BLAIR ROAD SUBSTATION
HARRIMAN UTILITY BOARD

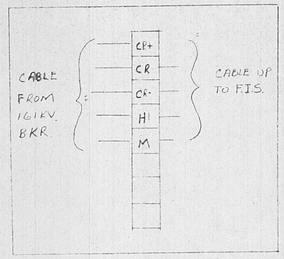
CATALOGUE OF ELECTRICAL DRAWINGS

McWHORTER & FRANKLIN ENGINEERS

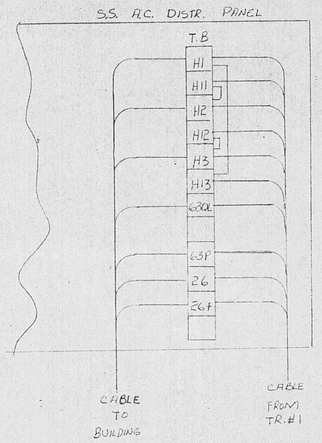
NASHVILLE, TENNESSEE

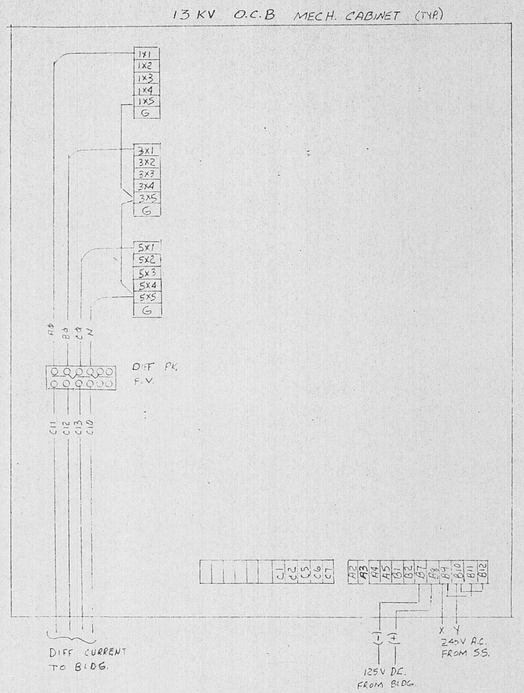
2117 FRANKLIN ROAD 37204 — TELEPHONE (615) 298-3338

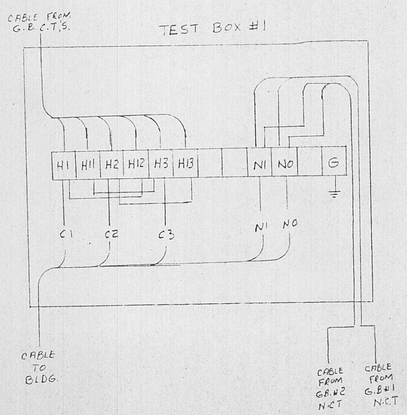
BLAIR ROAD SUBSTATION — HARRIMAN UTILITY BOARD — McWHORTER & FRANKLIN ENGINEERS — ELECTRICAL DRAWINGS

