Alternate Power to Gaitronics

Items 11, 12, 13 and 14: Change to Voltage Indication - 125 VDC Buses

(c) Prior to startup following the first refueling outage:

Items 1 and 5: Diverse Power Supply for T_h and T_c

ELECTRICAL POWER SYSTEMS

NORMALLY DE-ENERGIZED POWER CIRCUITS

LIMITING CONDITION FOR OPERATION

3.8.2.7 All circuits shown in Table 3.8-3 shall be de-energized.

APPLICABILITY: MODES 1, 2, 3, 4

ACTION:

With one or more of the circuits shown in Table 3.8-3 energized, de-energize the circuit(s) within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.8.2.7 At least once per 31 days, when operating in Modes 1-4, verify that all of the circuits in Table 3.8-3 are de-energized by noting the position of the appropriate circuit breakers.

TABLE 3.8-3

NORMALLY DE-ENERGIZED POWER CIRCUITS

Penetration	DEVICE NUMBER AND LOCATION	LOAD
2C-2 2D-2	480 V SWGR 2H Compartment N-16	Refueling and Maintenance Circuit
2F1-2	480 V MCC 2B1-1 Cubicle B4R	Reactor Cavity Manipulator Crane (2-MH-CR-5)
2F1-2	480 V MCC 2B1-1 Cubicle B4L	Fuel Transfer Control Cabinet (2-EI-CB-92)
2F1-2	480 V MCC 2B1-1 Cubicle C2R	RCC Fixture Change (2-RC-R-18)
11A-2	480 V MCC 2C1-1 Cubicle B3	RC Annulus Crane (2-MH-CR-19)
11B-2	480 V MCC 2C2-1 Cubicle A2R	Stud Tensioner, Portable Crane Receptacle
12E-2	480 V MCC 2B1-2 Cubicle C1l	RC Stage Basket
23C-2	480 V MCC 2B1-2 Cubicle A3	RC Polar Crane (2-MH-CR-01)
4A-2	480 V MCC 2H1-2S Cubicle G2	Loop 3 Hot Leg Stop Vv (MOV-2594) *
4A-2	480 V MCC 2H1-2S Cubicle H2	Loop 3 Cold Leg Stop Vv (MOV-2595)*
4B-2	480 V MCC 2H1-2S Cubicle H3	Loop 2 Hot Leg Stop Vv (MOV-2592)*
4B-2	480 V MCC 2H1-2S Cubicle J1	Loop 2 Cold Leg Stop Vv (MOV-2593)*
11A-2	480 V MCC 2H1-2S Cubicle F3	Loop 2 Bypass Stop Vv (MOV-2586)
11B-2	480 V MCC 2H1-2S Cubicle G1	Loop 3 Bypass Stop Vv (MOV-2587)
21E-2	480 V MCC 2H1-2S Cubicle F1	Loop 1 Bypass Stop Vv (MOV-2585)
22B-2	480 V MCC 2H1-2S Cubicle F2	Loop 1 Hot Leg Stop Vv (MOV-2590)*
22B-2	480 V MCC 2H1-2S Cubicle G3	Loop 1 Cold Leg Stop Vv (MOV-2591)*

* See Special Test Exception 3.10.4

SAFETY EVALUATION

PROPOSED TECHNICAL SPECIFICATION CHANGE

TO ELECTRICAL PENETRATION SECONDARY PROTECTION

NORTH ANNA UNIT 2

Due to both the large quantity of circuits requiring modification and testing, and the physical constraints of working in the electrical penetration area imposed by the number of required design changes to be implemented, completion of the secondary protection installation until the second refueling has been requested. In Section 8.8 of Supplement No. 10 to the North Anna Unit 2 Safety Evaluation Report (attached) the NRC concluded that the design of the primary protection system for the electrical penetrations was acceptable. Based on this evaluation, continued operation of North Anna Unit 2 pending complete installation of secondary protection devices is warranted.

8.8 Overcurrent Protection For Containment Electrical Penetrations

On August 3, 1979 we issued our position requiring containment electrical penetrations to have overcurrent protection that meets the recommentations of Regulatory Guide 1.63, Revision 1 "Electric Penetration Assemblies in Containment Structures for Light-Water-Cooled Nuclear Power Plants." We were subsequently advised that the North Anna Power Station Unit 2 design would not meet the single failure criterion and that some of the primary protective devices would not provide protection over the complete range of faults. Following further discussions with the applicant, we allowed the applicant to use the approach taken on the Diablo Canyon Nuclear Power Station, Units 1 and 2 (Docket Nos. 50-275 and 50-323) for an acceptable design.

The applicant submitted additional information that describes the installed primary overcurrent protection and the modifications to protection of the containment penetrations that carry power, control and instrumentation circuits. This information included listings of the power, control, and instrumentation circuits and their penetrations. Also, for each type of penetration, time-current heating curves that were matched with current-time operation curves for the primary protective devices were provided. A listing was provided giving the maximum available fault currents for each type of penetration. This information shows that the protective devices would operate in sufficient time even when carrying the maximum available fault currents to protect the penetrations from overheating and consequent loss of integrity. We conclude that the primary protection system for the penetrations as described in the submitted information is acceptable.

Our position also states that an acceptable design for the backup overcurrent protection system shall be submitted within six months after the date of licensing. Further, this backup system shall be installed and operational prior to startup following the first refueling outage. The applicant has agreed to comply with these requirements and we find this commitment acceptable. Accordingly, the Technical Specifications will reflect these requirements.

ATTACHMENT 2

ELECTRICAL PENETRATION PROTECTION CONTROL CIRCUITS

(PRIMARY AND SECONDARY)

NORTH ANNA POWER STATION - UNIT 2

VIRGINIA ELECTRIC AND POWER COMPANY

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASSACHUSETTS

POSITION	PENETRATION TYPE	PENETRATION CONDUCTOR	LOAD	TIME-CURRENT CURVE 1205D-SK(C)-	FULL LOAD AMPS	PRIMARY PROTECTIVE DEVICE	NOTES & COMMENTS	SECONDARY PROTECTIVE DEVICE	NOTES & COMMENTS
2F1-2	IC	10-AWG	Fuel Transfer Control Cab (2-EI-CB-92)	IC-1	3.9A	Fuse Bussman NON-15A		Fuse Bussman NON-15A*	
6B-2	IB	14-AWG	a) Stem Limit Switch (SLS MOV-2865A)	IB-1	178mA	Breaker GE TQB 5A		Breaker GE TE-15A	
			b) Loop 1 Red CKT	IB-2A	300mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	
			c) Loop 1 x Conn (MOV-2585)	IB-3	178mA	Fuse Bussman NON-15A	See Note "A" below for all circuits with IB-3 time current curve.	Fuse Bussman NON-15A	
			d) Hot Leg Isol (MOV-2590)	IB-3	178mA	Fuse Bussman NON-15A		Fuse Bussman NON-15A	
			e) Cold Leg Isol (MOV-2591)	IB-3	178mA	Fuse Bussman NON-15A		Fuse Bussman NON-15A	
			f) St. Generator Surface Sample (TV-SS212A)	IB-4	447mA	Breaker GE TE 15A		Breaker GE TE-15A*	
			g) Acc TK 1 CD Lg (MOV-2865A)	IB-3	178mA	Fuse Bussman NON-15A		Fuse Bussman NON-15A	
			h) ACC TK 1 CD LG (MOV-2865A)	IB-5	178mA	Fuse Bussman ABC 3A		Breaker GE TE-15A	
			i) ACC TK 2 CD LG (MOV-2865B)	IB-3	178mA	Fuse Bussman NON-15A		Fuse Bussman NON-15A	
			j) Acc TK 2 CD LG (MOV-2865B)	IB-5	178mA	Fuse Bussman ABC 3A		Breaker GE TE-15A	
			k) Loop 1 Regen Hx Outlet (HCV-2200A)	IB-5	20mA	Fuse Bussman ABC 3A		Breaker GE TE-15A	
			l) Loop 1 Regen Hx Outlet (HCV2200A)	IB-6	20mA	Breaker GE THED-15A		Breaker GE THED-15A*	
			m) Loop 1 Regen Hx Outlet (HCV-2200A)	IB-2B	20mA	Fuse Bussman ABC 10A		Breaker GE THED-15A	
			n) Loop 2 Regen Hx Outlet (HCV-2200B)	IB-5	20mA	Fuse Bussman ABC 3A		Breaker GE TE-15A	
			o) Loop 2 Regen Hx Outlet (HCV-2200B)	IB-6	20mA	Breaker GE THED-15A		Breaker GE THED-15A*	
			p) Loop 2 Regen Hx Outlet (HCV-2200B)	IB-2B	20mA	Fuse Bussman ABC 10A		Breaker GE THED-15A	
			q) Loop 3 Regen Hx Outlet (HCV-2200C)	IB-5	20mA	Fuse Bussman ABC 3A		Breaker GE TE-15A	
			r) Loop 3 Regen Hx Outlet (HCV-2200C)	IB-6	20mA	Breaker GE THED-15A		Breaker GE THED-15A*	
			s) Loop 3 Regen Hx Outlet (HCV-2200C)	IB-2B	20mA	Fuse Bussman ABC 10A		Breaker GE THED-15A	
			t) Press to Relief TK (PCV-2455C)	IB-6	54mA	Breaker GE THED-15A		Breaker GE THED-15A*	
→			u) Loop 1 Recirc Air Coil (TV-CC205A)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
→			v) Containment Instr Air (TV-IA201A)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	

*Proposed Secondary Protection Device. Existing Secondary Device inadequate.

Note A: Primary and secondary protection for all circuits with time current curve IB-3 provided by two Bussman Non 15A fuses, one in each leg of the 120 V a-c or 125 V d-c ungrounded circuit. See Sketch No. 1.

→ CIRCUITS REFERENCED IN VEPCO LETTER S.N. 084A

POSITION	PENETRATION TYPE	PENETRATION CONDUCTOR	LOAD	TIME-CURRENT CURVE 12050-SK(C)-	FULL LOAD AMPS	PRIMARY PROTECTIVE DEVICE	NOTES & COMMENTS	SECONDARY PROTECTIVE DEVICE	NOTES & COMMENTS
			w) (Rack 2-108)	IB-2A	380mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	
			x) Press to Relief TK (MOV-2536)	IB-3	140mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			y) Loop 1 HT LG CON (MOV-2700)	IB-3	178mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			z) Acc TK 3 Disch (MOV-2720A)	IB-3	178mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
6C-2	IB	14-AWG	a) Rack 2-120	IB-2A	380mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	
			b) Loop 2 X Conn (MOV-2586)	IB-3	178mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			c) Loop 2 Rad CRT	IB-2A	300mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	
			d) Hot Leg Isol (MOV-2592)	IB-3	178mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			e) Cold Leg Isol (MOV-2593)	IB-3	178mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			f) Recirc Spray (2-RS-P-01A VMS SW)	IB-3	132mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A*	
	→		g) Air Operated Damper (HV257A)	IB-1	73mA	Breaker GE TQB 5A		Breaker GE TE-15A	
	→		h) Air Operated Damper (HV257B)	N/R	N/R	Spare		Spare	
	→		i) Air Operated Damper (HV257C)	IB-1	73mA	Breaker GE TQB 5A		Breaker GE TE-15A	
	→		j) Cont Vacuum Eject Inlt (TV-CV200)	IB-1	330mA	Breaker GE TQB 5A		Breaker GE TE-15A	
	→		k) Loop 2 Recirc Air Coil (TV-CC205B)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
	→		l) Loop 3 Recirc Air Coil (TV-CC205C)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
	→		m) Press Liquid Space (TV-SS200A)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
	→		n) Press Vapor Space (TV-SS201A)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
	→		o) Press Liquid Space (TV-SS200A)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
	→		p) Press Rel TK Gas Space (TV-SS204A)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
	→		q) Prim Cool Hot Leg Hdr (TV-SS206A)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
			r) RCP SWHI DIS (MOV-2380)	IB-3	174mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	

*Proposed Secondary Protection Device. Existing Secondary Device inadequate.
See Note A on Page 1 for circuits with time current curve IB-3.

