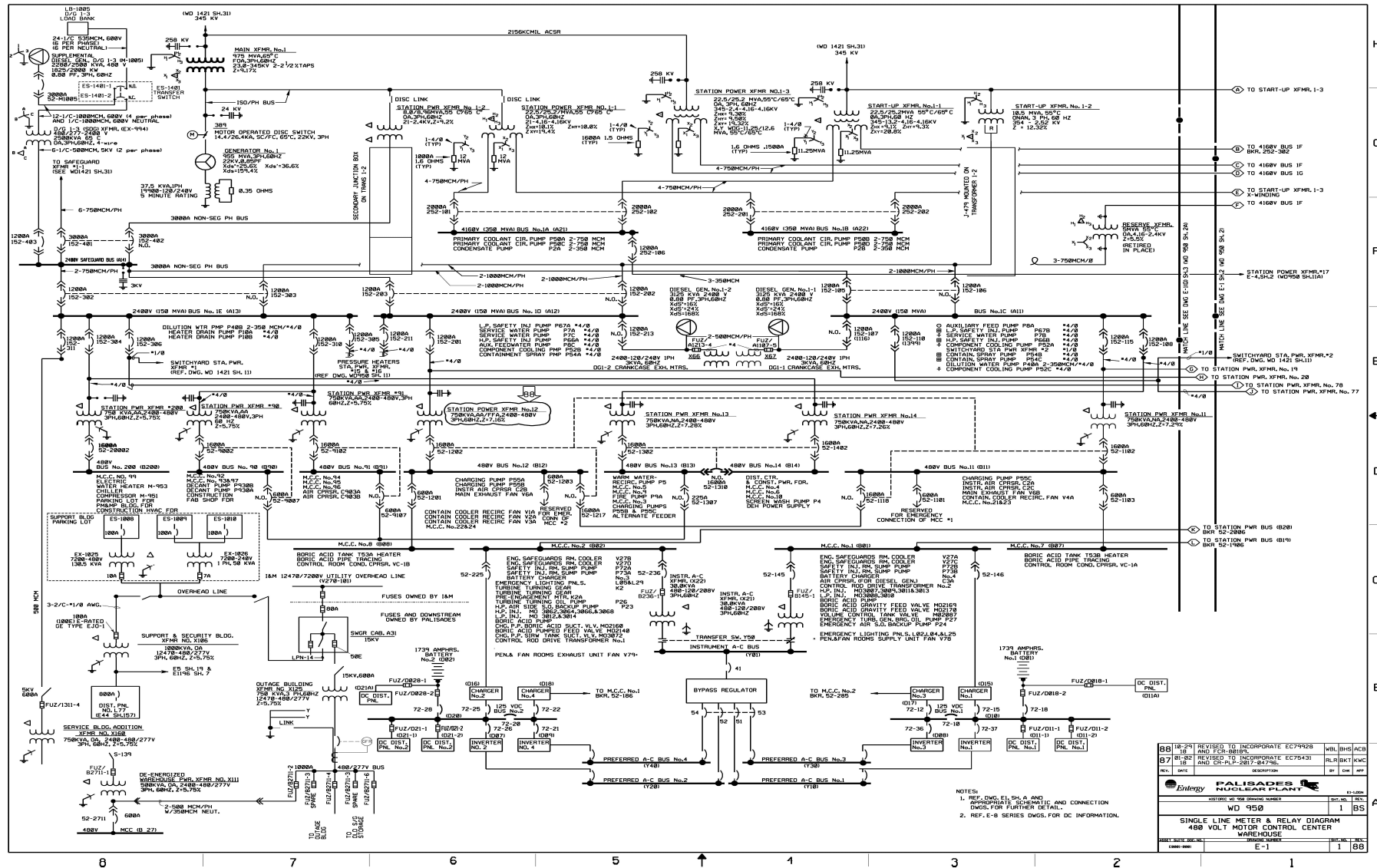
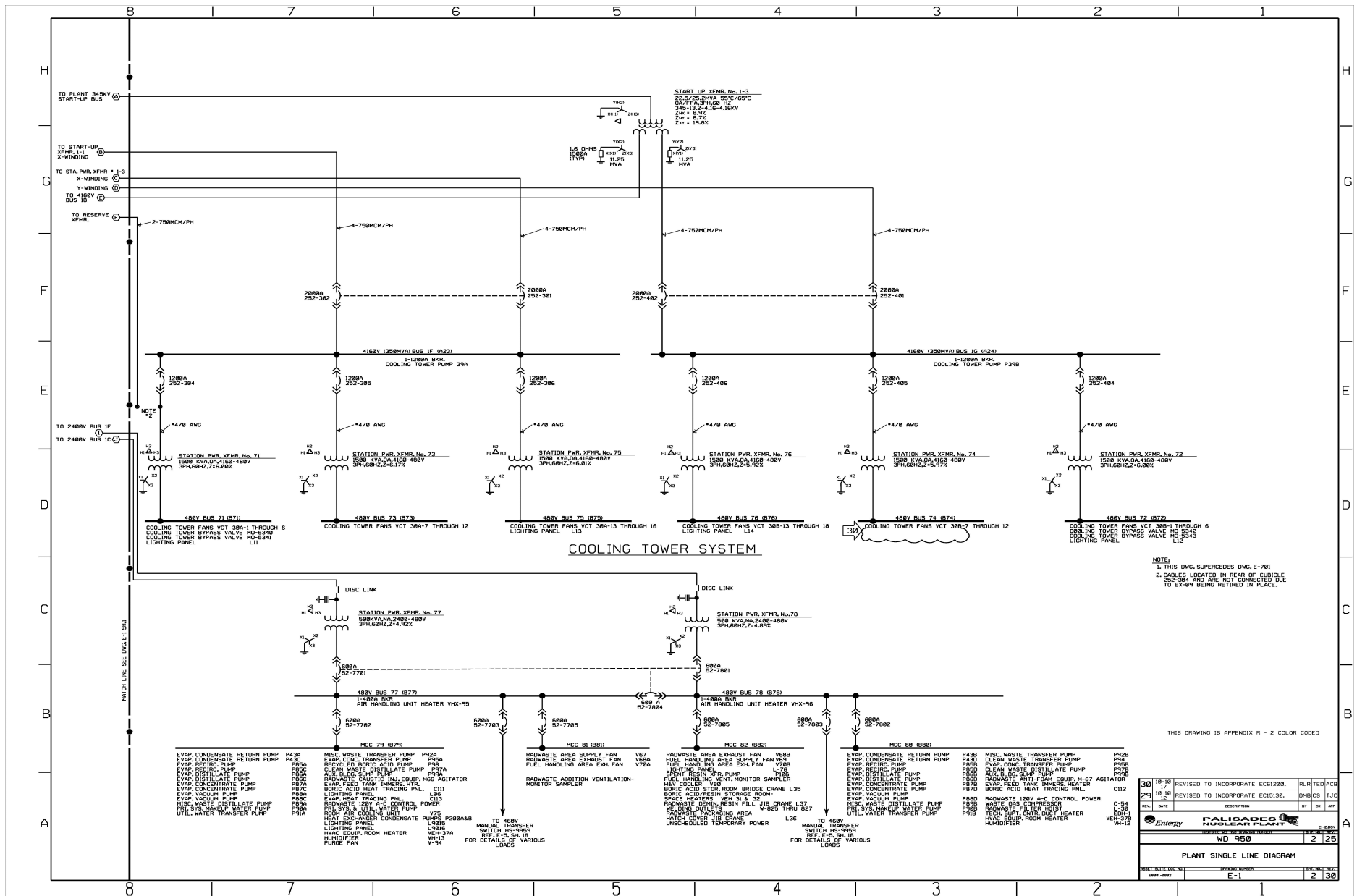