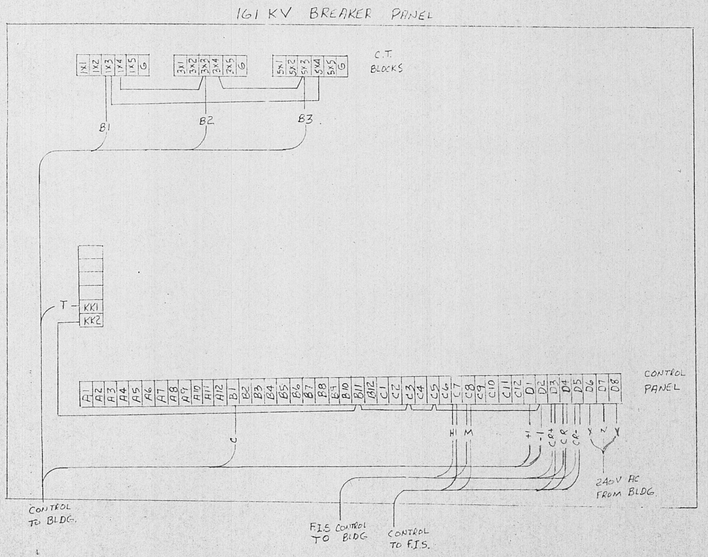


TEST BOX AT FIS









REVISIONS

DATE	

McWHORTER & FRANKLIN ENGINEERS

NASHVILLE, TENNESSEE

2117 FRANKLIN ROAD – 37204 TEL. (615)298-3338

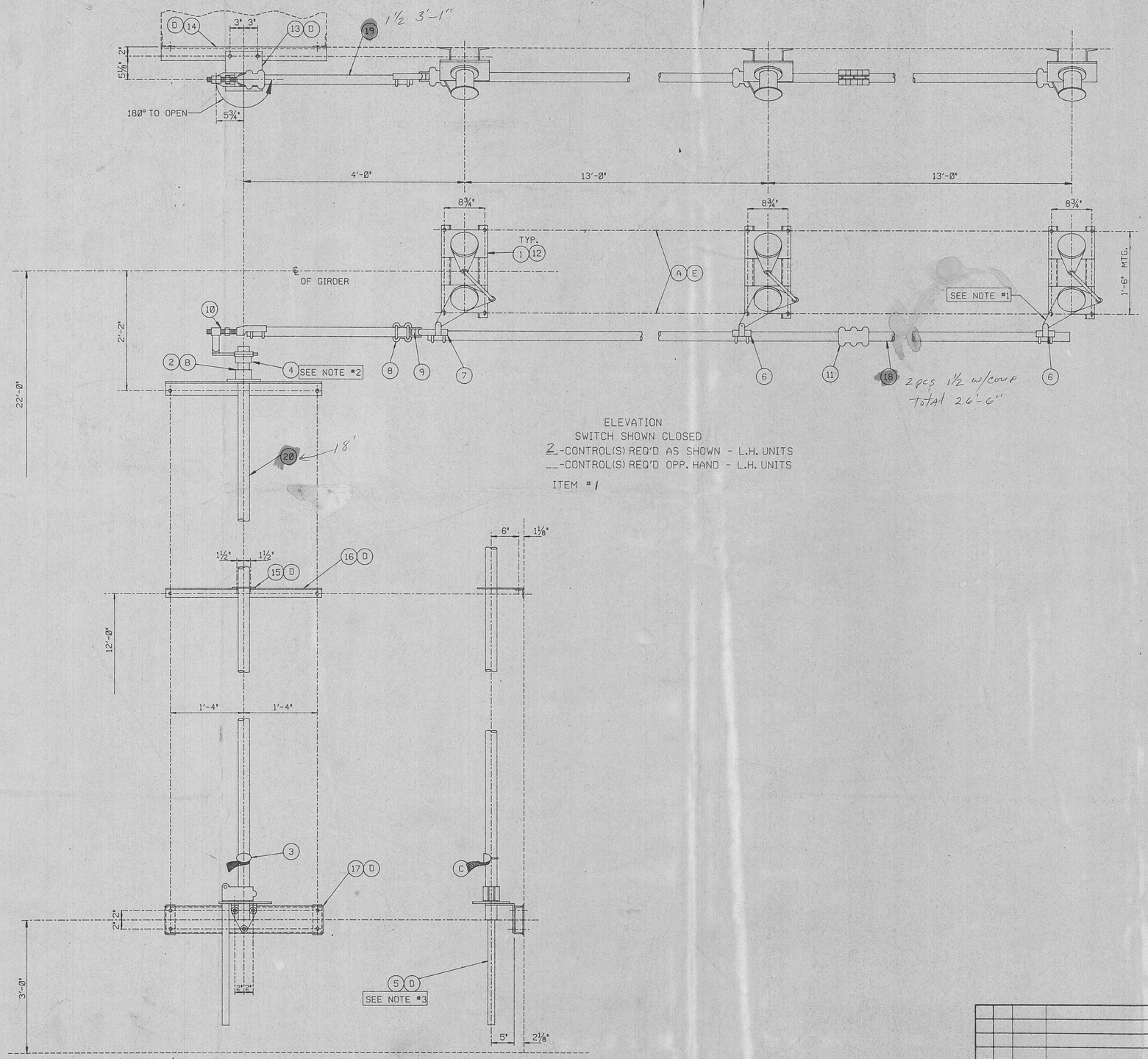
DATE:	
DRAWN:	
SCALE:	

HARRIMAN UTILITY BOARD

BLAIR ROAD SUBSTATION

CONNECTION DIAGRAM

SHEET 9 OF SHEETS



INSP. 1	INSP. 2	ITEM	MARK	QTY.	DESCRIPTION	REF.
		1	AGCH-5V	3	161 KV 1200 AMP SWITCH UNIT W/QUICK BREAK ARCING HORNS	C-2019 SH.128
		2		1	BALL BRNG. ASS'Y	A-9023
		3		1	GROUND SHUNT ASS'Y.	A-9027
		4		1	ADJ. ARM ASS'Y.	A-9206
		5		1	ROT. CONTROL	A-9261
		6	601-38	2	1½" IPS CLEVIS	
		7	601-145	1	1½" IPS CLEVIS	
		8	601-118	1	1½" IPS CLEVIS	
		9	601-54	1	UNIVERSAL KNUCKLE	
		10	601-80/160	1	1½" IPS THD. CLEVIS ASS'Y.	B-5233 SH.35
		11	601-23	1	1½" IPS COUPLER	
		12	MK-6697-1	6	SWITCH BASE	B-6697
		13	MK-6697-2	1	BRNG. PLATE	B-6697
		14	MK-6697-3	1	BRNG. PLATE SUPPORT	B-6697
		15	MK-6697-4	1	PIPE GUIDE	B-6697
		16	MK-6697-5	1	PIPE GUIDE SUPPORT	B-6697
		17	MK-6697-6	1	CONTROL SUPPORT	B-6697
		18		1	2 PCS. 1½" STD. GALV. PIPE X 26'-6" TOT LGTH.	
		19		1	1½" STD. GALV. PIPE X 3'-1"	
		20		1	2" STD. GALV. PIPE X 18'-0"	
		A		12	⅝" X 2" GALV.H.H.BOLT,H.N.,L.W.	
		B		2	½" X 1½" GALV.H.H.BOLT,H.N.,L.W.	
		C		1	⅝" X 3" GALV.H.H.BOLT,H.N.,L.W.	
		D		15	⅝" X 1½" GALV.H.H.BOLT,H.N.,L.W.	
		E		12	⅝" GALV. BEVEL WASHERS	

BILL OF MATERIAL
ONE CONTROL

D- 11257 SH.1
W.O. 44735

NOTES:

#1 Do not change stop bolts on main switch bearings. The tie wires should be left on all switch units until all clevises, reach rods, and arms have been secured, then removed.

#2 Adjustment should be made on this arm to assure full opening and closing of each switch unit. The dimension shown on the arm is a trial dimension, as the arm may need to be lengthened or shortened to completely open and close the switch, due to differences in specific applications.

#3 Angular adjustment should be made as desired by moving the stop plates on the control handle, or stop bolts on the gear box control handle when furnished.

USCO Power Equipment Corporation
Post Office Box 10023 • Birmingham, Alabama 35202-0023
Telephone (205) 592-7241 • Facsimile (205) 592-0470