POSITION	PENETRATION TYPE	PENETRATION CONDUCTOR	LOAD	TIME-CURRENT CURVE 12050-SK(C)-	FULL LOAD AMPS	PRIMARY PROTECTIVE DEVICE	NOTES & COMMENTS	SECONDARY PROTECTIVE DEVICE	NOTES & COMMENTS
6B-2	IB	14-AMG	a) Letdown Line Loop 2 (LCV-2460B Lim. Sw.)	IB-5	84mA	Bussmann ABC-3A		Breaker GE TE-15A	
			b) Loop 1 RCP Seal Lk Off (HCV-2303A)	IB-7	20mA	GE TEB-10A		Breaker GE TEB-10A*	
			c) Loop 2 RCP Seal Lk Off (HCV-2303B)	IB-7	20mA	GE TEB-10A		Breaker GE TEB-10A*	
			d) Loop 2 Accum Test Line (HCV-2850C)	IB-7	20mA	GE TEB-10A		Breaker GE TEB-10A*	
			e) Loop 2 Accum Test Line (HCV-2850D)	IB-7	20mA	GE TEB-10A		Breaker GE TEB-10A*	
			f) Loop 2 Accum Mk Up Line (HCV-2851B)	IB-7	20mA	GE TEB-10A		Breaker GE TEB-10A*	
			g) Loop 2 Accum Prim XFER (HCV-2852B)	IB-7	20mA	GE TEB-10A		Breaker GE TEB-10A*	
			h) Loop 2 Accum N2 Supply (HCV-2853B)	IB-7	20mA	GE TEB-10A		Breaker GE TEB-10A*	
			i) Loop 2 Stand Pipe Trip (TV-2522B)	IB-7	46mA	GE TEB-10A		Breaker GE TEB-10A*	
			j) Pri Grd Wtr to Rel TK (HCV-2519)	IB-7	20mA	GE TEB-10A		Breaker GE TEB-10A*	
			k) Auxiliary Spray Line (HCV-2311)	IB-7	20mA	GE TEB-10A		Breaker GE TEB-10A*	
			l) FR Rel TK to FO XFER TK (TV-2523)	IB-7	46mA	GE TEB-10A		Breaker GE TEB-10A*	
			m) Loop 1 Letdown Line (LCV-2460A)	IB-7	84mA	GE TEB-10A		Breaker GE TEB-10A*	
			n) Loop 2 Drain Line (HCV-2557B)	IB-7	20mA	GE TEB-10A		Breaker GE TEB-10A*	
			o) Loop 2 FIL Line Header (HCV-2556B)	IB-7	20mA	GE TEB-10A		Breaker GE TEB-10A*	
			p) Letdown Line Loop 2 (LCV-2460B)	IB-7	84mA	GE TEB-10A*		Breaker GE TEB-10A*	

*Proposed Secondary Protection Device. Existing Secondary Device inadequate.

POSITION	FEEDING IDS TYPE	FEEDING IDS CONDUCTOR	LOAD	TIME-CURRENT CURVE 12050-EK(C)-	FULL LOAD AMPS	PRIMARY PROTECTIVE DEVICE	NOTES & COMMENTS	SECONDARY PROTECTIVE DEVICE	NOTES & COMMENTS
6D-2	IB	14-AWG	a) Loop 3 X Conn (MOV-2587)	IB-3	178mA	Fuse Bussman MDR-15A		Fuse Bussman MDR-15A	
			b) Loop 3 Rod CKT	IB-2A	300mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	
			c) Hot Leg Isol (MOV-2594)	IB-3	178mA	Fuse Bussman MDR-15A		Fuse Bussman MDR-15A	
			d) Cold Leg Isol (MOV-2595)	IB-3	178mA	Fuse Bussman MDR-15A		Fuse Bussman MDR-15A	
			e) Loop 2 Charging Line (HCV-2310)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
		→	f) Neut Shld TK Cool A Inlt (TV-CC207A)	IB-1	330mA	Breaker GE TQB-5A		Breaker GE TE-15A	
		→	g) Neut Shld TK Cool A Otlet (TV-CC208A)	IB-1	330mA	Breaker GE TQB- 5A		Breaker GE TE-15A	
		→	h) Neut Shld TK Cool B Inlt (TV-CC207B)	IB-1	330mA	Breaker GE TQB- 5A		Breaker GE TE-15A	
			i) Skid Comp A (2-IA-C-02A)	IB-3	935mA	Fuse Bussman MDR-15A		Fuse Bussman MDR-15A	
		→	j) Neut Shld TK Cool B Otlt (TV-CC208B)	IB-1	330mA	Breaker GE TQB-5A		Breaker GE TE-15A	
			k) Press Rel TK N2 Purge (HCV-2550)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
		→	l) Loop 2 Inlet Header (TV-CC206B)	IB-1	330mA	Breaker GE TQB-5A		Breaker GE TE-15A	
			m) RCP Bearing Lift Pp (PS-13-2)	IB-3	38mA	Fuse Bussman MDR-15A		Fuse Bussman MDR-15A	
			n) RCP Bearing Lift Pp (PS-13-2)	IB-3	6.7A for 4.5 Cycles	Fuse Bussman MDR-15A		Fuse Bussman MDR-15A	
			o) RCP Bearing Lift Pp (PS-14-2)	IB-3	6.7A for 4.5 Cycles	Fuse Bussman MDR-15A		Fuse Bussman MDR-15A	
			p) RACK 2-102	IB-2A	380mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	
		→	q) Neutron Shld Cool Make Up (SOV-HS201)	IB-1	330mA	Breaker GE TQB-5A		Breaker GE TE-15A	
			aa) Neutron Det Evacuation (2-RD-ER-01)	IB-5	Later	Bussman ABC 3A		Breaker GE TE-15A	
			ab) Skid Comp A (PS-IA213A)	-	-	Internal Annunciator Circuit**			
11A-2	IC	~~10-AWG~~ →	a) Steam Gen Blow Down (TV-BD200G)	IC-2	447mA	Breaker GE TQB-5A		Breaker GE TE-15A	
		→	b) Steam Gen Blow Down (TV-BD200K)	IC-2	447mA	Breaker GE TQB-5A		Breaker GE TE-15A	
		→	c) Steam Gen Blow Down (TV-BD200J)	IC-2	447mA	Breaker GE TQB-5A		Breaker GE TE-15A	
11C-2	IC	10-AWG	a) Loop 1 SLS CKTS	IC-3	330mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	
			b) RACK 2-106	IC-3	380mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	

*Proposed Secondary Protection Device. Existing Secondary Device Inadequate.
**Current limiting to 4 amps.
See Note A on Page 1 for circuits with time current curve IB-3.

POSITION	PENETRATION TYPE	PENETRATION CONDUCTOR	LOAD	TIME-CURRENT CURVE 12050-SK(C)-	FULL LOAD AMPS	PRIMARY PROTECTIVE DEVICE	NOTES & COMMENTS	SECONDARY PROTECTIVE DEVICE	NOTES & COMMENTS
11D-2	IC	10-AWG	a) Loop 2 SLS CKTS	IC-3	300mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	
			b) RACK 2-117	IC-3	380mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	
			c) Press Relief B2 Supply (SOV-2455C-3)	IC-4	1.6A	Breaker GE TEB-10A		Breaker GE TEB-10A*	
11B-2	IC	10-AWG	a) Loop 3 SLS CKTS	IC-3	300mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	
			b) RACK 2-103	IC-3	380mA	Fuse Bussman ABC 10A		Breaker GE TE-15A	
14B-2	IB	14-AWG	a) Reeid Heat Rem Hdr A (TV-SB207A, 207B)	IB-4	330mA	Breaker GE TE-15A		Breaker GE TE-15A*	
			b) Reeid Heat Rem Hdr B (TV-SB207B)	IB-4	330mA	Breaker GE TE-15A		Breaker GE TE-15A*	
			c) Loop 1,2&3 S/G Sample Selector (TV-SB211A-C)	IB-4	330mA	Breaker GE TE-15A		Breaker GE TE-15A*	
			d) Reactor Leak DET Line (HCV-2544)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
		→	e) Loop 1 Inlet Header (TV-CC206A)	IB-1	330mA	Breaker GE TQB-5A		Breaker TE-15A	
		→	f) Loop 3 Inlet Header (TV-CC206C)	IB-1	330mA	Breaker GE TQB-5A		Breaker TE-15A	
			g) RCP Bearing Lift Pp (PS-12-2)	IB-3	3mA	Fuse Bussman MDH-15A		Fuse Bussman MDH-15A	
			h) RHR Return (MOV-CC200A)	IB-3	174mA	Fuse Bussman MDH-15A		Fuse Bussman MDH-15A	
			i) RHR Return (MOV-CC200B)	IB-3	174mA	Fuse Bussman MDH-15A		Fuse Bussman MDH-15A	
19A-2	IB	14-AWG	a) Loop 1,2&3 Prim Cool CLD LG TB-SB209A-C	IB-4	330mA	Breaker GE TE-15A		Breaker GE TE-15A*	
			b) Loop 3 Drain Cont V (HCV-2557C)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			c) Loop 1 Accum Test Line (HCV-2850A)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			d) Loop 1 Accum Test Line (HCV-2850B)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			e) Loop 3 Accum Test Line (HCV-2850E)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			f) Loop 3 Accum Test Line (HCV-2850F)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			g) Loop 1 Accum Mkup Line (HCV-2851A)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			h) Loop 3 Accum Mkup Line (HCV-2851C)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			i) Loop 1 Accum Prim XFER (HCV-2852A)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			j) Loop 3 Accum Prim XFER (HCV-2852C)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	

*Proposed Secondary Protection Device. Existing Secondary Device inadequate.
See Note A on Page 1 for circuits with time current curve IB-3.

POSITION	PENETRATION TYPE	PENETRATION CONDUCTOR	LOAD	TIME-CURRENT CURVE 12050-8X(C)-	FULL LOAD AMPS	PRIMARY PROTECTIVE DEVICE	NOTES & COMMENTS	SECONDARY PROTECTIVE DEVICE	NOTES & COMMENTS
			k) Loop 1 Accum N2 Supply (HCV-2853A)	IB-7	20mA	Breaker GE TED-10A		Breaker GE TED-10A*	
			l) Loop 3 Accum N2 Supply (HCV-2853C)	IB-7	20mA	Breaker GE TED-10A		Breaker GE TED-10A*	
			m) Exc Letdown Hx Inlet (HCV-2201)	IB-7	20mA	Breaker GE TED-10A		Breaker GE TED-10A*	
			n) Press Rel TK N2 Line (HCV-2698)	IB-7	20mA	Breaker GE TED-10A		Breaker GE TED-10A*	
	→		o) Reactor Coolant PP (SOV-CC216A)	IB-8	597mA	Breaker W Quik Lag 5A		Breaker GE TE-15A	
	→		p) Reactor Coolant PP (SOV-CC216B)	IB-8	597mA	Breaker W Quik Lag 5A		Breaker GE TE-15A	
	→		q) Reactor Coolant PP (SOV-CC216C)	IB-8	597mA	Breaker W Quik Lag 5A		Breaker GE TE-15A	
			r) Rel Tank V&D STS Line (HCV-2549)	IB-7	20mA	Breaker GE TED-10A		Breaker GE TED-10A*	
			s) Excs Letdown Hx Outlet (HCV-2389)	IB-7	20mA	Breaker GE TED-10A		Breaker GE TED-10A*	
			t) RCP Bearing Lift Pp (PS-14-2)	IB-3	38mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			u) Primary Drain Transfer Tk (LS-DG203)	IB-3	123mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			v) Primary Drain Transfer Tk (LS-DG203)	IB-3	123mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			w) RC Purge System Supply (MOV-HV200A)	IB-3	178mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			x) RC Purge System E&H (MOV-HV200C)	IB-3	178mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			y) Cont Cab RAD near 2-RC-P-1A (2-FP-CP-06)	IB-6	5mA	Breaker GE THED-15A		Breaker GE THED-15A*	
			z) Cont Cab RAD near 2-RC-P-1B (2-FP-CP-07	IB-6	5mA	Breaker GE THED-15A		Breaker GE THED-15A*	
			aa) Cont Cab RAD near 2-RC-P-1C (2-FP-CP-08)	IB-6	5mA	Breaker GE THED-15A		Breaker GE THED-15A*	
19C-2	IB	14-AWG	a) ACC TK 3 CD LG (MOV-2865C)	IB-3	178mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			b) ACC TK 3 CD LG (MOV-2865C)	IB-5	178mA	Fuse Bussman ABC 3A		Fuse Bussman ABC 3A*	
			c) Recirc Spray (2-RS-P-01B V1B SW)	IB-3	132mA	Fuse Bussman MDN-15A		Fuse Bussman MDN-15A	
			d) Press To Relief TK (PCV-2456)	IB-6	54mA	Breaker GE THED-15A		Breaker GE THED-15A*	

*Proposed Secondary Protection Device. Existing Secondary Device Inadequate.
See Note A on Page 1 for circuits with time current curve IB-3.