**SINGLE LINE METER & RELAY DIAGRAM**  
**480 VOLT MOTOR CONTROL CENTER - WAREHOUSE**



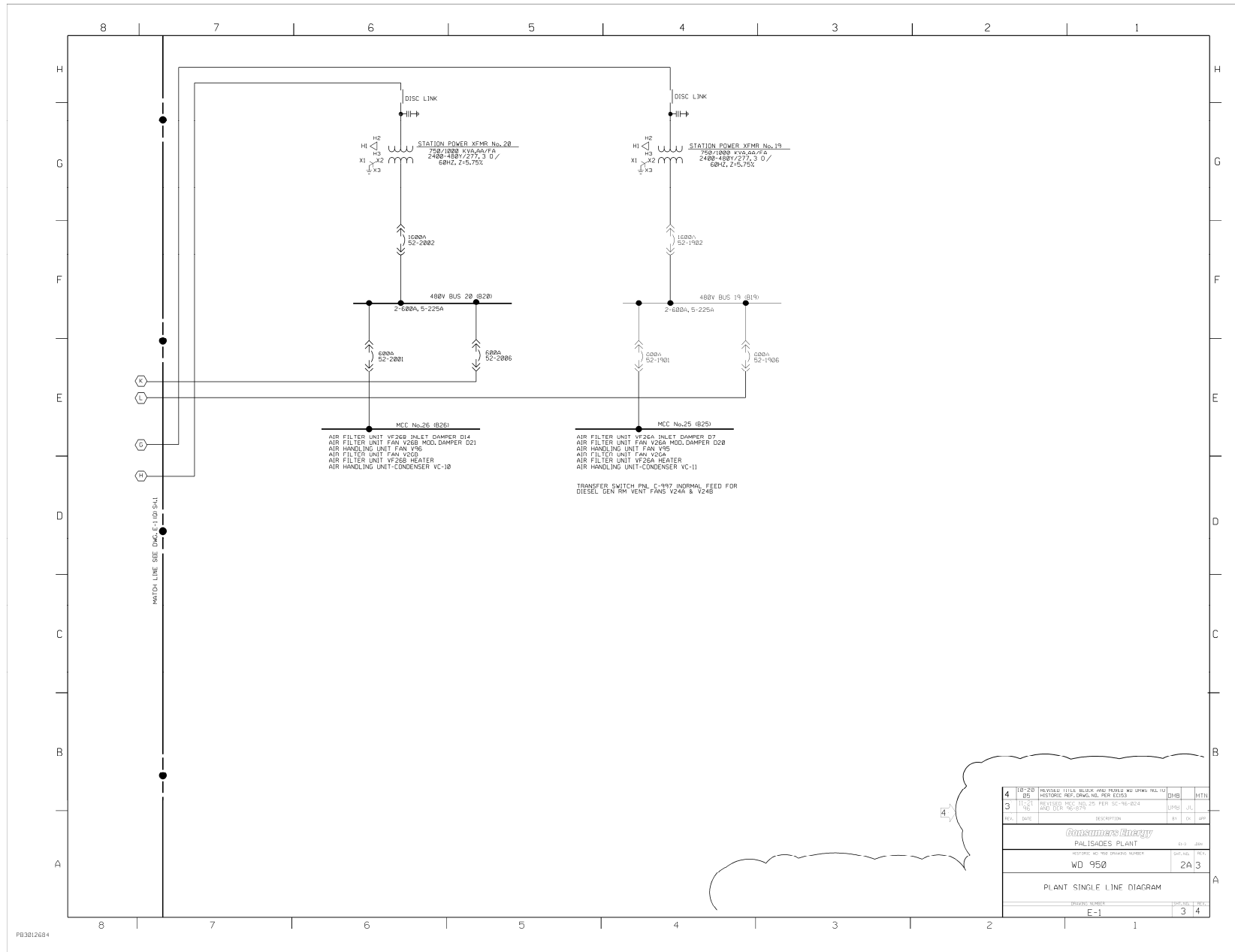
PLANT SINGLE LINE DIAGRAM



NOTE:  
1. THIS DWG. SUPERCEDES DWG. E-781  
2. CABLES LOCATED IN REAR OF CUBICLE 252-384 AND ARE NOT CONNECTED DUE TO EX-84 BEING RETIRED IN PLACE.