BY	NO.	DATE	REVISION

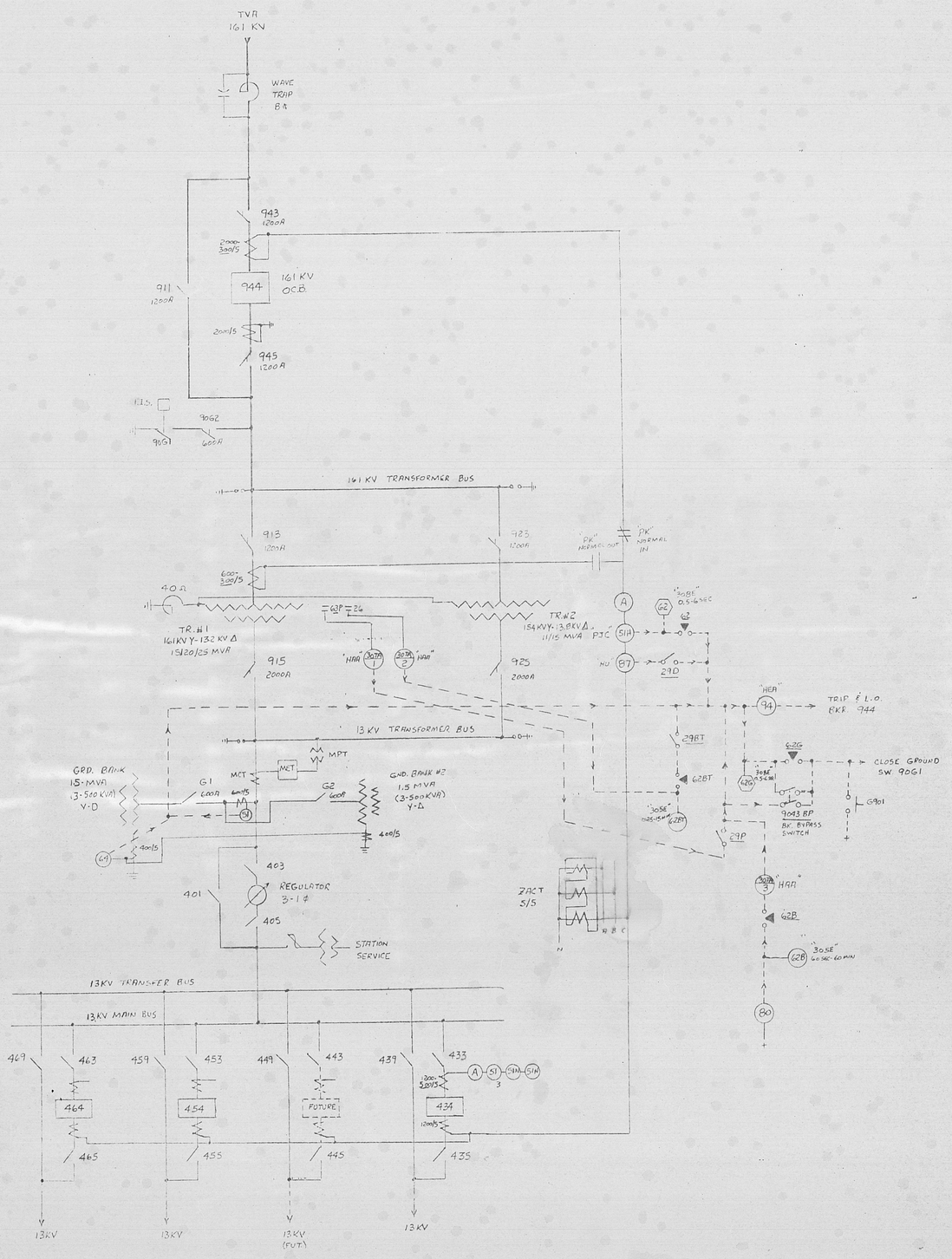
REFERENCES: SKETCH

CONTROL DETAILS
TYPE "AGCH-5V" 161 KV 1200 AMP
HARRIMAN UTILITY BOARD

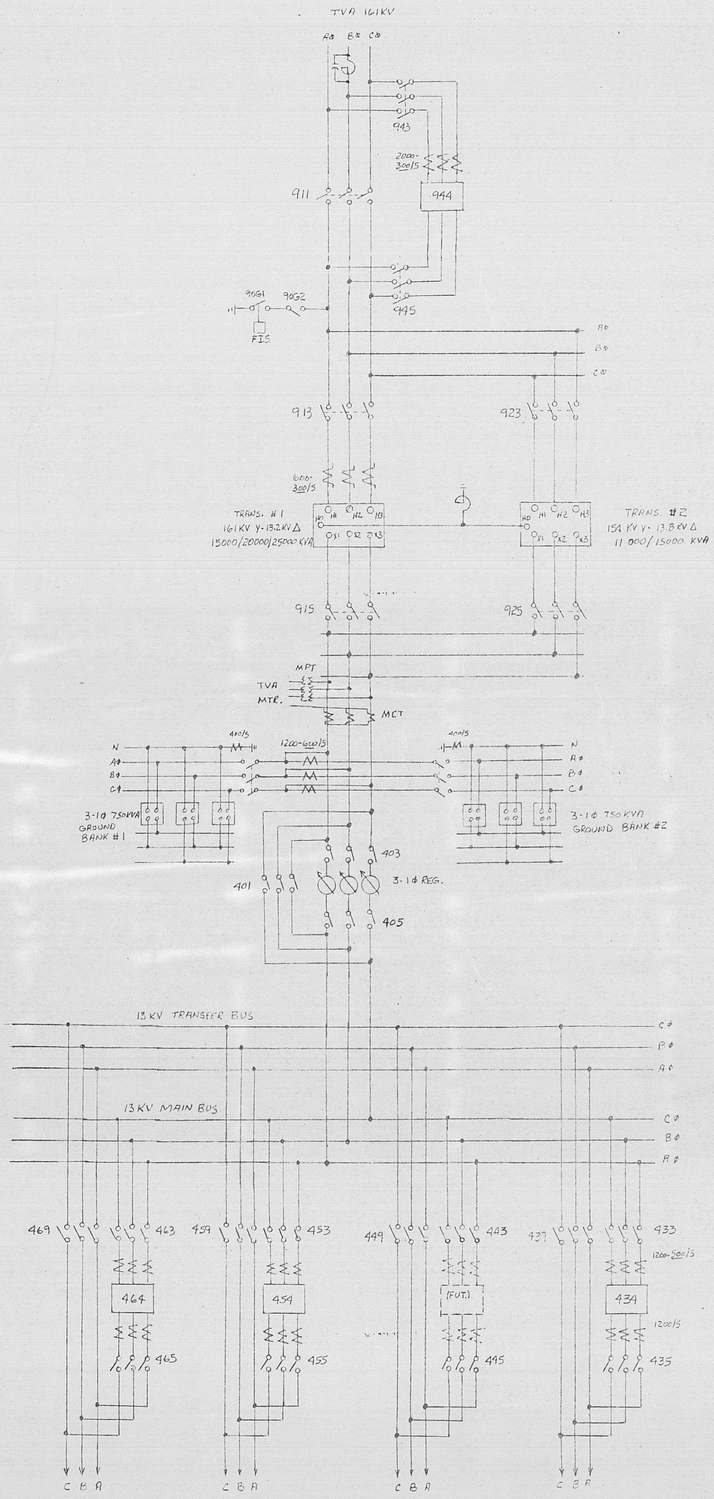
W.O. 44735 | P.O. 12108 | APPROVED:

DRAWN: 7-21-94 TLR
TRACED:
CHECKED:

D- 11257 | SH. 1 | REV.