POSITION	PENETRATION TYPE	PENETRATION CONDUCTOR	LOAD	TIME-CURRENT CURVE 12050-SK(C)-	FULL LOAD AMPS	PRIMARY PROTECTIVE DEVICE	NOTES & COMMENTS	SECONDARY PROTECTIVE DEVICE	NOTES & COMMENTS
			e) Elevator	IB-9	Later	Fuse Bussman Type AGC-6A		Fuse Bussman Type AGC-6A*	
			f) Elevator	IB-9	Later	Fuse Bussman Type AGC-6A		Fuse Bussman Type AGC-6A*	
			g) Air Operated Damper (HV257B)	IB-1	73mA	Breaker GE TQB 5A		Breaker GE TE-15A	
			h) Air Operated Damper (HV257C)	IB-1	73mA	Breaker GE TQB 5A		Breaker GE TE-15A	
		→	i) RCP Thermal Barrier (TV-CC201B)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
		→	j) Loop 1 Return Header (TV-CC202B)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
		→	k) Loop 2 Return Header (TV-CC202D)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
		→	l) Loop 3 Return Header (TV-CC202F)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
		→	m) Reac Cont Sump Pp Disch (TV-DA200B)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
		→	n) Prim Drain XFER LP Dis (TV-DG200B)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
		→	o) Limit SW ON TV-RM200C (TV-RM200C)	IB-1	447mA	Breaker GE TQB 5A		Breaker GE TE-15A	
			p) Skid Comp B (2-IA-C-02B)	IB-3	935mA	Fuse Bussman MOH 15A		Fuse Bussman MOH-15A	
			q) Containment Isol (TV-2842)	IB-6	158mA	Breaker GE THED-15A		Breaker GE THED-15A*	
		→	r) Pri Drn XFER TK Vent (TV-VG200B)	IB-1	447mA	Breaker GE TQB-5A		Breaker GE TE-15A	
			s) N2 Supply Line (HCV-2936)	IB-6	20mA	Breaker GE THED-15A		Breaker GE THED-15A*	
			t) Press to Rel TK (MOV-2535)	IB-3	178mA	Fuse Bussman MOH-15A		Fuse Bussman MOH-15A	
			u) LP & HT LG COM (MOV-2701)	IB-3	178mA	Fuse Bussman MOH-15A		Fuse Bussman MOH-15A	
			v) ACC TK & DISCH. (MOV-2720B)	IB-3	178mA	Fuse Bussman MOH-15A		Fuse Bussman MOH-15A	
			w) Skid Comp B (PL-IA213B)	-	-	Internal Annunciator Circuit**			
19D-2	IB	14-AWG	a) Primary Coolant Hot Leg (TV-8820A-D)	IB-4	330mA	Breaker GE TE-15A		Breaker GE TE-15A*	
			b) Primary Coolant Hot Leg (TV-8820A-D)	IB-4	330mA	Breaker GE TE-15A		Breaker GE TE-15A*	
			c) Loop 1 Letdown Line (LCV-2460A Lim. Sw.)	IB-2A	84mA	Bussman ABC-3A		Breaker GE TE-15A	
			d) Incore Instr RM Sump (LS-DA206)	IB-10	8mA	Breaker GE TQB-15A	-	Breaker GE TQB-15A*	

*Proposed Secondary Protection Device. Existing Secondary Device inadequate.
**Current limiting to 4 amps.
See Note A on Page 1 for circuits with time current curve IB-3.

POSITION	PENETRATION TYPE	PENETRATION CONDUCTOR	LOAD	TIME-CURRENT CURVE 12050-SK(C)-	FULL LOAD AMPS	PRIMARY PROTECTIVE DEVICE	NOTES & COMMENTS	SECONDARY PROTECTIVE DEVICE	NOTES & COMMENTS
			e) Loop 1 Stand Pipe Trip (TV-2522A)	IB-7	46mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			f) Loop 2 Stand Pipe Trip (TV-2522C)	IB-7	46mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			g) Loop 3 RCP Seal LK-OFF (HCV-2303C)	IB-7	46mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			h) Recirc Seal Wtr Outlet (HCV-2307)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			i) Loop 1 Fil Line Header (HCV-2556A)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			j) Loop 3 Fil Line Header (HCV-2556C)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			k) Loop 1 Drain Line (HCV-2557A)	IB-7	20mA	Breaker GE TEB-10A		Breaker GE TEB-10A*	
			l) Elevator	IB-9	Later	Fuse Bussman Type AGC 6A		Fuse Bussman Type AGC 6A*	
			m) Elevator	IB-9	Later	Fuse Bussman Type AGC 6A		Fuse Bussman Type AGC 6A*	
			n) Elevator	IB-9	Later	Fuse Bussman Type AGC 6A		Fuse Bussman Type AGC 6A*	
			o) Elevator	IB-9	Later	Fuse Bussman Type AGC 6A		Fuse Bussman Type AGC 6A*	
			p) Elevator	IB-9	Later	Fuse Bussman Type AGC 6A		Fuse Bussman Type AGC 6A*	
			q) Elevator	IB-9	Later	Fuse Bussman Type AGC 6A		Fuse Bussman Type AGC 6A*	
			r) Elevator	IB-9	Later	Fuse Bussman Type AGC 6A		Fuse Bussman Type AGC 6A*	
			s) Elevator	IB-9	Later	Fuse Bussman Type AGC 6A		Fuse Bussman Type AGC 6A*	
			t) RCP Bearing Lift Pp (PS-12-2)	IB-3	6.7A for 4.5 Cycles	Fuse Bussman NON 15		Fuse Bussman NON 15A	
21B-2	IC	10-AMG	a) Steam Gen Blowdown (TV-BD200B)	IC-2	447mA	Breaker GE TQB-5A		Breaker GE TE-15A	
		→	b) Steam Gen Blowdown (TV-BD200D)	IC-2	447mA	Breaker GE TQB-5A		Breaker GE TE-15A	
		→	c) Steam Gen Blowdown (TV-BD200F)	IC-2	447mA	Breaker GE TQB-5A		Breaker GE TE-15A	
			d) RC Purge Sys Supply (MOV-HV200B)	N/R	N/R	Spare		Spare	
			e) Mot Oper VV For Contain Supply (MOV-HV200A, MOV-HV200C)	IB-3	178mA	Fuse Bussman NON 15A		Fuse Bussman NON 15A	
21D-2	IC	10-AMG	a) Press Rel H2 Supply (SOV-2456-3)	IC-4	1.6A	Breaker GE TEB-10A		Breaker GE TEB-10A*	

*Proposed Secondary Protection Device. Existing Secondary Device inadequate.
See Note A on Page 1 for circuits with time current curve IB-3.

STONE & WEBSTER ENGINEERING CORPORATION

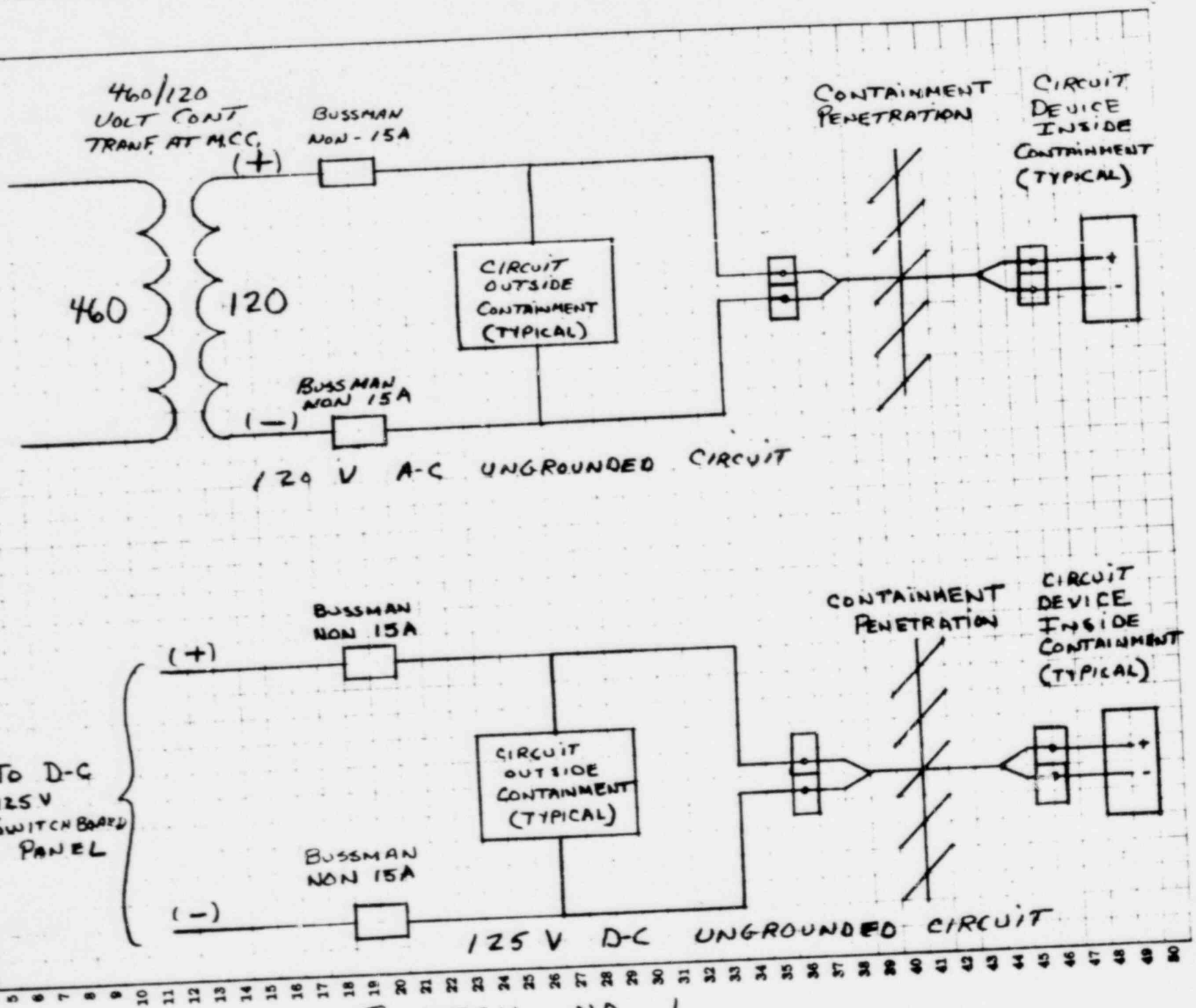
CALCULATION SHEET

Client UEPCO Job No 12050

Subject Typical Arrangement 120 V A.C. Date 9-26-80 By TPC

AND 125 V D.C. UNGROUNDED CIRCUITS Checked 9-26-80 By TPC

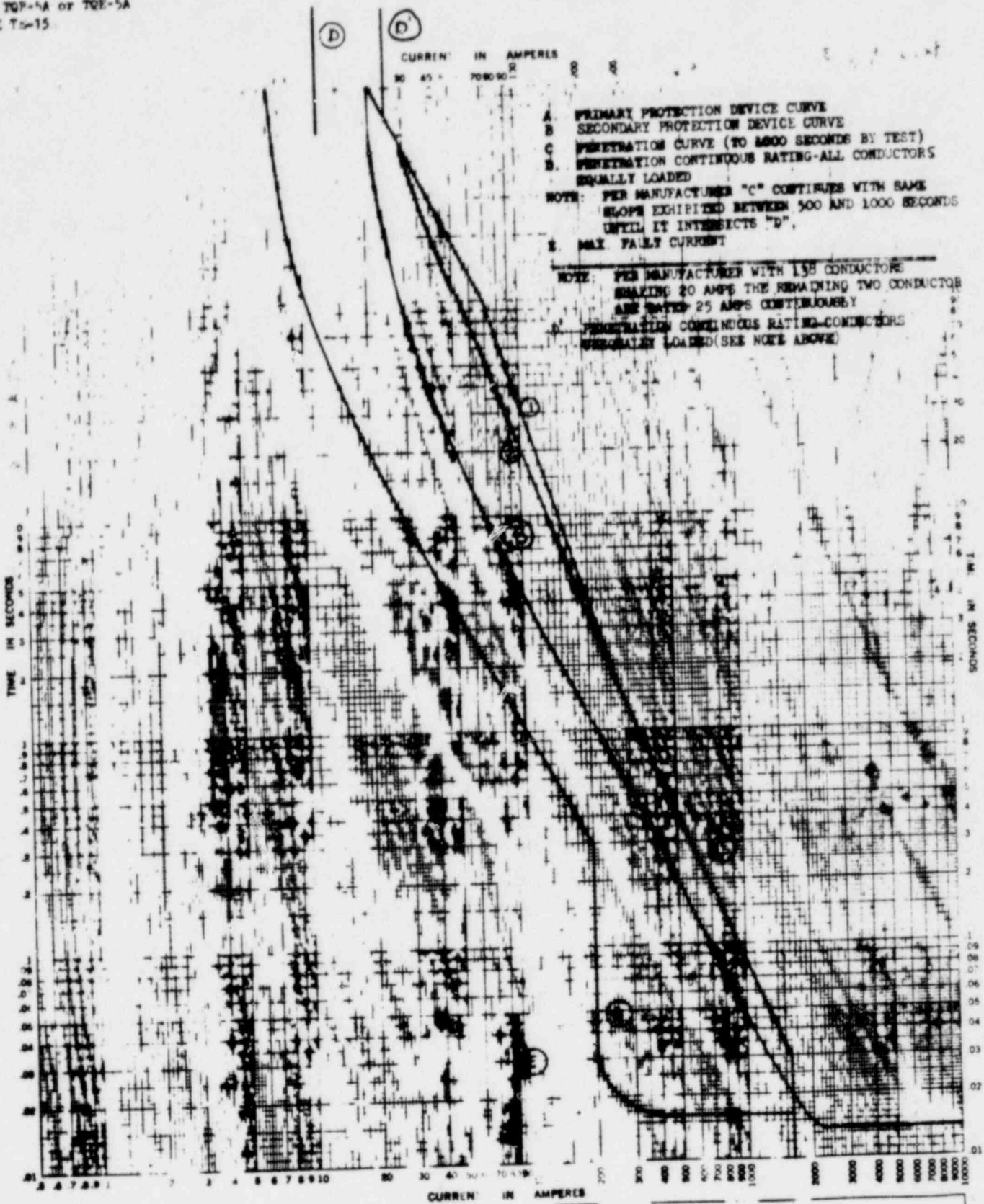
Based on Revised By



SKETCH NO. 1

#14 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A. GE TQP-4A or TQE-5A
B. GE TQ-15