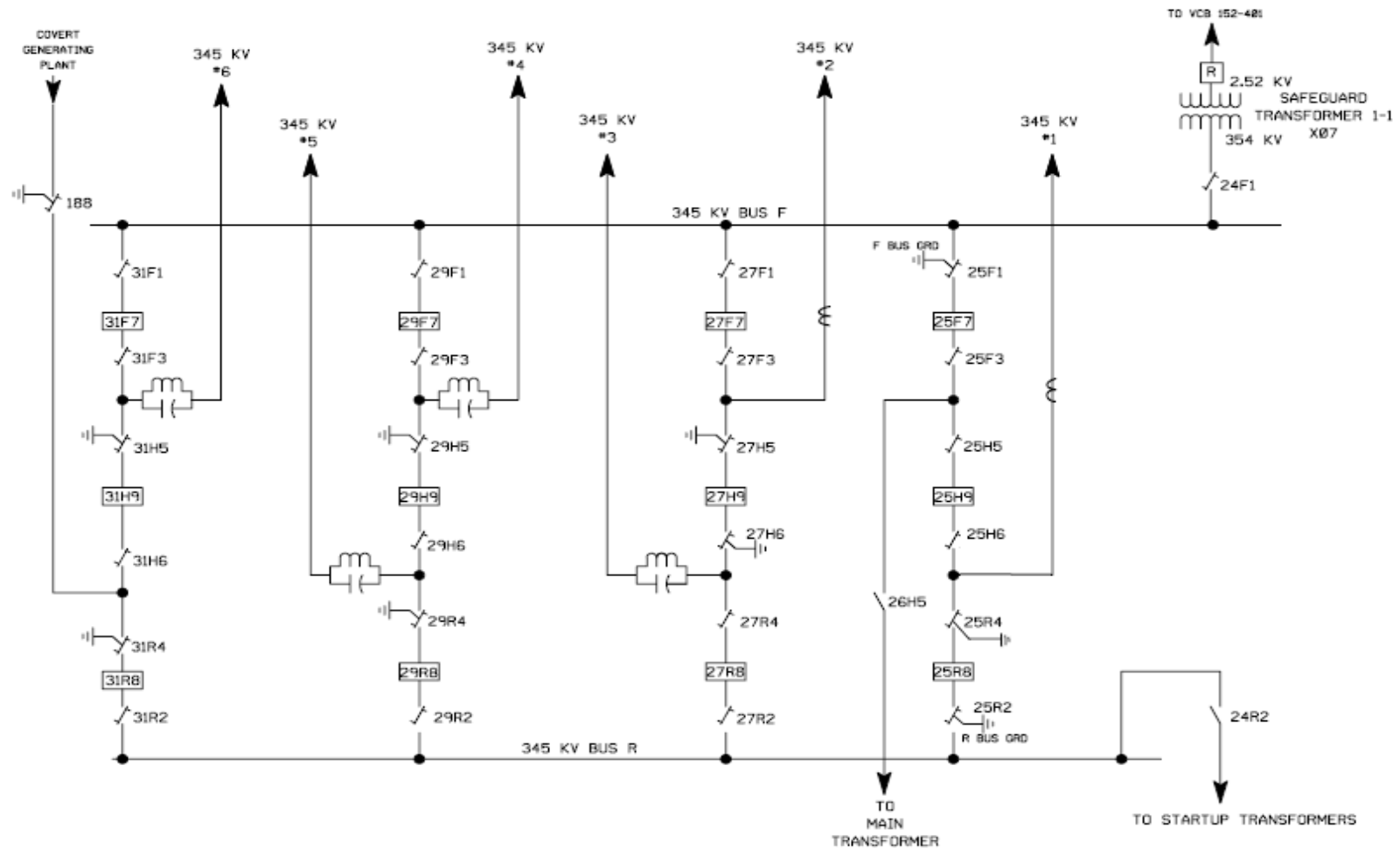
THIS DRAWING IS APPENDIX R - 2 COLOR CODED

PLANT SINGLE LINE DIAGRAM

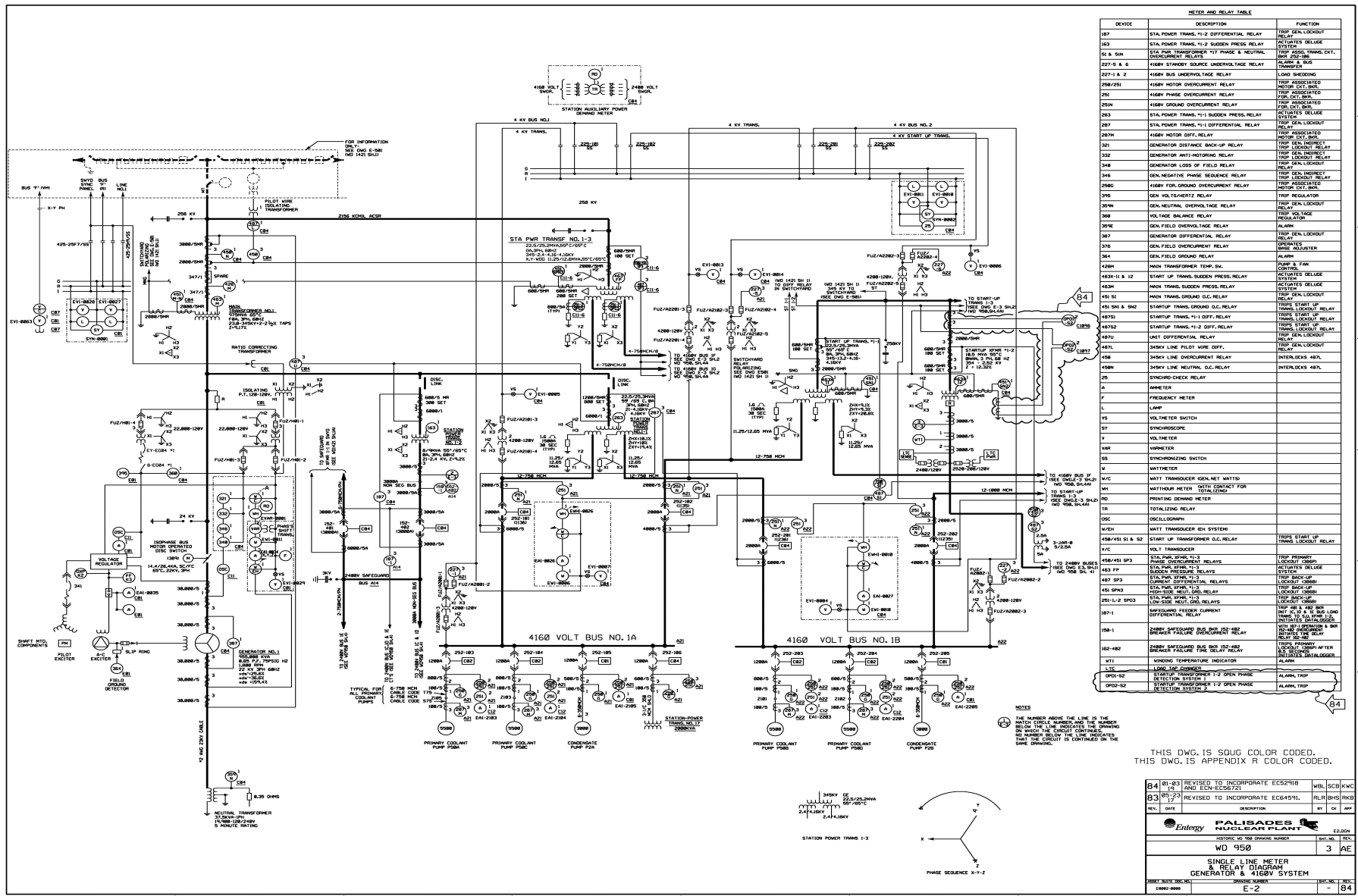


4	10-20	REVISED TITLE BLOCK AND PAGES TO UPD TO ILL-10	DWB	MTN
3	11-21	HISTORIC REF. DWG. NO. PER ECIS		
3	11-21	REVISED TITLE BLOCK AND PAGES TO UPD TO ILL-10	DWB	MTN
3	11-21	AND COR. NO. 875		
REV.	DATE	DESCRIPTION	BY	CHK
<b>Consumers Energy</b> PALISADES PLANT				
HISTORIC NO. AND DRAWING NUMBER			REV.	REV.
WD 950			2A	3
PLANT SINGLE LINE DIAGRAM				
DESIGN NUMBER			REV.	REV.
E-1			3	14