SHEET 1 OF SHEETS	HARRIMAN UTILITY BOARD BLAIR ROAD SUBSTATION ONE LINE DIAGRAM	DATE: DRAWN: SCALE:	McWHORTER & FRANKLIN ENGINEERS NASHVILLE, TENNESSEE 2117 FRANKLIN ROAD – 37204 TEL. (615)298-3338	DATE	REVISIONS



SHEET 2 OF SHEETS	HARRIMAN UTILITY BOARD BLAIR ROAD SUBSTATION THREE LINE DIAGRAM	DATE: 4-6-95 DRAWN: SCALE:	McWHORTER & FRANKLIN ENGINEERS NASHVILLE, TENNESSEE 2117 FRANKLIN ROAD – 37204 TEL. (615)298-3338	DATE / REVISIONS

WL-8725

"16SBIED915" R.V.

CONTACTS HANDLE END		POSITIONS: CLOSE	NORMAL AFTER CLOSE	NORMAL AFTER TRIP	TRIP
1 ⊣⊢ ⊣⊢ 2	1	X			
	2	X			
3 ⊣⊢ ⊣⊢ 4	3				X
	4				X
5 ⊣⊢ ⊣⊢ 6	5	X	X		
	6	X	X		
7 ⊣⊢ ⊣⊢ 8	7	X	X		
	8	X	X		
9 ⊣⊢ ⊣⊢ 10	9			X	X
	10			X	X

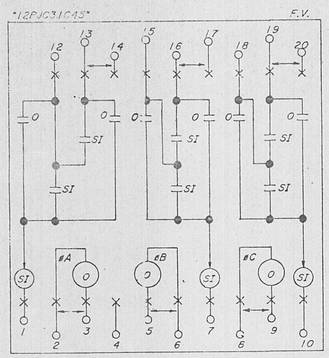
9001H
3F2
3F2
3G1
3G1
—
—
—
—
—
—

"SBM" 10BC568 R.V.

CONTACTS HANDLE END		POSITIONS: CLOSE	NORMAL	TRIP
1 ⊣⊢ ⊣⊢ 2	1	X		
	2			X
3 ⊣⊢ ⊣⊢ 4	3	X		
	4			X

G901
—
2U7
—
—

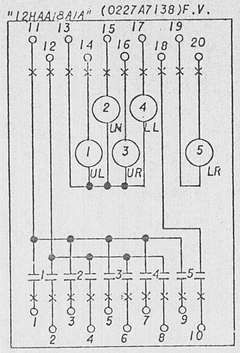
"12PJC31C45" F.V.



CASE: 6 5/8" x 10 5/16"

	51H
1,12,13	2D7
2,3	2H1
5,6	2H2
7,15	2E7
8,9	2H2
10,18	2E7
19,20	—

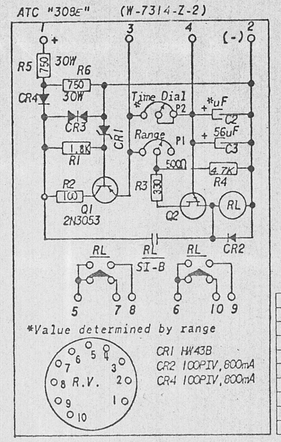
"12HAA18A1A" (0227A7138) F.V.



Case: 6-5/8" x 10-5/16"

	30TA
1,11	2F7
2	3P3
3	2F7
4	3P3
5	2F7
6	3Q3
7	2F7
8	3Q3
9	2G7
10,18	—
12	3P2
13	3K4
14,15	3K4
16	3L4
17	3L4
19,20	3L4

ATC "308E" (W-7314-Z-2)



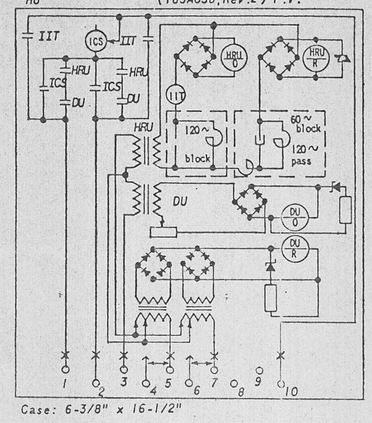
*Value determined by range

CR1 HK43B
CR2 100PIV, 800mA
CR4 100PIV, 800mA

Case: 3-3/4" x 3-3/4"

	62G	62
1	2G9	2D8
2	2G9	2D8
3	—	—
4	—	—
5	2H9	2E8
6	2H9	2E8
7	2G9	2E8
8	2G9	2E8
9	2G9	2E8
10	2G9	2E8

"HU" (185A036, Rev.2) F.V.



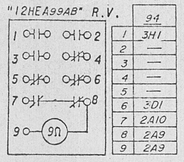
Case: 6-3/8" x 16-1/2"

	87
1	2A8
2	2B8
3	2U1
4	2U1
5	2U1
6	2K1
7	2K1
8	—
9	—
10	2A6

DEVICE SERIES	FUNCTION
1-99	For equipment general to station
200	For equipment general to 13 kV
900	For equipment general to 161 kV
9900	For equipment *general to Gnd. Sw. 9061*
9000	For equipment *general to Ckt. Sw. 9089*

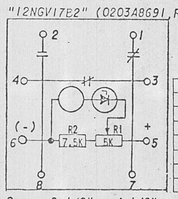
DEVICE	TYPE	FUNCTION
01	SB-1, *SBM*	Control switch
30TA	HAA	Target, tripping & alarm relay
51H	PJC	Overcurrent relay
62, 62C	308E	Transistorized timing relay
62B, 62BT	305E	Timing relay
80	NGV	Battery undervoltage relay
87	HU	Transformer differential relay
94	HEA	Auxiliary tripping relay
A	ADH-2	3W thermal demand ammeter

"12HEA99AB" R.V.



	94
1	3H1
2	—
3	—
4	—
5	—
6	3D1
7	2A10
8	2A9
9	2A9

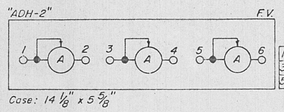
"12NGV17B2" (0203A8691, Rev.0) F.V.



Case: 2-1/2" x 4-1/2"

	80
1	3L2
2	—
3	3Q2
4	3Q3
5	3R3
6	3R4
7	3L2
8	—

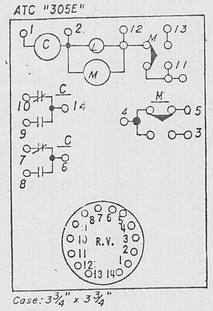
"ADH-2" F.V.