TIME-CURRENT CHARACTERISTIC CURVES

For
BASIS FOR DATA Standards
1. Tests made at
2. Curves are plotted to
Date
Volts a-c at
p-f starting at 25C with no initial load
Test points so variations should not

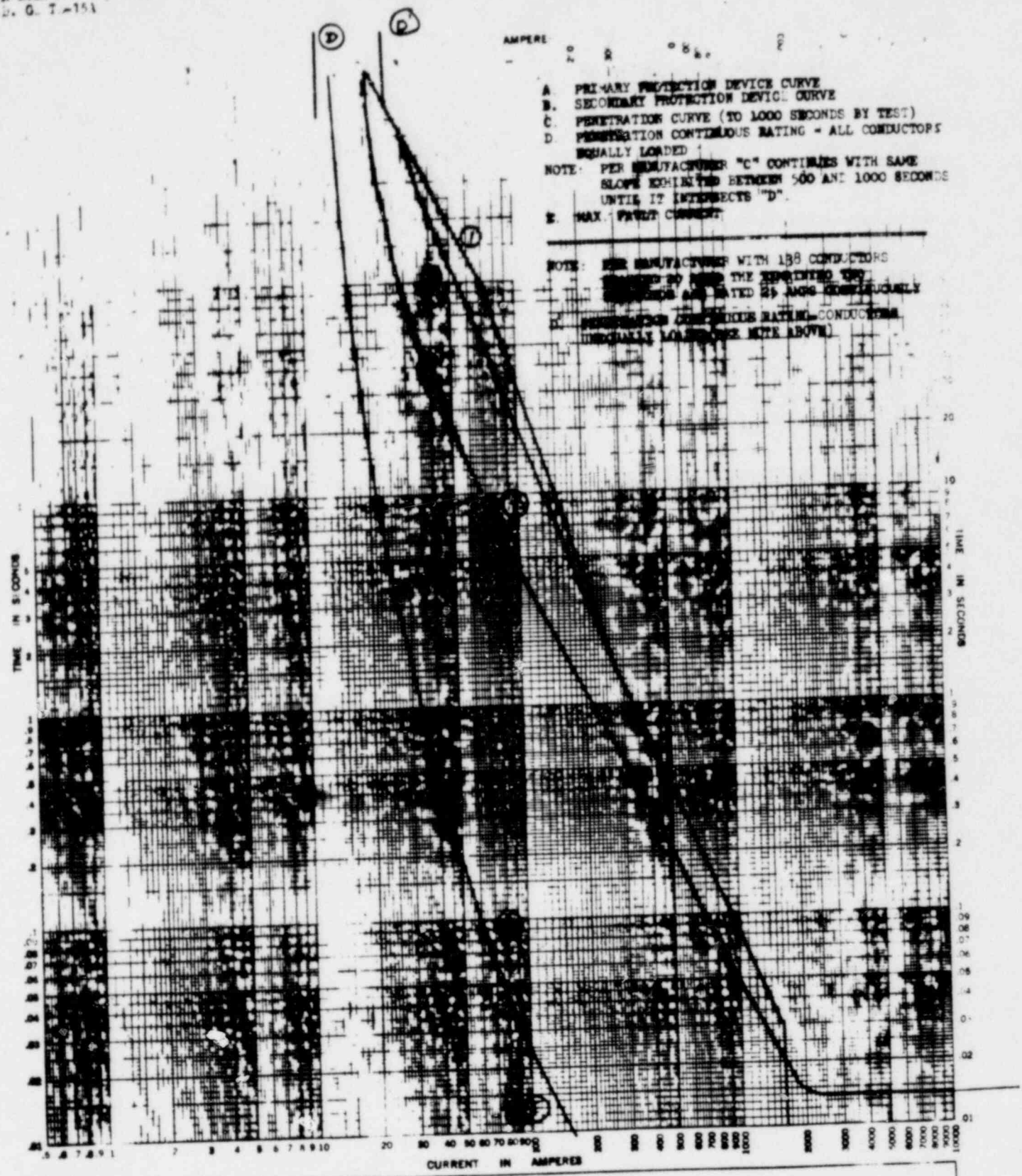
No. 12050-SK(C)-IB-1
Date 2/19/80

REV 1 7/15/2 TPC

K-E TIME-CURRENT CHARACTER... 48 5258

#14 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A BUSS 4A ABC-10A
D. G. T-151



TIME-CURRENT CHARACTERISTIC CURVES

For _____ Fuse Links. In _____

BASIS FOR DATA Standards _____ Dated _____

1. Tests made at _____ Volts a-c or _____ p-f., starting at 25C with no initial load _____

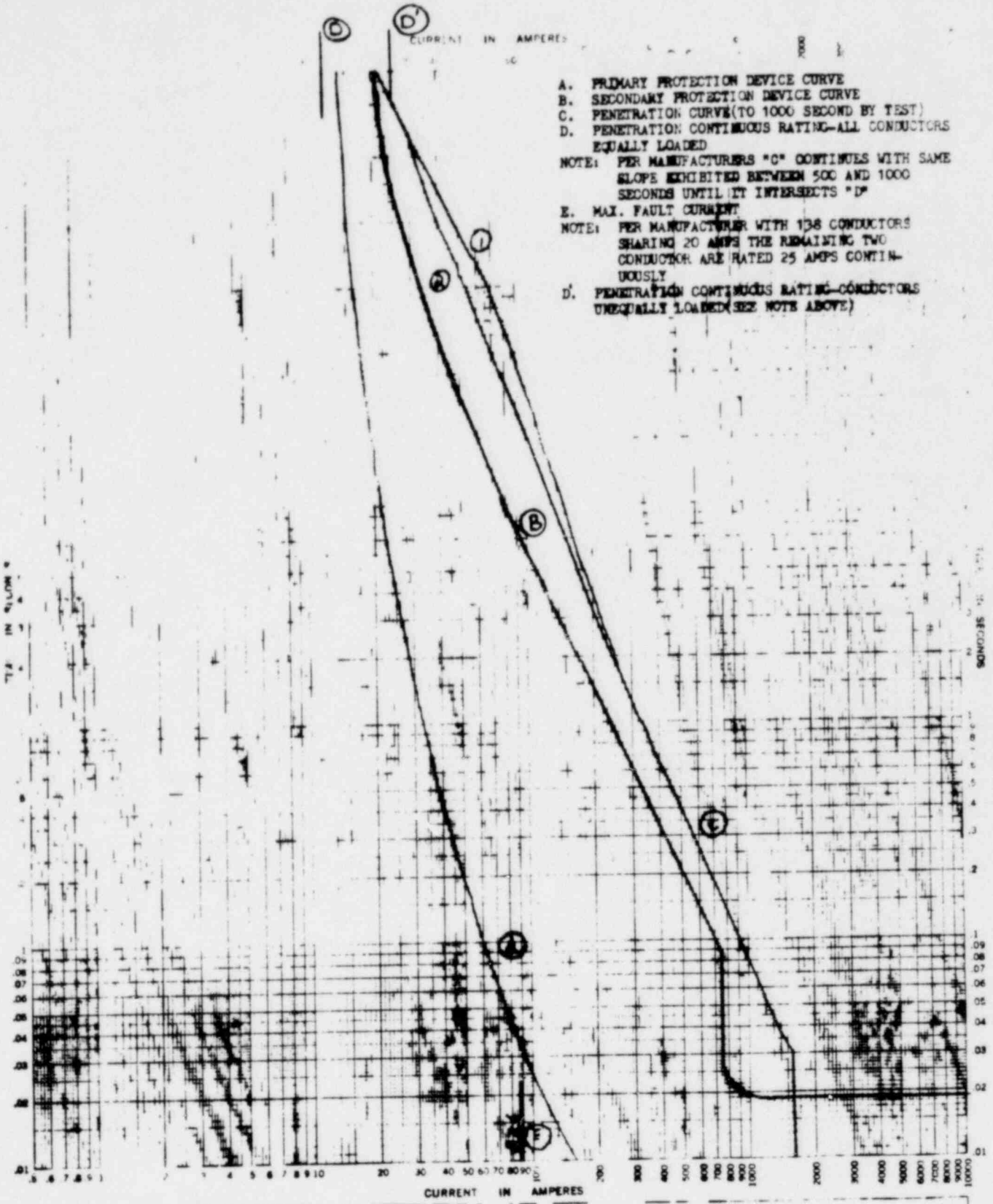
2. Curves are plotted to _____ Test points so variations should be _____

12950-SK(C)-1B-2A
No. _____
Date 2/18/80 LMO

REV 1 9/15/80 TR

K-E TIME-CURRENT CHARACTER TIC 48 5258

A. WESTINGHOUSE EBC-10A
B. GE THED -15A



TIME-CURRENT CHARACTERISTIC CURVES

For ..... Fuse Links In .....

BASIS FOR DATA Standards ..... Dated .....

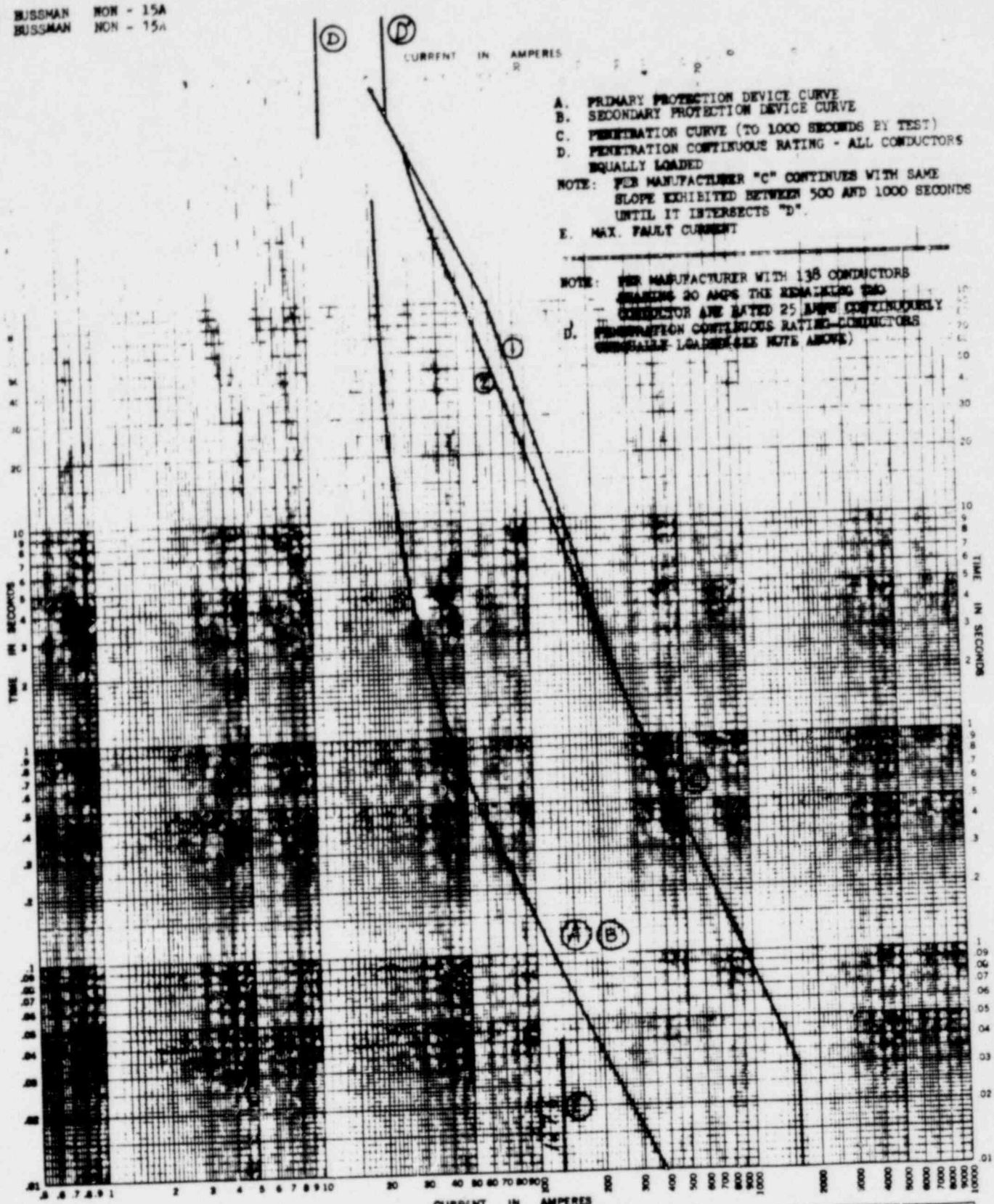
1. Tests made at ..... Volts a-c at ..... p-f, starting at 25C with no initial load .....
2. Curves are plotted to ..... Test points so variations should be .....