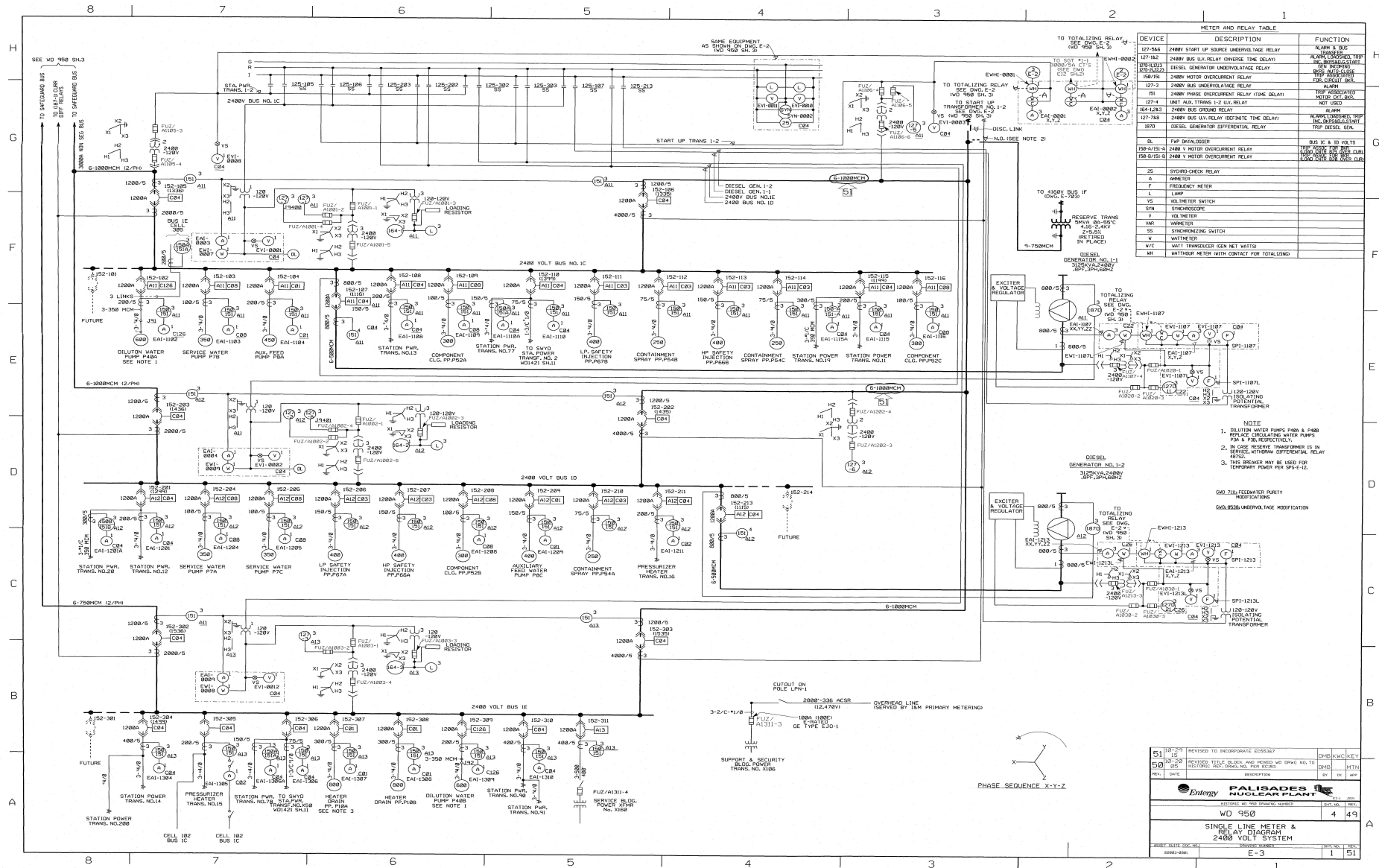
SUBSTATION



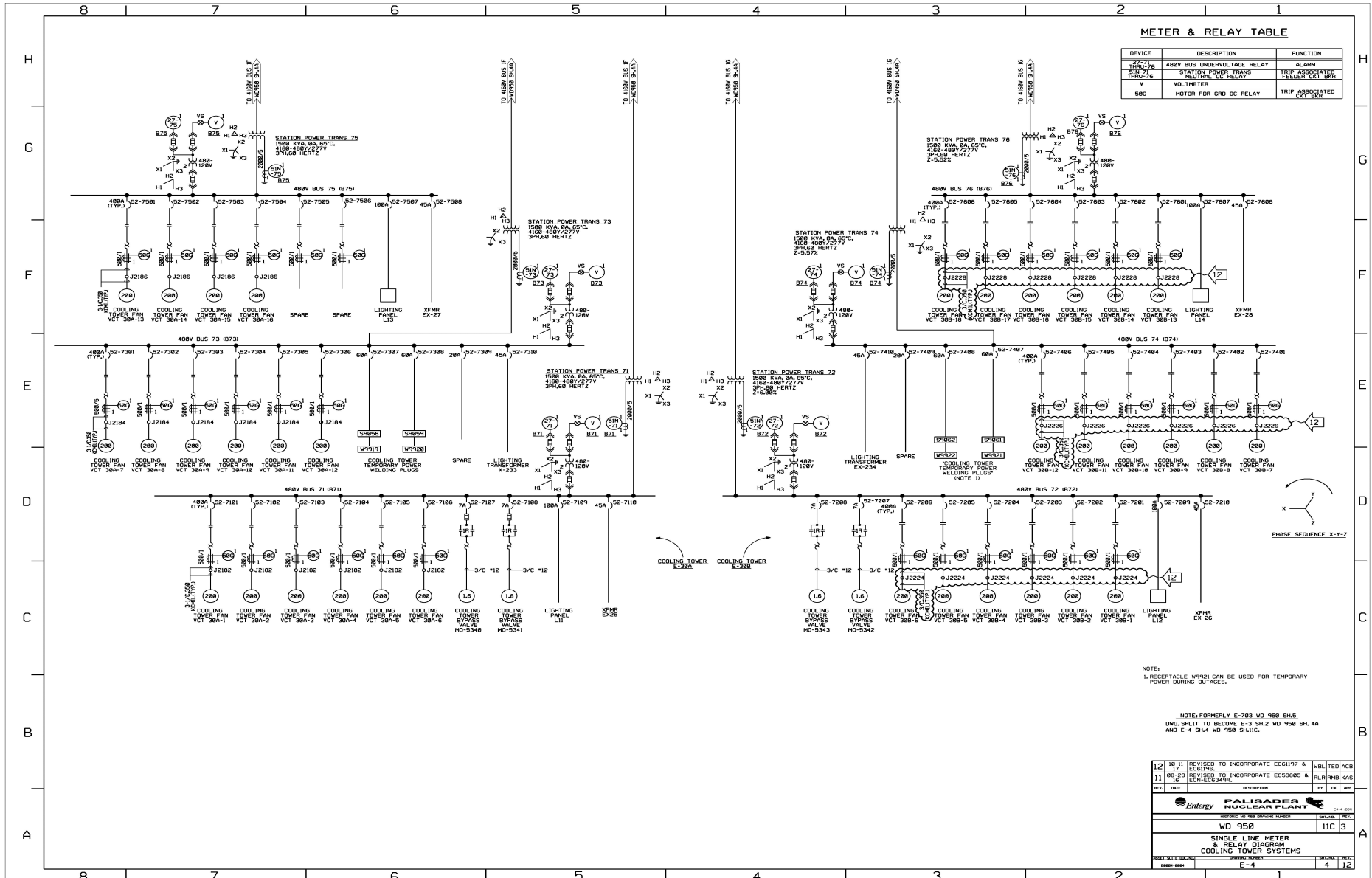
**SINGLE LINE METER & RELAY DIAGRAM  
GENERATOR & 4160V SYSTEM**



## SINGLE LINE METER & RELAY DIAGRAM 2400 VOLT SYSTEM

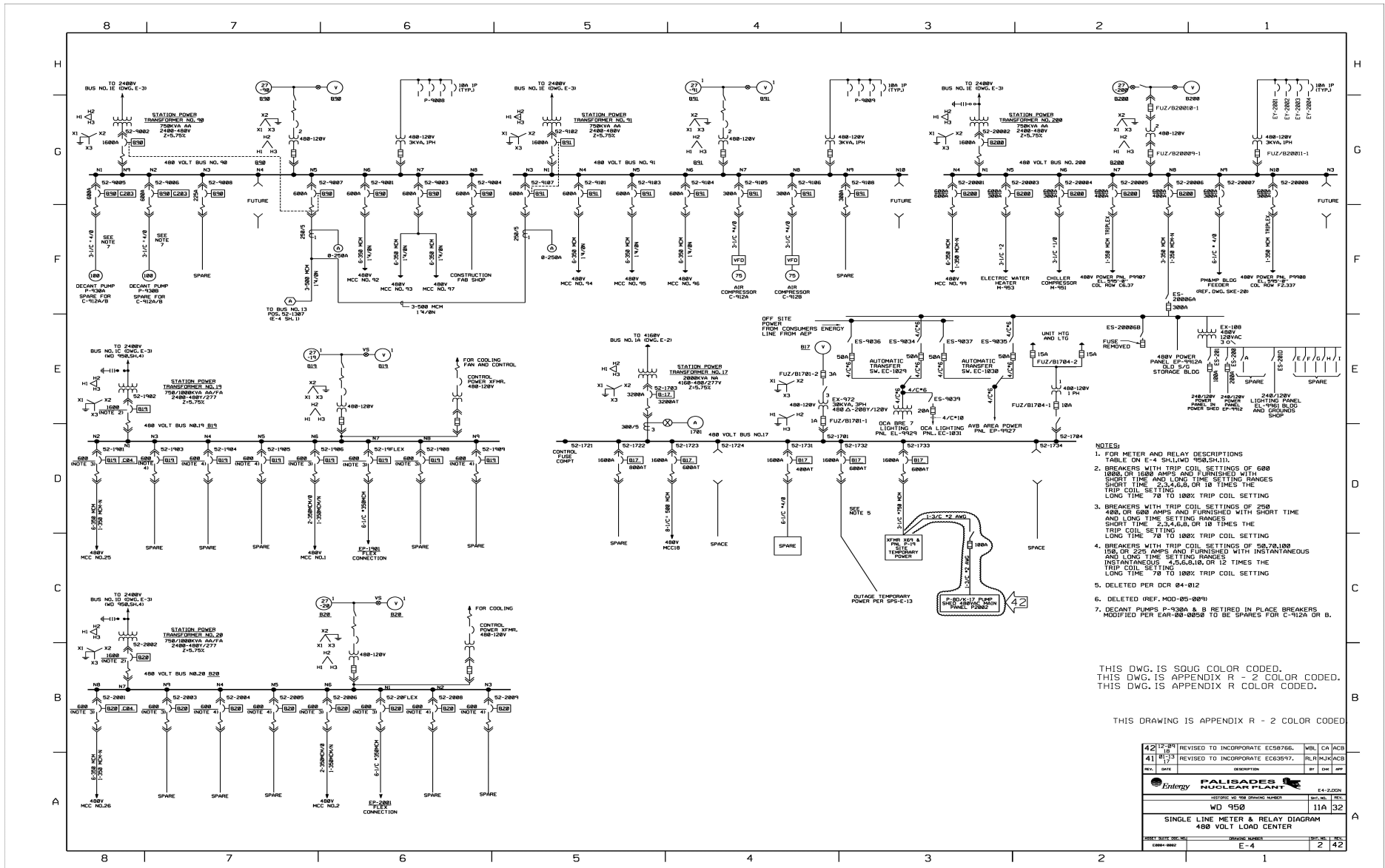