Case: 14 1/8" x 5 5/8"

	A
1,2	2G1
3,4	2G2
5,6	2G2

ATC "305E"



Case: 3 3/4" x 3 3/4"

	62BT	62BI
1	3P4	3Q4
2	3R4	3Q3
3	2G7	3M3
4	2G7	3M3
5	2G7	3M3
6	—	—
7	—	—
8	—	—
9	—	—
10	—	—
11	3Q4	3R4
12	3Q4	3R4
13	3Q4	3R4
14	—	—

REFERENCES:
Single Line Diagram WL-8723
Switchboard Front View WL-8726
Switchboard Wiring Rear View WL-8727

REV. NO.	DATE	WORK ORDER	DSGN	DRWN	CHKD	SUPV.	SUBM.	MF
1	4-19-95	MARKED FOR BLAIR ROAD SUB						

DSGN JR SUPV. WS W.O. 37774
DRWN SB/DLP PROJ. ENGR.
CHKD JG

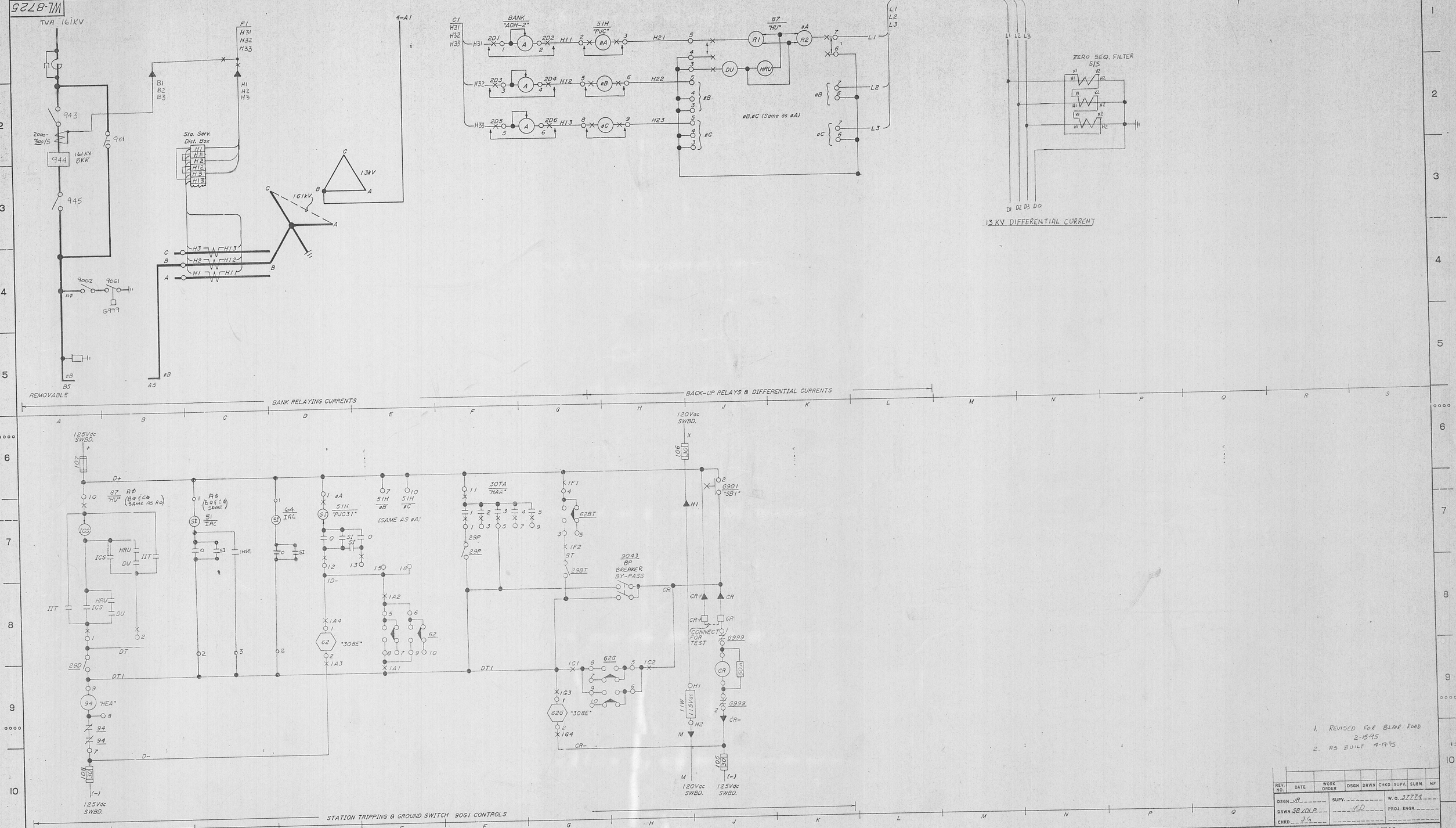
TENNESSEE VALLEY AUTHORITY
DIVISION OF TRANSMISSION PLANNING AND ENGINEERING
HARRIMAN UTILITY BOARD
BLAIR ROAD SUBSTATION-161kV
ELEMENTARY DIAGRAM
INTERNAL CONNECTIONS