No. 12050-SK(C)-IB-2B
Date 9/15/82 TRC

M-E TIME-CURRENT CHARACTERISTIC RELIFFEL & ESSOP CO. 48 5258

#14 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A BUSSMAN NON - 15A
B BUSSMAN NON - 15A



TIME-CURRENT CHARACTERISTIC CURVES

For _____ Fuse Lin _____ In _____

BASIS FOR DATA Standards _____ Dated _____

1. Tests made at _____ Volts a-c at _____ p-f., starting at 25C with no initial load

2. Curves are plotted to _____ Test points so variations should be _____

No. L8050-SK(C)-IB-3

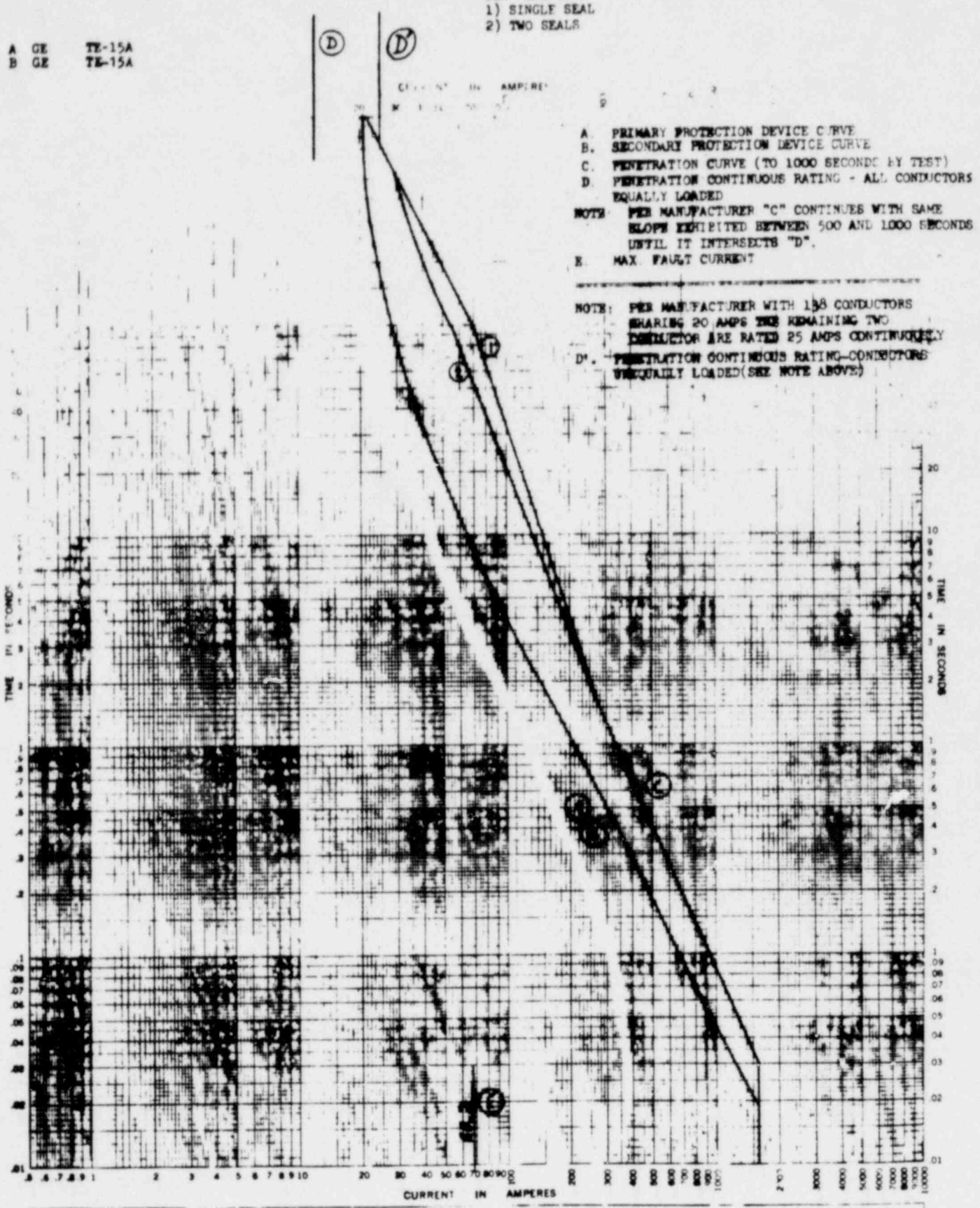
Date 2/18/80 WMD

REV 1 9/4/80 TRC

K•E TIME-CURRENT CHARACTERISTIC KEUFFEL & ESSER CO 46 5258

#14 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A GE TE-15A
B GE TE-15A



TIME-CURRENT CHARACTERISTIC CURVES

For _____ Fuse Links In _____

BASIS FOR DATA Standards _____ Dated _____

1. Tests made at _____ Volts a-c at _____ p-f. starting at 25C with no initial load

2. Curves are plotted to _____ Test points so variations should be _____

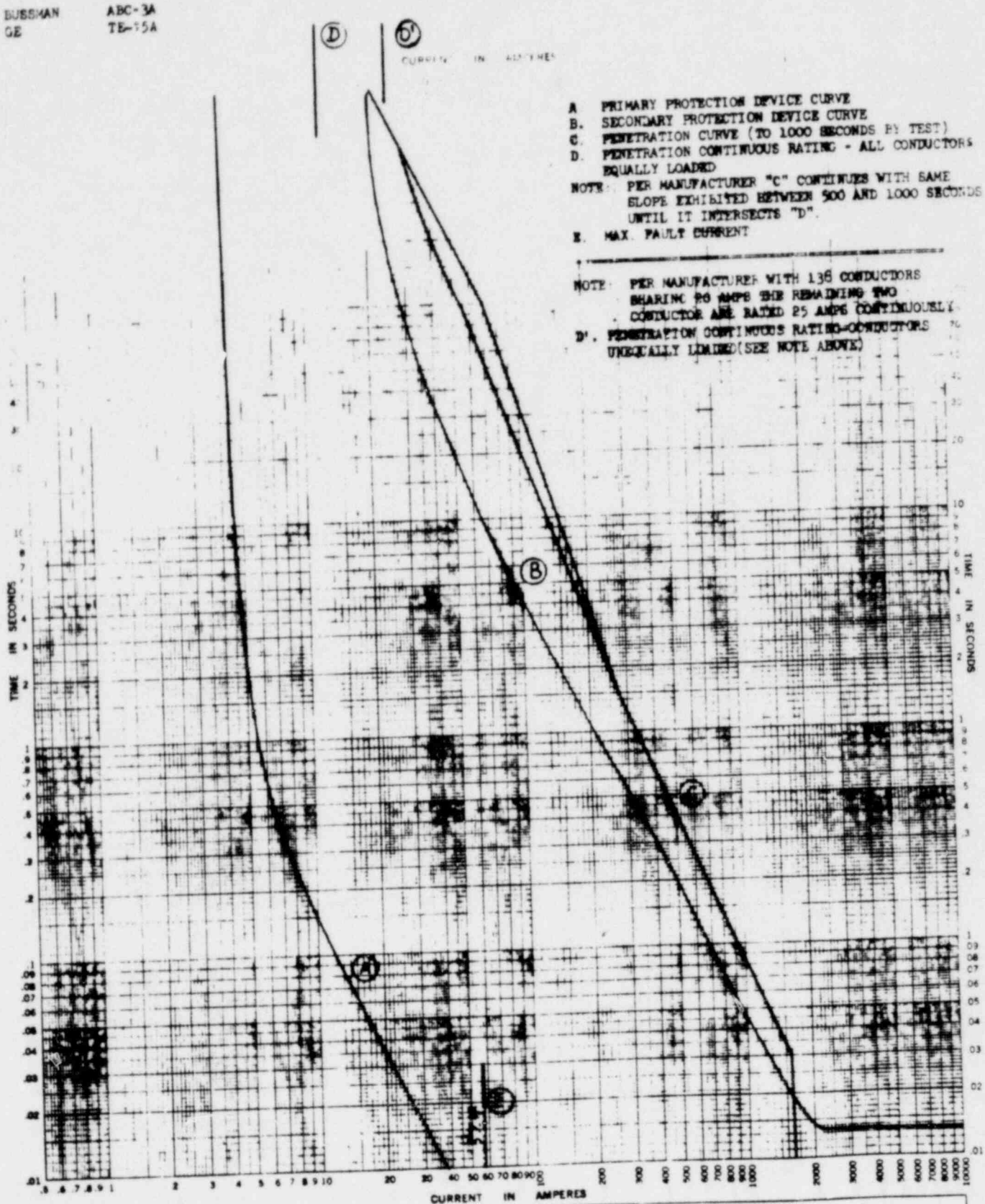
No. 12050-SK(C)-IB-4
Date 2/12/80 MMD

REV 1 9/15/81 MMD

K-E TIME-CURRENT CHARACTERISTIC

#14 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A BUSSMAN ABC-3A
B GE TE-15A