**SINGLE LINE METER & RELAY DIAGRAM  
480 VOLT LOAD CENTERS**



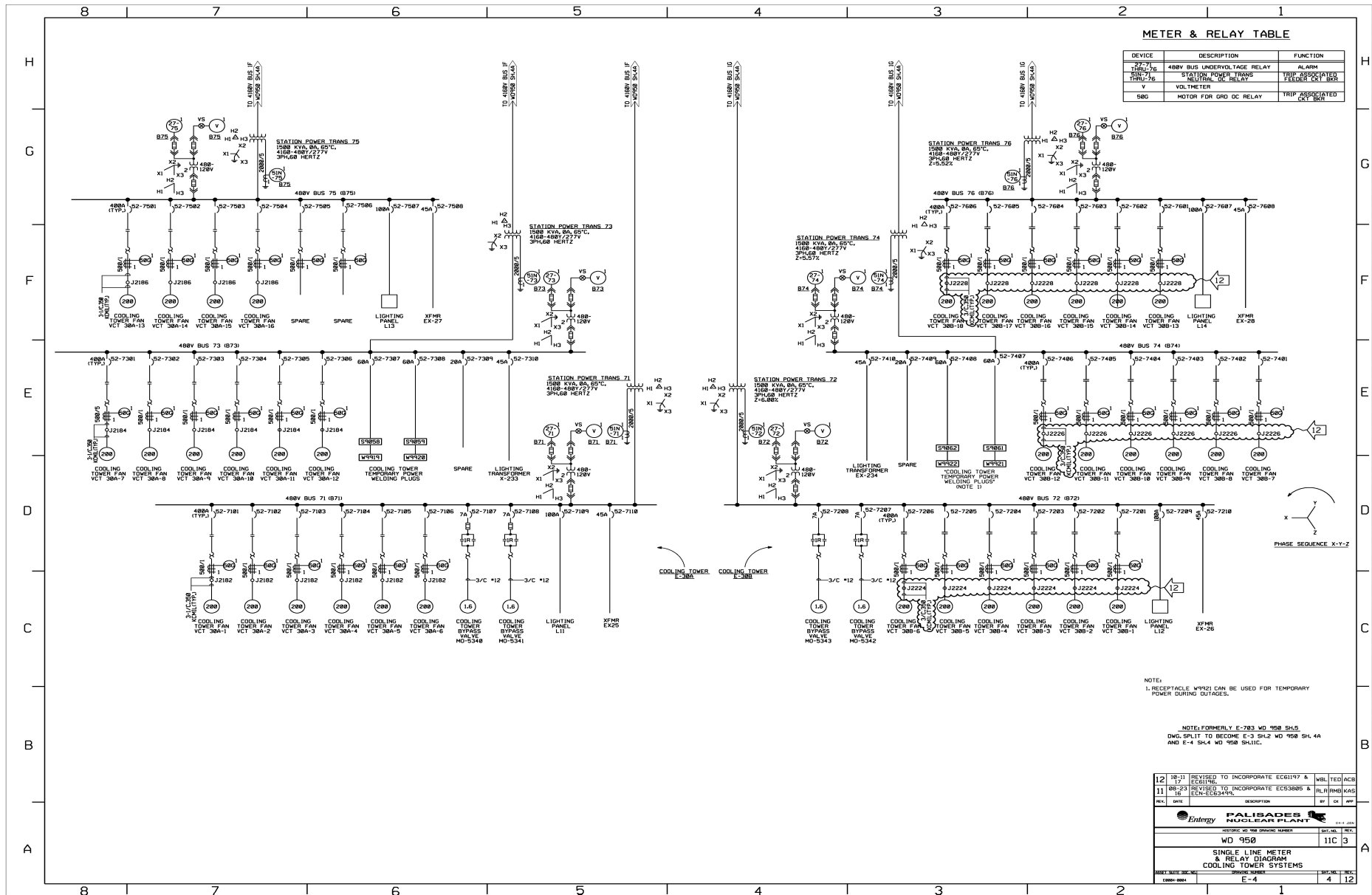
12	18-31	REVISED TO INCORPORATE EC61197 & EC61196	MBL/TED/ACD
11	08-23	REVISED TO INCORPORATE EC53388 & ECN-EC6349H	RLN/RMB/KAD
REV	DATE	DESCRIPTION	BY / CHK / APP
<b>PALISADES NUCLEAR PLANT</b>			
HISTORIC WD 958 DRAWING NUMBER			
WD 950			SHEET NO. 11C 3
SINGLE LINE METER & RELAY DIAGRAM COOLING TOWER SYSTEMS			
0021 DATE 06/06/01 1989-2001	E-4		SHEET NO. 4 12