SHEET 3

DATE 9/1/82 | SUBMITTED | APPROVED | SHEET 1 OF 3 SHEETS
SCALE NONE | CLASS. CODE D502 | MICROFILMED | WL-8725 | R-1

STATION NO. 5296

WL-8725



1. REVISED FOR BLAIR ROAD 2-15-95
2. AS BUILT 4-19-95

REV. NO.	DATE	WORK ORDER	DSGN	DRWN	CHKD	SUPV.	SUBM.	MF

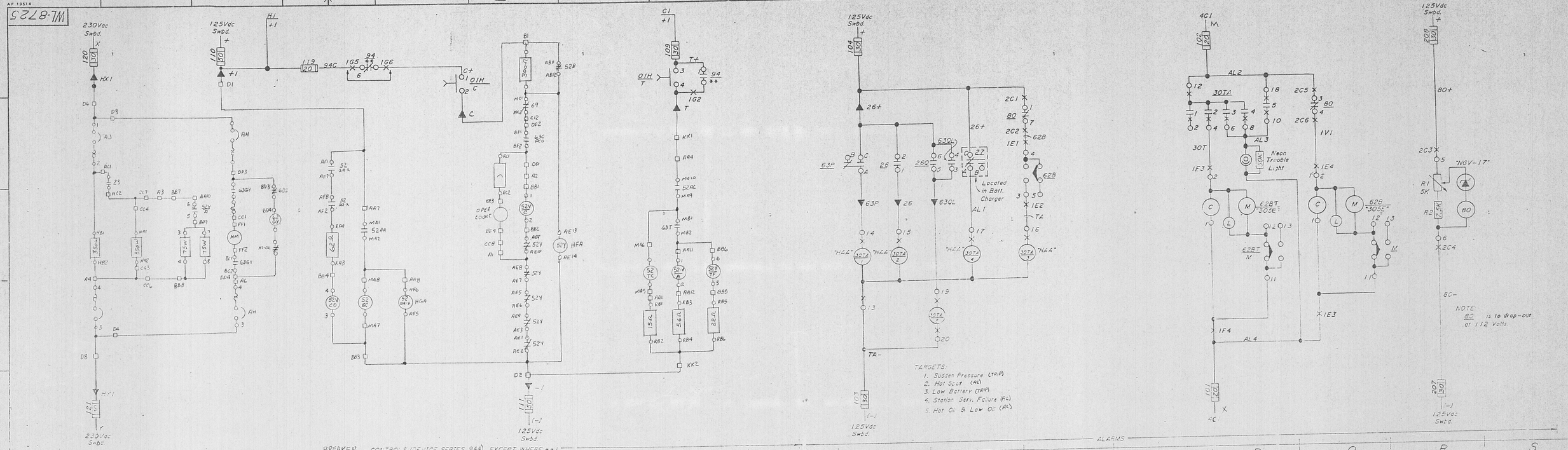
DSGN JB SUPV. JRD W.O. 37774
DRWN SB/DLP PROJ. ENGR.
CHKD JG

TENNESSEE VALLEY AUTHORITY
DIVISION OF TRANSMISSION PLANNING AND ENGINEERING
HARRIMAN UTILITY BOARD
BLAIR ROAD SUBSTATION-161kV
ELEMENTARY DIAGRAM
TRANSF. BK., GND. SW. & DIFF. TRIPPING

SHEET 4

DATE	SUBMITTED	APPROVED	SHEET 2 OF 3 SHEETS
7/1/92			WL-8725 R-2
SCALE NONE	CLASS. CODE		

[redacted]



1. REVISED FOR BLAIR ROAD 2-15-95
2. ADDED BREAKER ELEM. 4-18-95

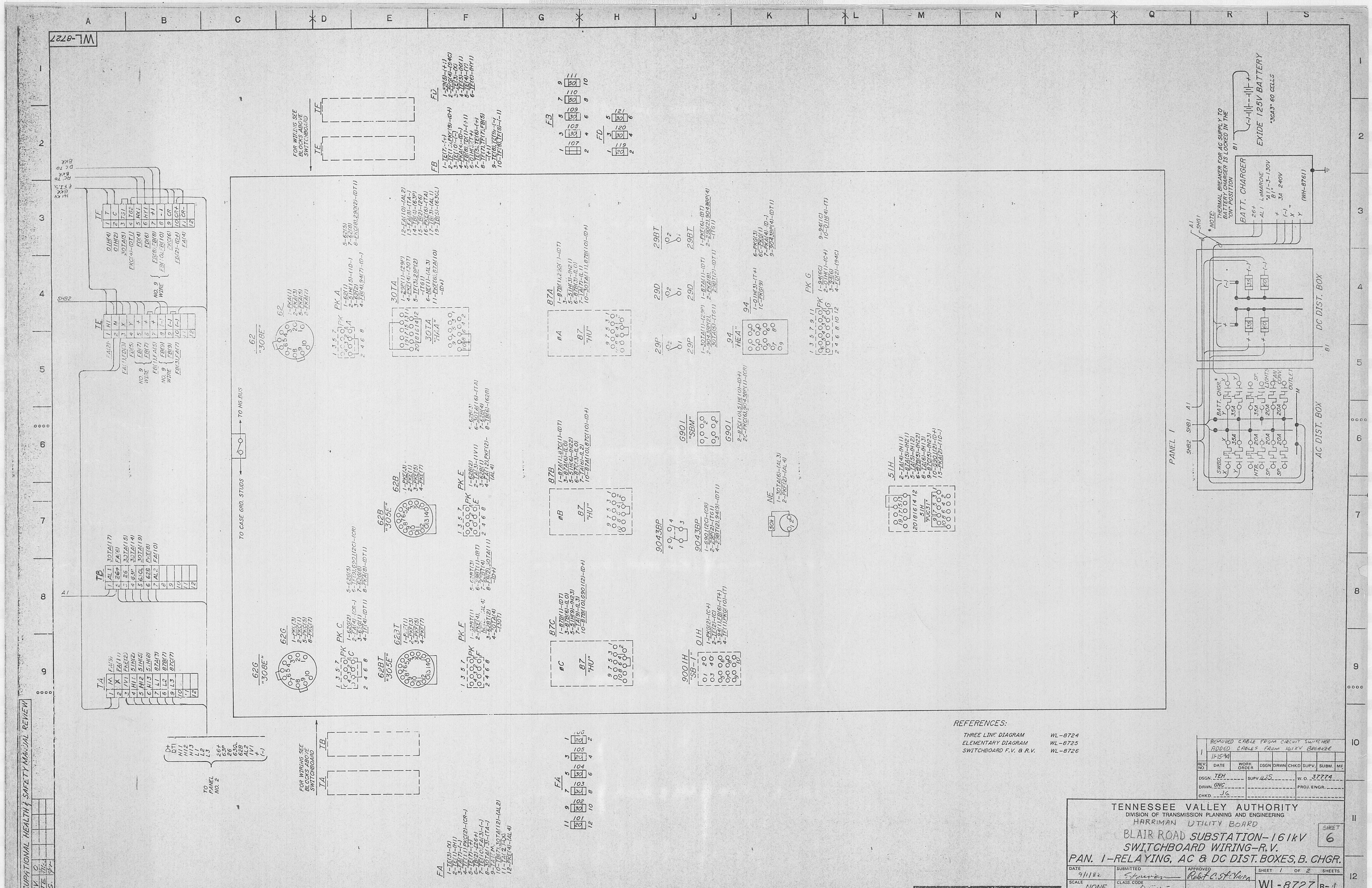
REV. NO.	DATE	WORK ORDER	DSGN	DRWN	CHKD	SUPV.	SUBM.	MF

DSGN JR — SUPV. WS — W.O. 37774
DRWN DLP/SB — PROJ. ENGR.
CHKD JG

TENNESSEE VALLEY AUTHORITY
DIVISION OF TRANSMISSION PLANNING AND ENGINEERING
HARRIMAN UTILITY BOARD
BLAIR ROAD SUBSTATION-161kV
ELEMENTARY DIAGRAM
BREAKER & ALARMS