TIME-CURRENT CHARACTERISTIC CURVES

For _____ Fuse Links In _____

BASIS FOR DATA Standards _____ Dated _____

1. Tests made at _____ Volts a-c at _____ p-f., starting at 25C with no initial load

2. Curves are plotted to _____ Test points so variations should be _____

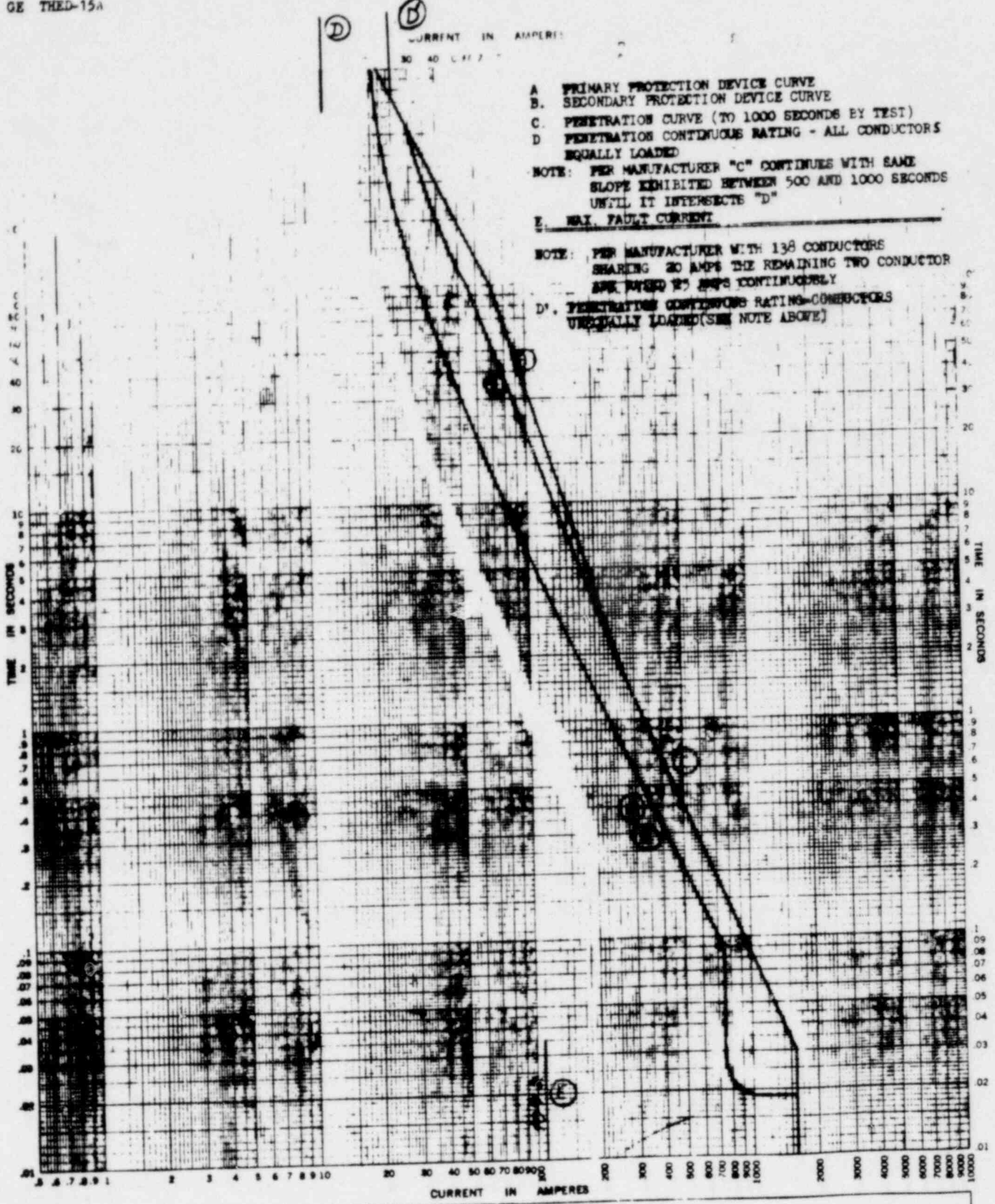
No. 12050-SK(C)-IB-5
Date 2/19/80 LWRO

REV 1 9/15/80 TK

K-E TIME-CURRENT CHARACTERISTIC KEUFFEL & ESSER CO 48 5258

#14 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A GE THED-15A
B GE THED-15A



TIME-CURRENT CHARACTERISTIC CURVES

For _____ Fuse Links. In _____

BASIS FOR DATA Standards _____ Dated _____

1. Tests made at _____ Volts a-c at _____ p-f., starting at 25C with no initial load _____

2. Curves are plotted to _____ Test points so variations should be _____

12057-6K(C)-1E-6

No. _____

Date 2/19/80 WMD

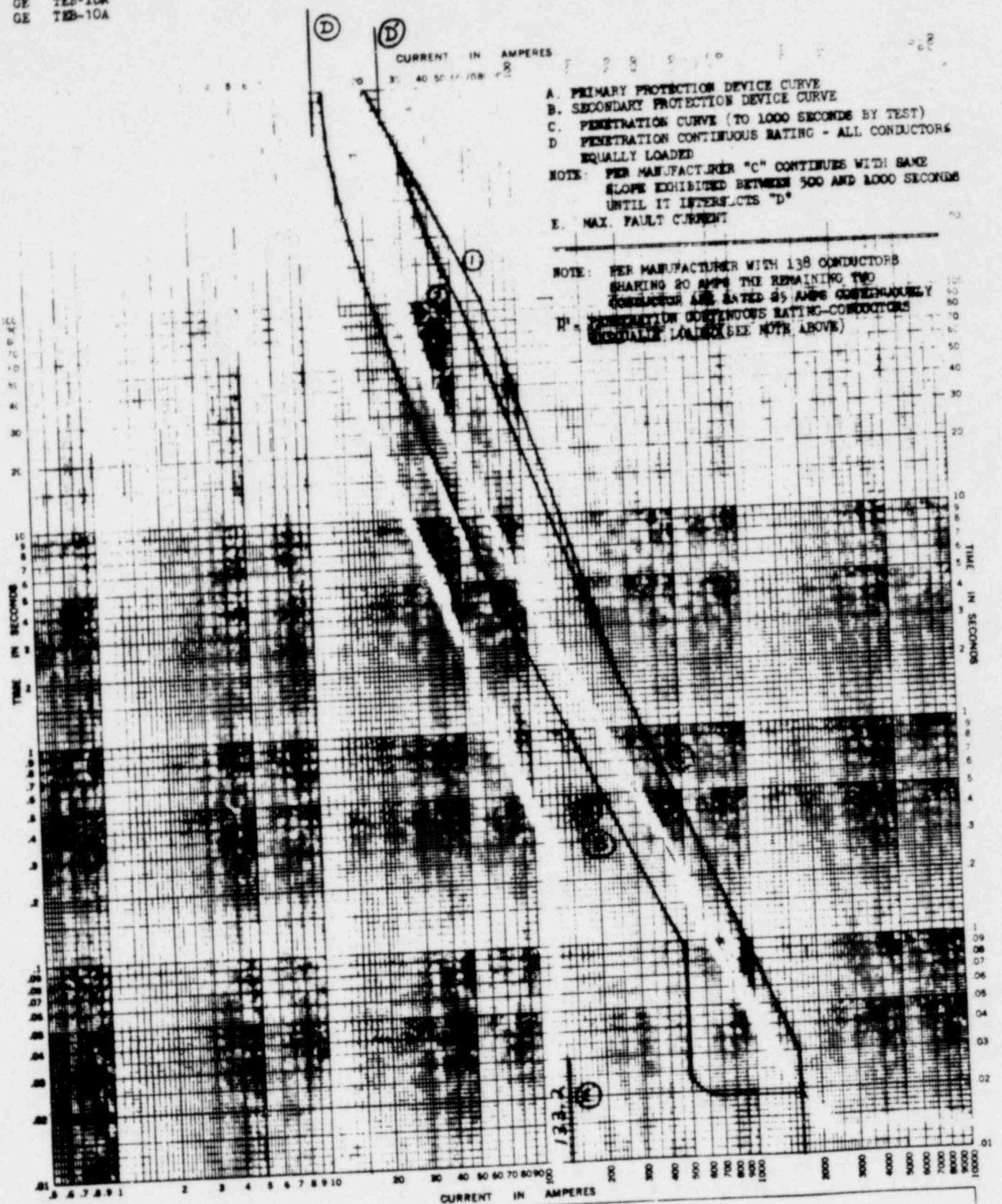
REV 1 9/15/83 TH

K-E TIME-CURRENT CHARACTERISTIC KEUFFEL & ESSER CO 46 5258

#14 FEED THRU

1) SINGLE SEAL
2) TWO SEALS

A GE TEB-10A
B GE TEB-10A



TIME-CURRENT CHARACTERISTIC CURVES

Fuse Links In

For

BASIS FOR DATA Standards Dated

1. Tests made at Volts a-c at p-f., starting at 25C with no initial load

2. Curves are plotted to Test points so variations should be

No. 12050-SK(C)-IB-7

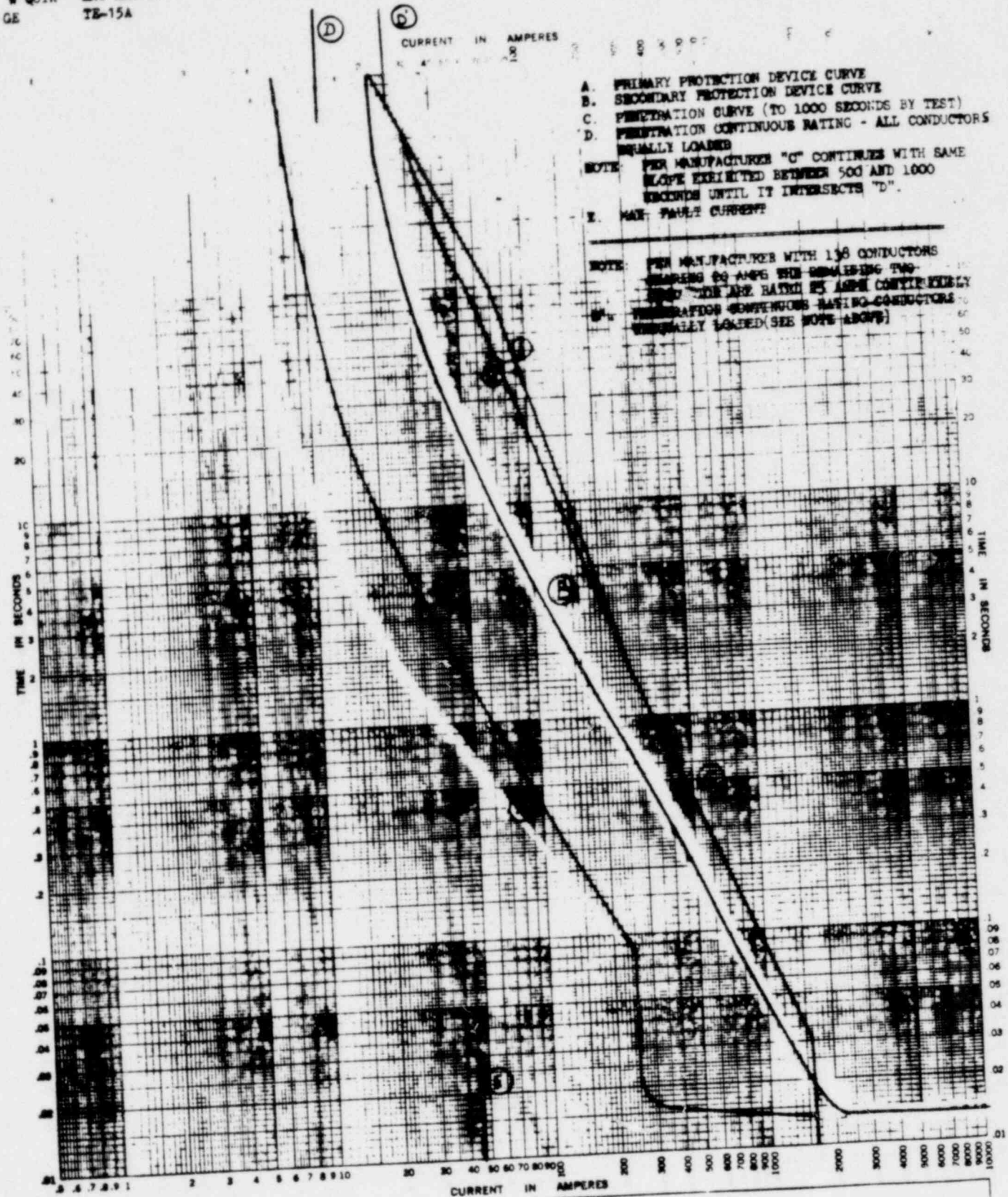
Date 2/19/80 LMRO

REV 1 9/15/80 TAK

M-E TIME-CURRENT CHARACTERISTIC 48 5258

#14 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A W QUIK LAG BRK 5A
B GE TE-15A