**SINGLE LINE METER & RELAY DIAGRAM**  
**480 VOLT LOAD CENTERS**



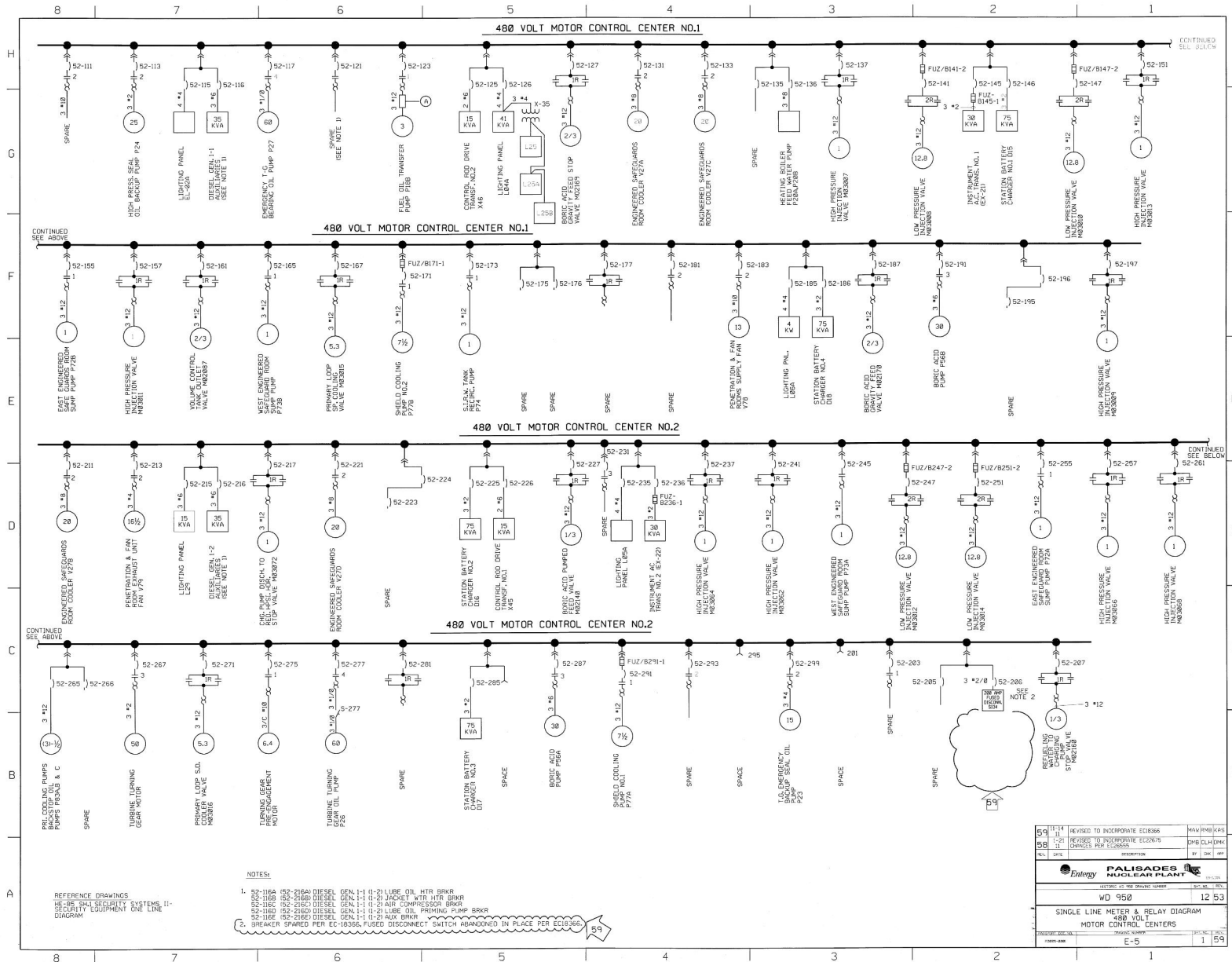


SINGLE LINE METER & RELAY DIAGRAM  
COOLING TOWER SYSTEMS



12	18-31	REVISED TO INCORPORATE EC6197 & EC6196.	WDL	TCB	ACB
11	18-23	REVISED TO INCORPORATE EC53805 & ALN1990 (WAS ECN-EC53474).	ALN	WDL	ACB
10	16		W	TCB	ACB
SINGLE LINE METER & RELAY DIAGRAM COOLING TOWER SYSTEMS					
E-4				4	12

**SINGLE LINE METER & RELAY DIAGRAM  
480 VOLT MOTOR CONTROL CENTERS**



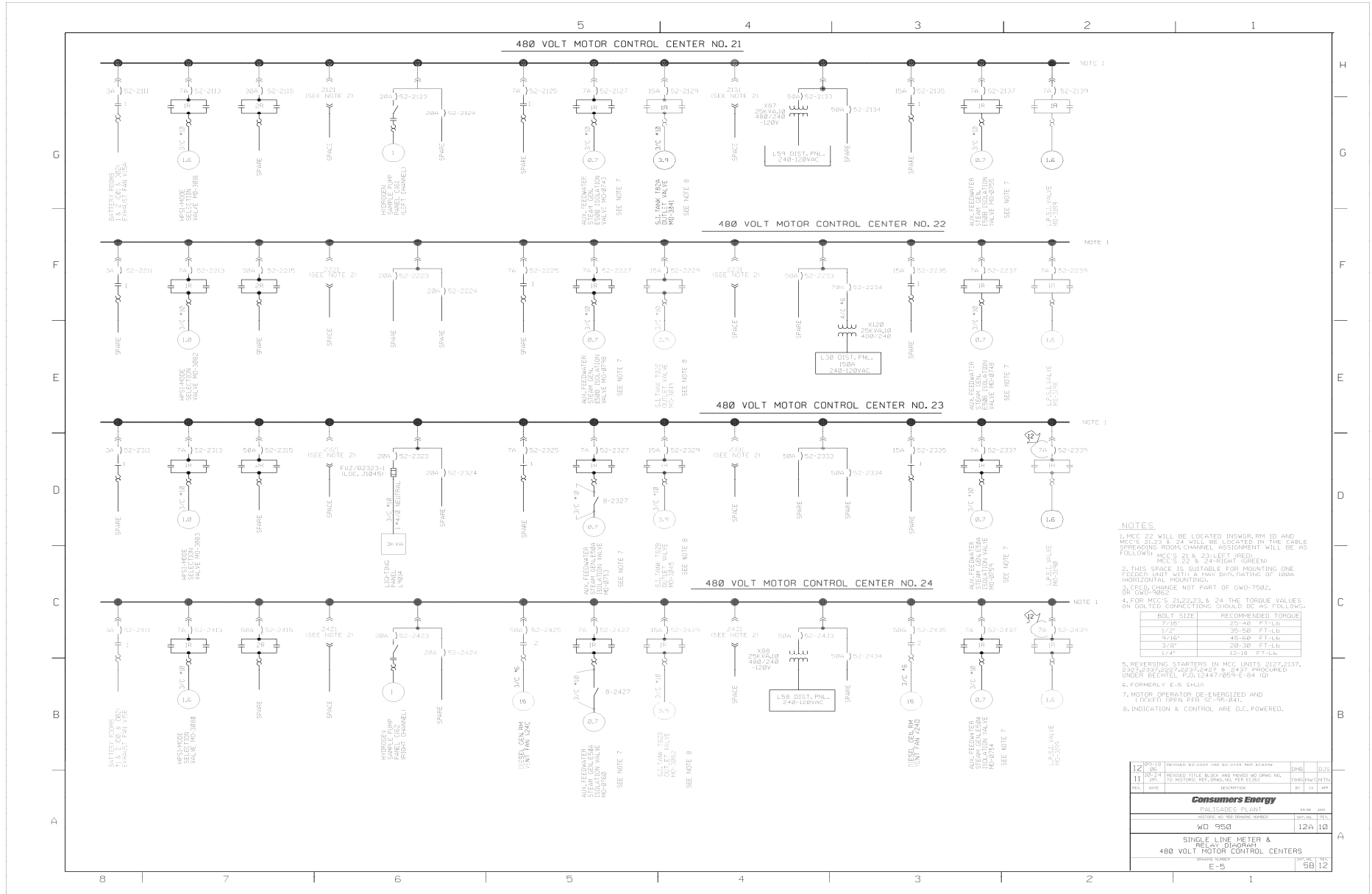
REFERENCE DRAWINGS  
SEE FSAR SECURITY SYSTEMS II-  
SECURITY EQUIPMENT ONE LINE  
DIAGRAM

NOTES:

- 52-115-115 52-216A DIESEL GEN. 1-1 0-2 LUBE OIL WTR BRKR
  - 52-115-115 52-216B DIESEL GEN. 1-1 0-2 JACKET WTR WTR BRKR
  - 52-115-115 52-216C DIESEL GEN. 1-1 0-2 AIR COMPRESSOR BRKR
  - 52-115-115 52-216D DIESEL GEN. 1-1 0-2 LUBE OIL PRIMUM PUMP BRKR
  - 52-115-115 52-216E DIESEL GEN. 1-1 0-2 AIR BRKR
  - 52-115-115 52-216F DIESEL GEN. 1-1 0-2 LUBE OIL WTR BRKR
2. BREAKER SPARED PER EC-18366, FUSED DISCONNECT SWITCH ABANDONED IN PLACE PER EC18366.