SHEET 5

DATE	SUBMITTED	APPROVED	SHEET 3 OF 3 SHEETS
9/1/82	Hinman	Robt C. Stephens	WL-8725 R-1
SCALE NONE	CLASS. CODE		



REFERENCES:

THREE LINE DIAGRAM	WL-8724
ELEMENTARY DIAGRAM	WL-8725
SWITCHBOARD F.V. & R.V.	WL-8726

REV. NO.	DATE	WORK ORDER	DSGN	DRWN	CHKD	SUPV.	SUBM.	MF
1	11-15-94	REMOVED CABLE FROM CIRCUIT SWITCHER ADDED CABLES FROM 161KV BREAKER						

DSGN. TEH SUPV. WLS W.O. 37774
DRWN. GNC PROJ. ENGR.
CHKD. JS

TENNESSEE VALLEY AUTHORITY
DIVISION OF TRANSMISSION PLANNING AND ENGINEERING
HARRIMAN UTILITY BOARD
BLAIR ROAD SUBSTATION-161kV
SWITCHBOARD WIRING-R.V.
PAN. 1-RELAYING, AC & DC DIST. BOXES, B. CHGR.

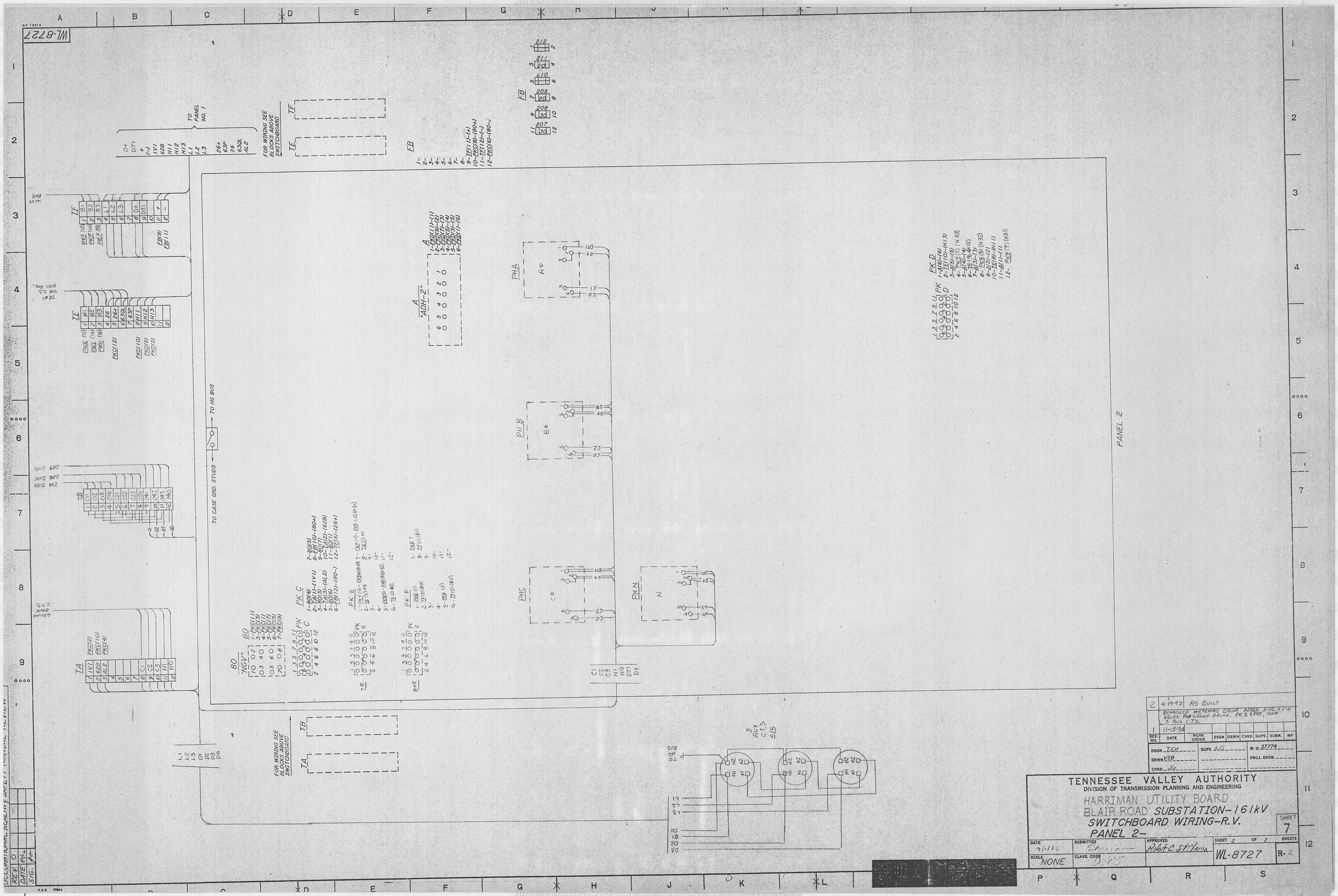
SHEET 6

DATE	SUBMITTED	APPROVED	SHEET 1 OF 2 SHEETS
9/1/82		Robt C. St. Vrena	WL-8727 R-1

SCALE NONE CLASS. CODE

K&E 19 1253 9-76 MC 5312

WL-8727



REV. NO.	DATE	WORK ORDER	DSGN	DRWN	CHKD	SUPV.	SUBM.	MF
2	4-19-95	AS BUILT						
		REMOVED METERING EQUIP. ADDED 3-DC & 1-N RELAY, FOR GROUND BANKS, PK E & PK F, AND 3 AUX. C.T.S.						
1	11-15-94							