TIME-CURRENT CHARACTERISTIC CURVES

For _____ Fuse Links In _____

BASIS FOR DATA Standards _____ Dated _____

1. Tests made at _____ Volts a-c at _____ p-f., starting at 25C with no initial load

2. Curves are plotted to _____ Test points so variations should be _____

No. 18050-SK(C)-18-8

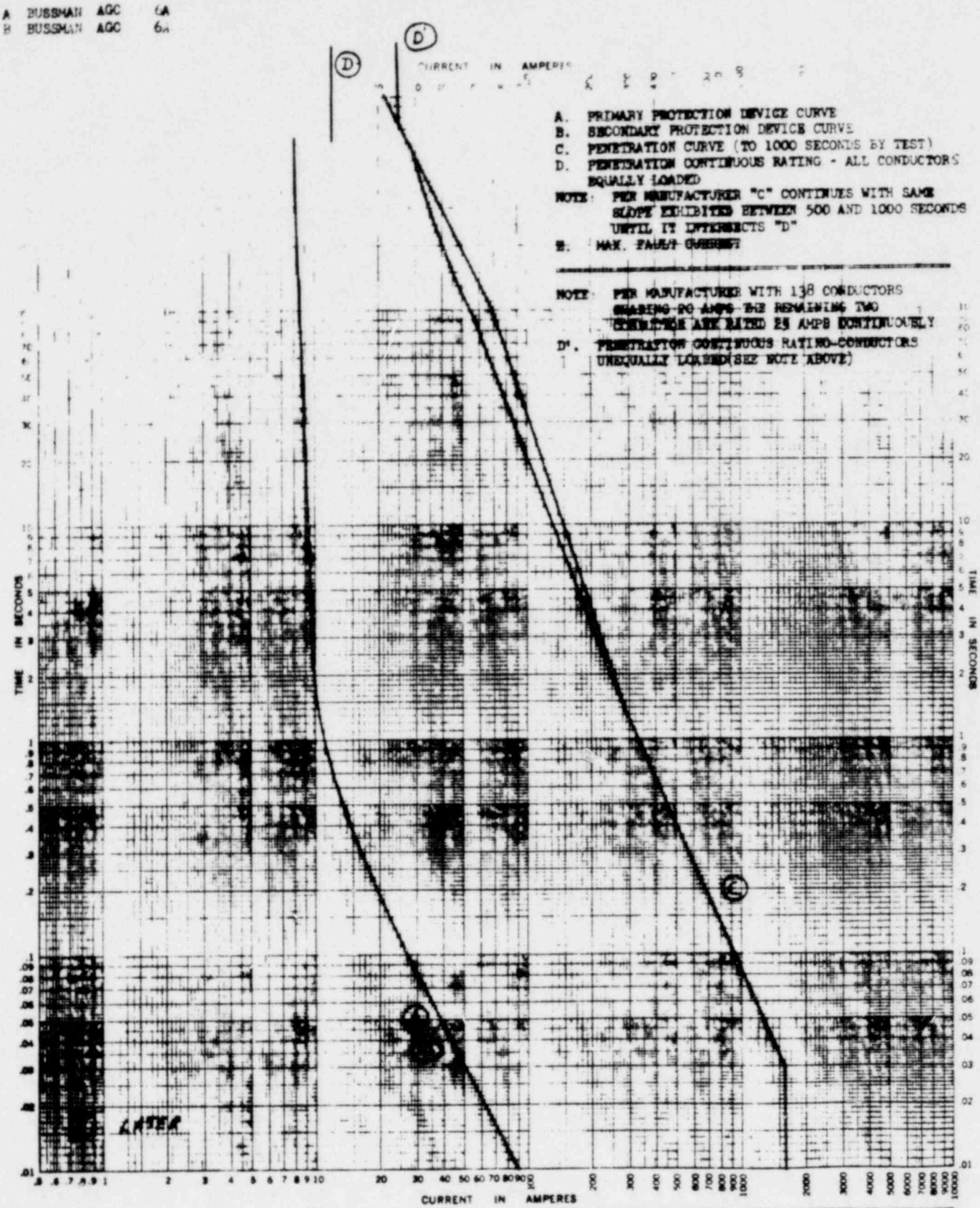
Date 2/19/80 JHO

REV 1 4/17/80 TPC

M-E TIME-CURRENT CHARACTERISTIC KEUFFEL & ESSER CO 48 5258

#14 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A BUSSMAN AGC 6A
B BUSSMAN AGC 6A



TIME-CURRENT CHARACTERISTIC CURVES

For ..... Fuse Links In .....

BASIS FOR DATA Standards ..... Dated .....

1. Tests made at ..... Volts a-c at ..... p-f., starting at 25C with no initial load
2. Curves are plotted to ..... Test points so variations should be .....

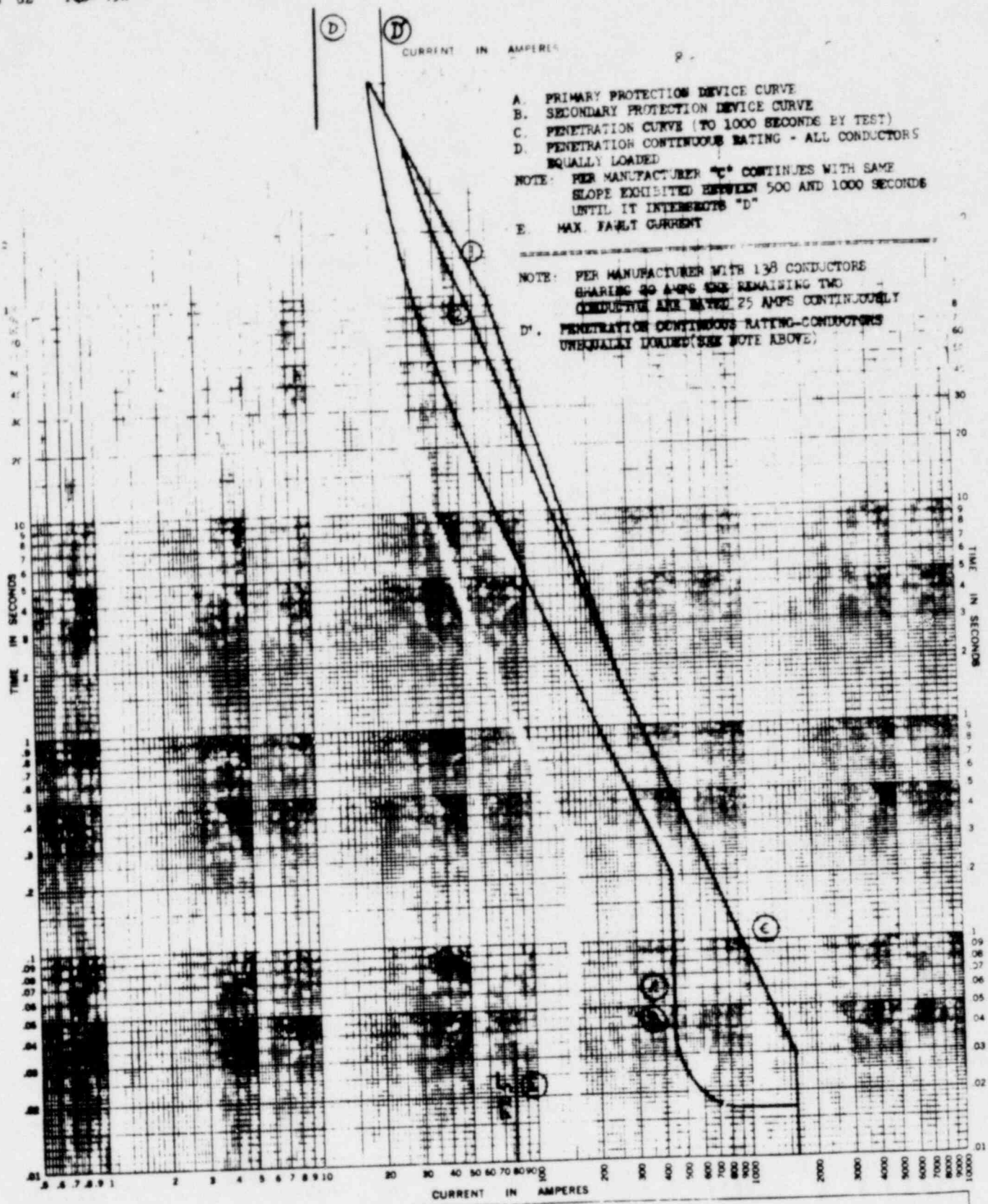
No. 12050-SK(C)-IB-9
Date 2/19/80 JMO

REV 1 2/15/80 TJC

K&E TIME-CURRENT CHARACTERISTIC KEUFFEL & ESSER CO 48 5258

#14 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A GE TQB- 15A
B GE TQB- 15A



TIME-CURRENT CHARACTERISTIC CURVES

For _____ Fuse Links. In _____

BASIS FOR DATA Standards _____ Dated _____

1. Tests made at _____ Volts a-c at _____ p-f., starting at 25C with no initial load

2. Curves are plotted to _____ Test points so variations should be _____

No. 12050-SK(C)-IB-10

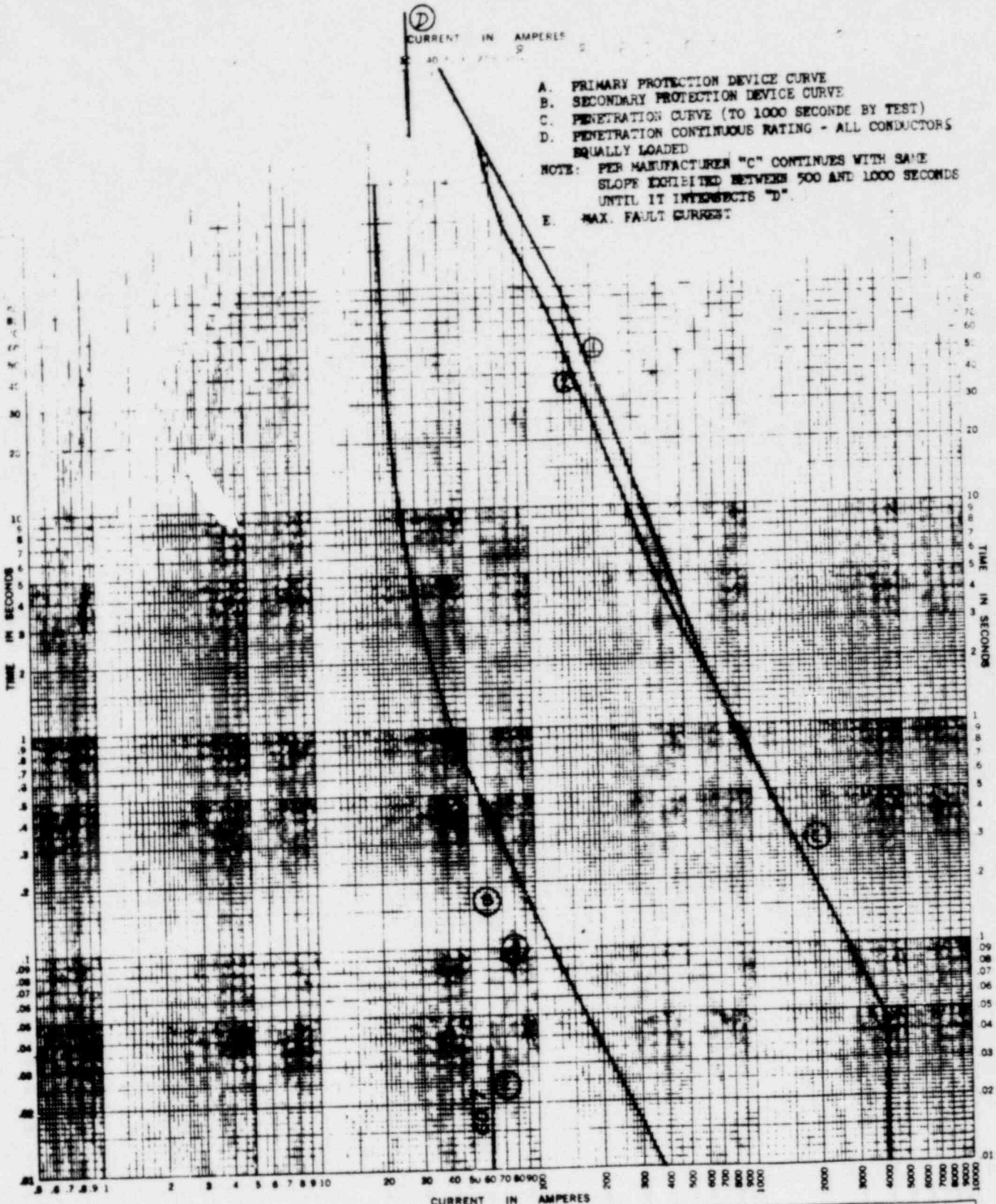
Date 2/19/80 MMO

AEU 9/17/80 TPC

M•E TIME-CURRENT CHARACTERISTIC KELLY & ESSER CO 48 9258

#10 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A BUSSMAN NON-15A
B BUSSMAN NON-15A



TIME-CURRENT CHARACTERISTIC CURVES

For _____ Fuse Links In _____

BASIS FOR DATA Standards _____ Dated _____

1. Tests made at _____ Volts a-c at _____ p-f., starting at 25C with no initial load

2. Curves are plotted to _____ Test points so variations should be _____

No. 12050-SK(C)-IC-1

Date 2/12/80 MHO

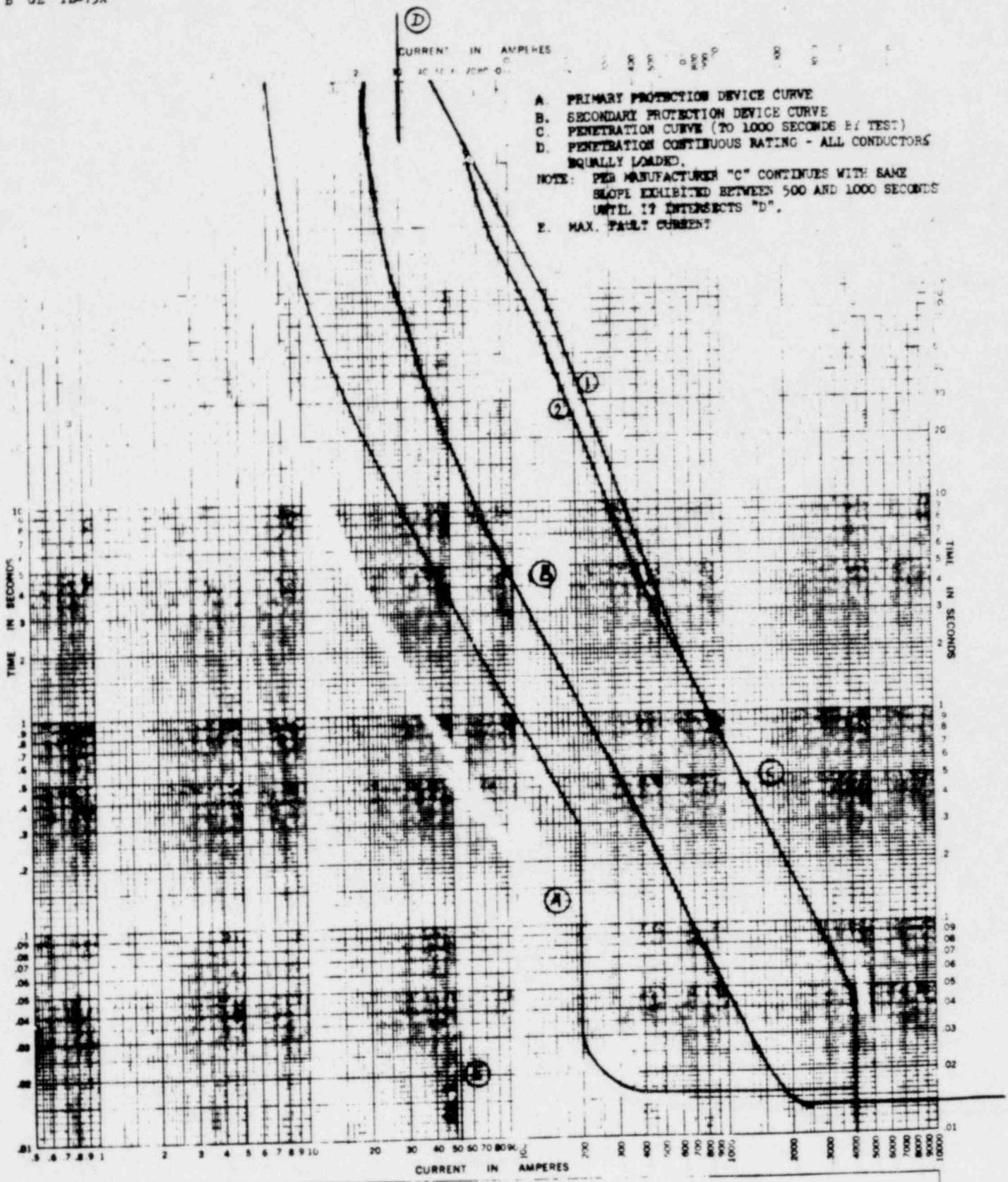
REV 1 4/15/80 TPC

REV 2 9/22/80 TPC

K•E TIME-CURRENT CHARACTERISTIC KEUFFEL & ESSER CO 48 5258

#10 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A GE TQB-5A
B GE TE-15A



TIME-CURRENT CHARACTERISTIC CURVES

For ..... Fuse Links ..... In .....

BASIS FOR DATA Standards ..... Dated .....

1. Tests made at ..... Volts a-c at ..... p.f. starting at 25C with no initial load

2. Curves are plotted to ..... Test points so variations should be .....

12050-SK(C)-IC-2

No. .....

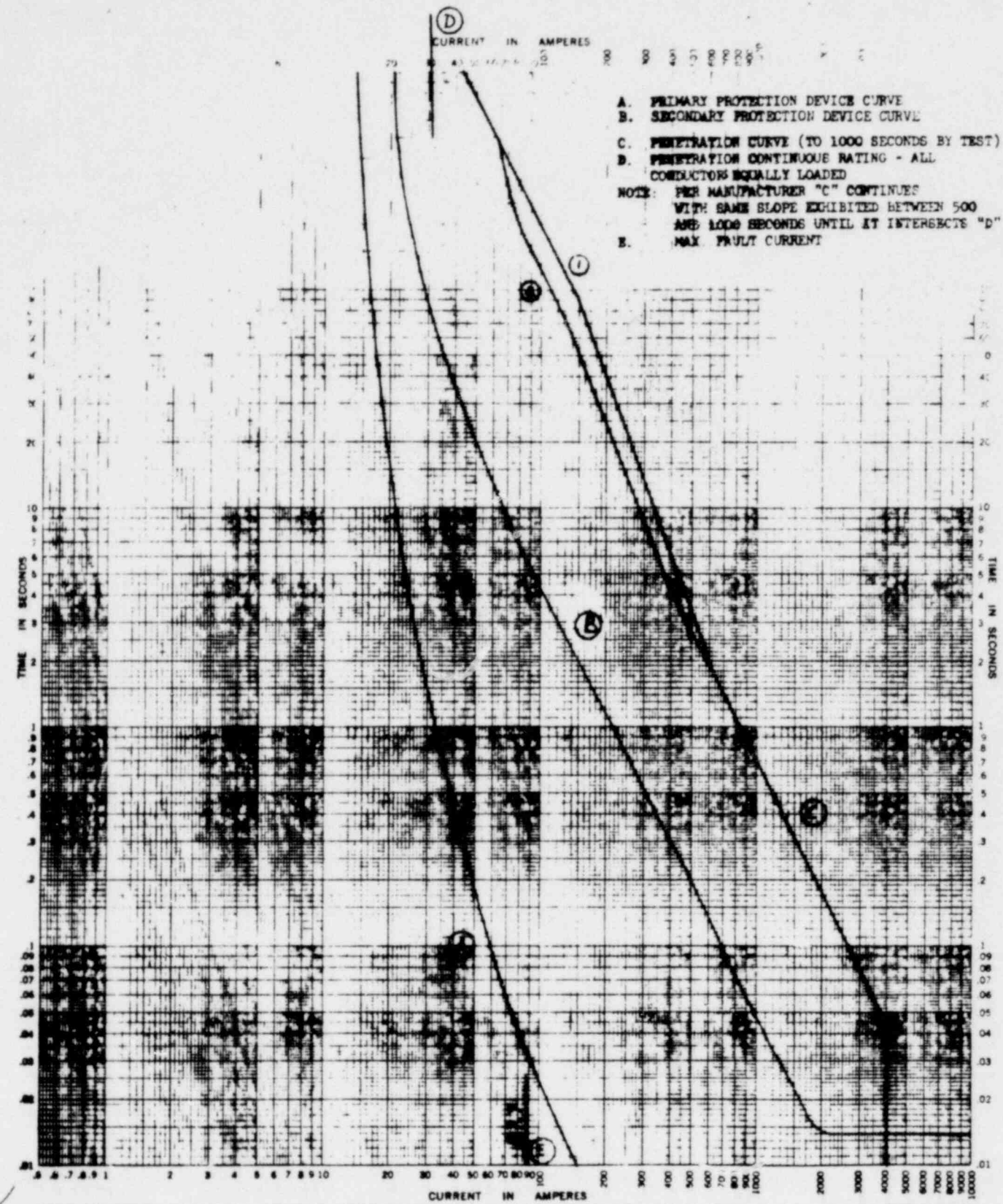
Date 2/9/80 JMO

Rev. 1 9/15/80 JR

K-E TIME-CURRENT CHARACTERISTIC KEUFFEL & ESSER CO. 48 5258

A BUSSMAN ABC-10A
B GE TE-15A

1) SINGLE SEAL
2) TWO SEAL



TIME-CURRENT CHARACTERISTIC CURVES

For ..... Fuse Links. In .....

BASIS FOR DATA Standards ..... Dated .....

1. Tests made at ..... Volts a-c at ..... p-f., starting at 25C with no initial load.
2. Curves are plotted to ..... Test points so variations should be .....

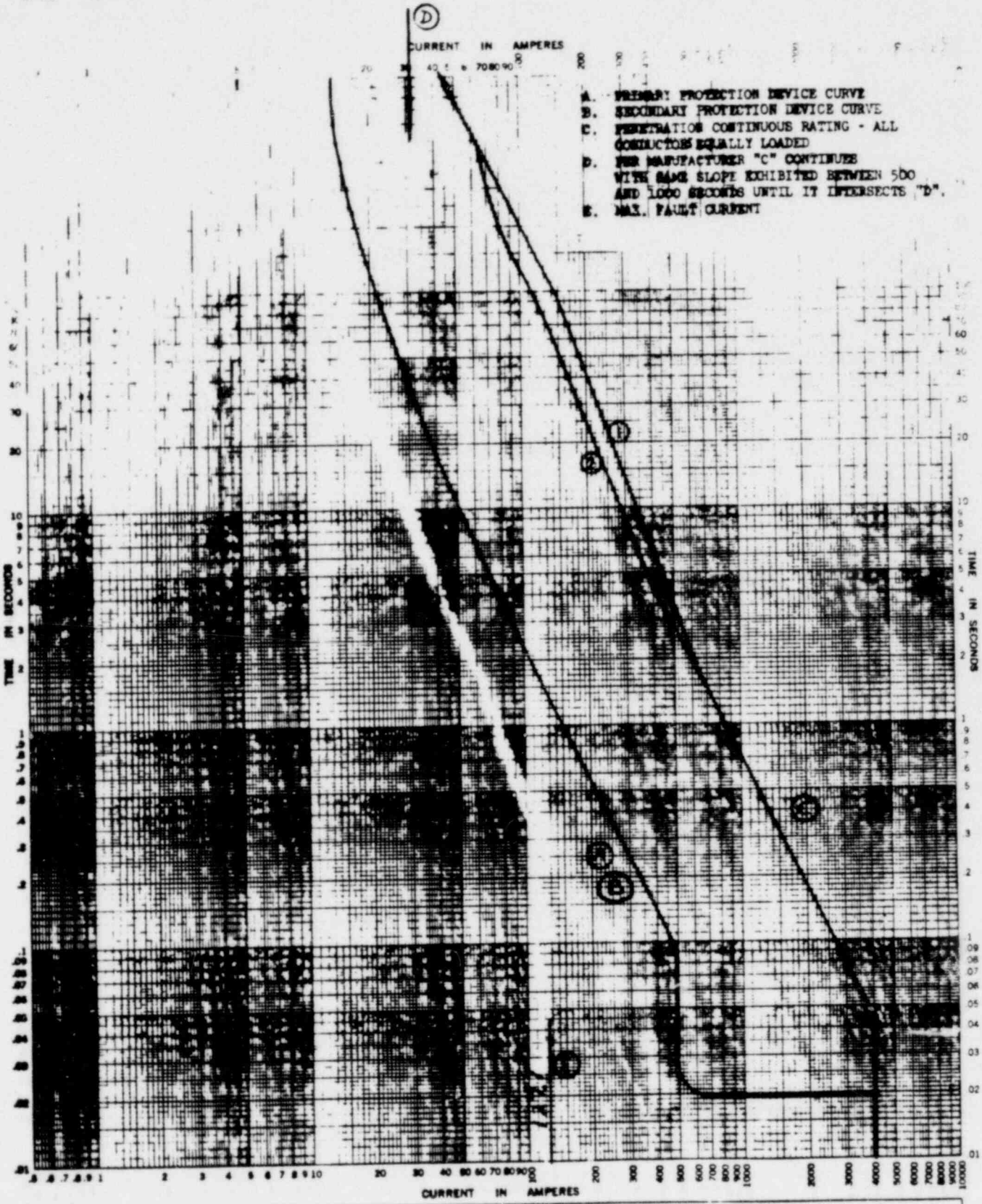
12050-BK(C)-IC-3
No. .....
Date 2/19/80 JMD

REV 1 6/15/20 TAC

K-E TIME-CURRENT CHARACTERISTIC KEUFFEL & ESSER CO. 48 5258

#10 FEED THRU
1) SINGLE SEAL
2) TWO SEALS

A GE TEB-10A
B GE TEB-10A



TIME-CURRENT CHARACTERISTIC CURVES

For _____ Fuse Links. In _____

BASIS FOR DATA Standards _____ Dated _____

1. Tests made at _____ Volts a-c at _____ p-f., starting at 25C with no initial load.
2. Curves are plotted to _____ Test points so variations should be _____

12050-SK(C)-IC-4

No.

Date 2/19/80 JMO

Rev. 1 4/17/80 TPC

H-E TIME-CURRENT CHARACTERISTIC 48 9258