DSGN TEN SUPV. LLS W.O. 37774
DRWN VSB PROJ. ENGR.
CHKD JG

TENNESSEE VALLEY AUTHORITY
DIVISION OF TRANSMISSION PLANNING AND ENGINEERING

HARRIMAN UTILITY BOARD
BLAIR ROAD SUBSTATION-161kV
SWITCHBOARD WIRING-R.V.
PANEL 2-

SHEET 7

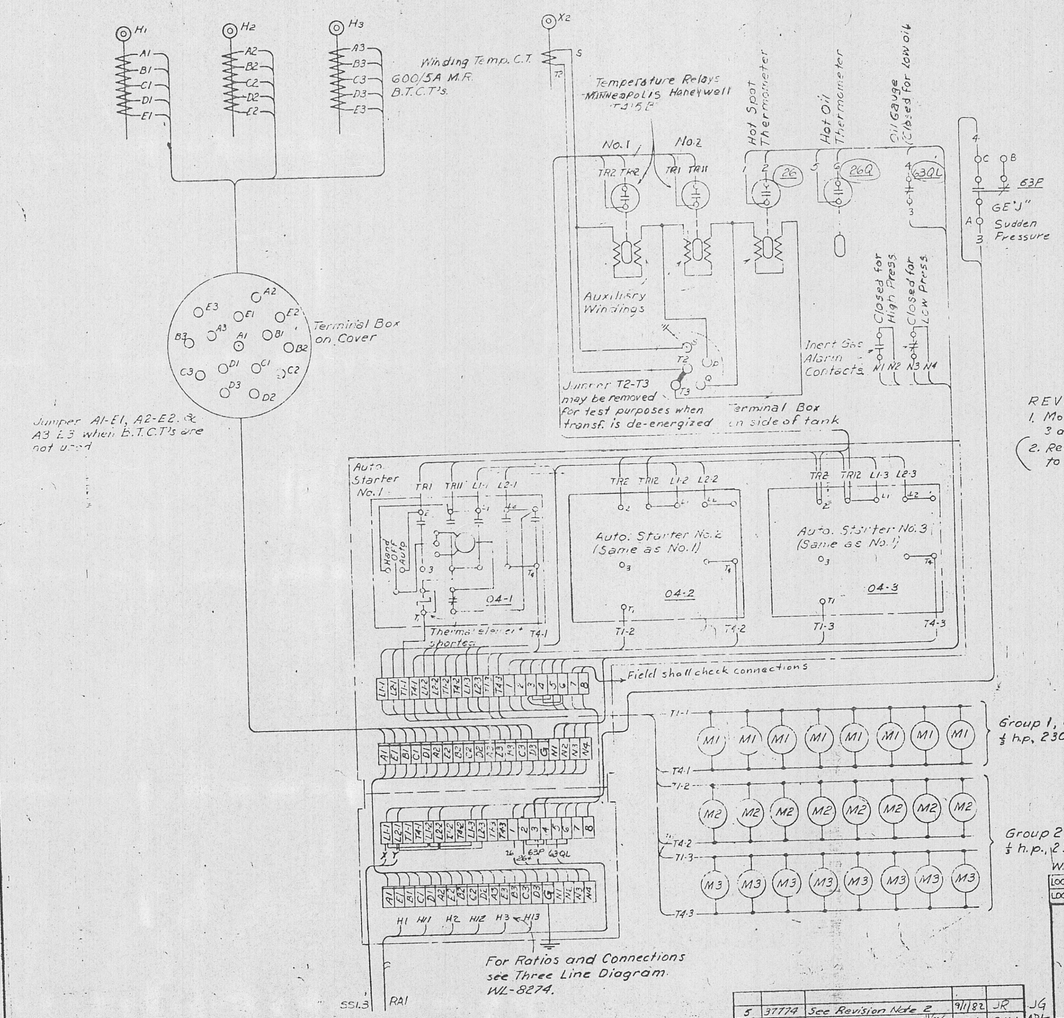
DATE	SUBMITTED	APPROVED	SHEET 2 OF 2	SHEETS
9/1/82	[illegible]	Robt C. Stillman	WL-8727	R-2
SCALE NONE	CLASS. CODE [illegible]			

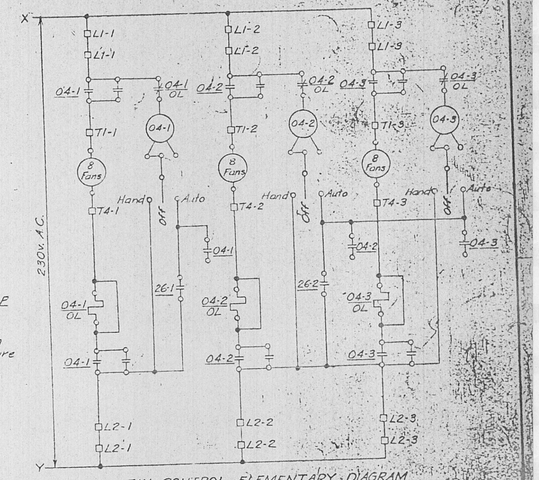
REV 0 DATE 11/4/82 SIG. [illegible]

OCCUPATIONAL HEALTH SAFETY MANUAL REVIEW

K&E 77844

HC-25592





REVISION NOTES:
1. Moved to Location 2. Added 63P and reconnected points 3 and 4 in split term. box.
2. Retired from stock. Moved to location 3. Added Jumpers to Term. Block 3-5, 4-6.

REFERENCES:
Transformer Nameplate Diag. MC-2517
Pol., Ratios, & Tap. - B.T.C.T's SC-1899
Mfrs. Drawings 48379-A
Mfr's Wiring Diagram

5	37774	See Revision Note 2	9/1/82	JR	JG		
4		Fld. Chg. HMR-105	11/20/61	EWJ	ADL		
3	44374	See Revision Note 1.	5/9/60	DAY	DGW		
2	45150	Chgd. Cables & Tagging	2/20/52	Louie	HJS		
1		Field Changes, S.O.S. 3/23/51	4/9/51	WJS	GBI		
ISSUE	W.O.	REVISION	DATE	SIG			

LOCATION 1 Calvert Pri. | LOCATION 2 Counce Pri. | LOCATION 3 Clinch River Tr-Mkt

TENNESSEE VALLEY AUTHORITY
DEPARTMENT OF POWER ENGINEERING AND CONSTRUCTION

TRANSFORMER ACCESSORIES DIAGRAM
PENNSYLVANIA 3-Φ 15000/20000/25000 KVA
161000 GRD. Y-13200 VOLTS

SCALE: None | DRAWN: W.L.N. | TRACED: | CHECKED: FWS | CORRECT: JMB | SUBMITTED: M. G. Charles E.E.6 | APPROVED 4-26-50 | DATE 4-26-50 | SHEET 1 OF 1 | HC-25592

MICROFILMED

SHEET 8