59	1/11	REVISED TO INCORPORATE EC18366	MAN/HR/BJP
58	1/1	REVISED TO INCORPORATE EC18366	SH/CL/BJK
58	1/1	CHANGES PER EC18366	BT, J, LW, JRP
NO.	DATE	DESCRIPTION	BY, DATE
<b>Palisades NUCLEAR PLANT</b>			
ENTREPRENEUR ENERGY			
WD 950		12 53	
SINGLE LINE METER & RELAY DIAGRAM 480 VOLT MOTOR CONTROL CENTERS			
E-9		1 59	

**SINGLE LINE METER & RELAY DIAGRAM  
480 VOLT MOTOR CONTROL CENTERS**



**NOTES:**

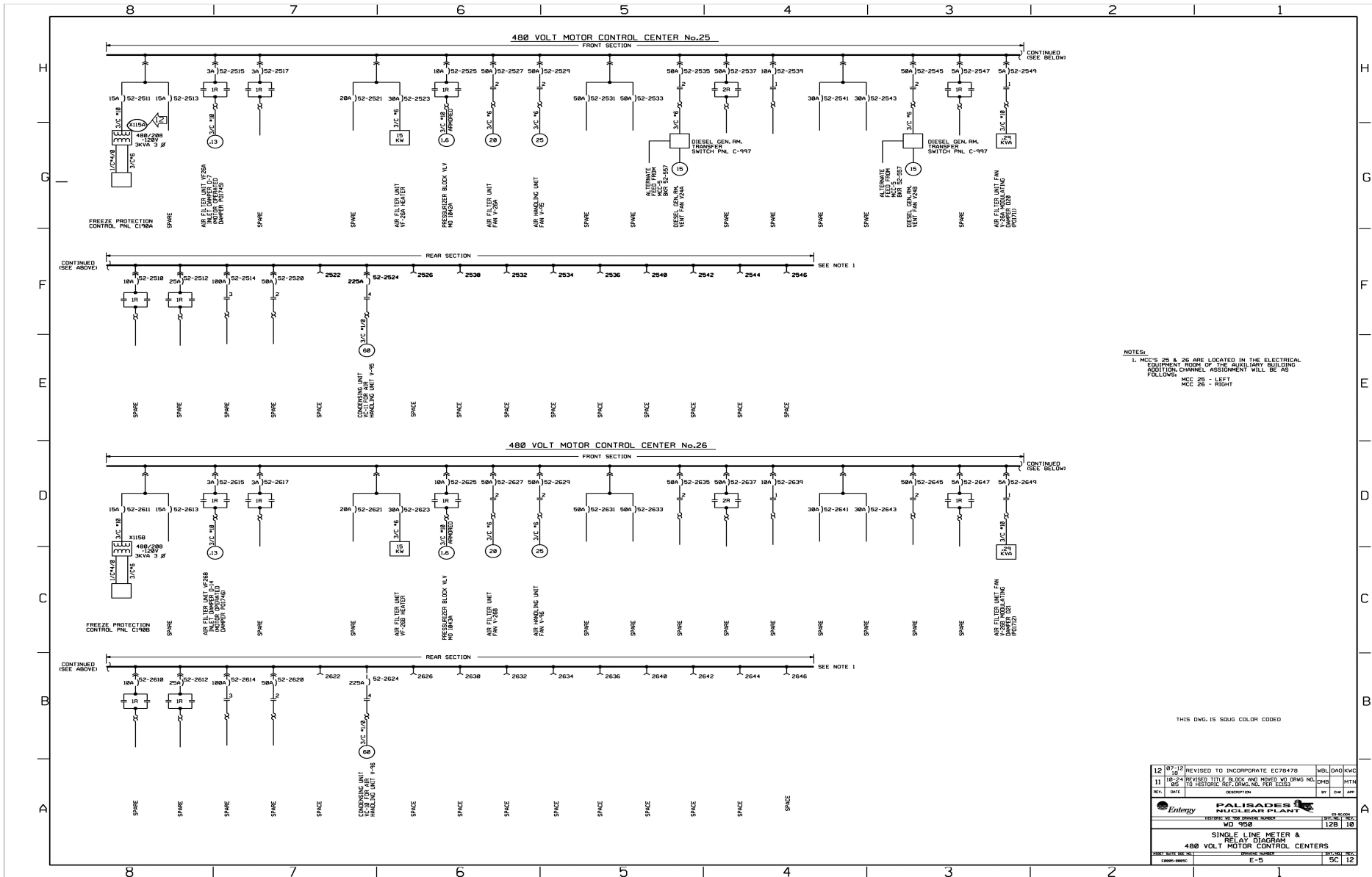
- MCC 22 WILL BE LOCATED INSWR, RM 40 AND MCCS 21, 23 & 24 WILL BE LOCATED IN THE CABLE SPREADING ROOM, CHANNEL ASSIGNMENT WILL BE AS FOLLOWS: MCC 21 & 22 (LEFT RED), MCC 23 & 24 (RIGHT GREEN).
- THIS SPACE IS SUITABLE FOR MOUNTING ONE FEEDER UNIT WITH 24 PAKS, DOWNTIME OF INHA HORIZONTAL MOUNTING.
- TORQUE CHANGE NOT PART OF GWO-7502, OR GWO-7062.
- FOR MCC'S 21, 22, 23, & 24 THE TORQUE VALUES IN DOTTED CONNECTIONS SHOULD BE AS FOLLOWS:

BOLT SIZE	RECOMMENDED TORQUE
7/16"	25-30 FT-LB
1/2"	35-50 FT-LB
3/8"	45-60 FT-LB
1/4"	20-30 FT-LB
1/4"	12-18 FT-LB

- REVERSING STARTERS IN MCC UNITS 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.
- FORMERLY E-5 CHAIN.
- MOTOR OPERATOR DE-ENERGIZED AND LOCKOUT OPEN PER AC-95-041.
- INDICATION & CONTROL ARE D.C. POWERED.

12	REVISED 02-2020 AND 02-2021 PER SCRAM	DRN	DJS
11	REVISED TITLE BLOCK AND PENDING WORK TO HISTORIC REF, DRN, NO. PER ECRS	DRN	DRN
10	REVISED	DRN	DRN
<b>Consumers Energy</b>			
PALISADES PLANT			
HISTORIC NO.	50	ISSUANCE NUMBER	58
WD	950	REV. NO.	10
SINGLE LINE METER & RELAY DIAGRAM 480 VOLT MOTOR CONTROL CENTERS			
ISSUANCE NUMBER	E-5	DATE	58.12

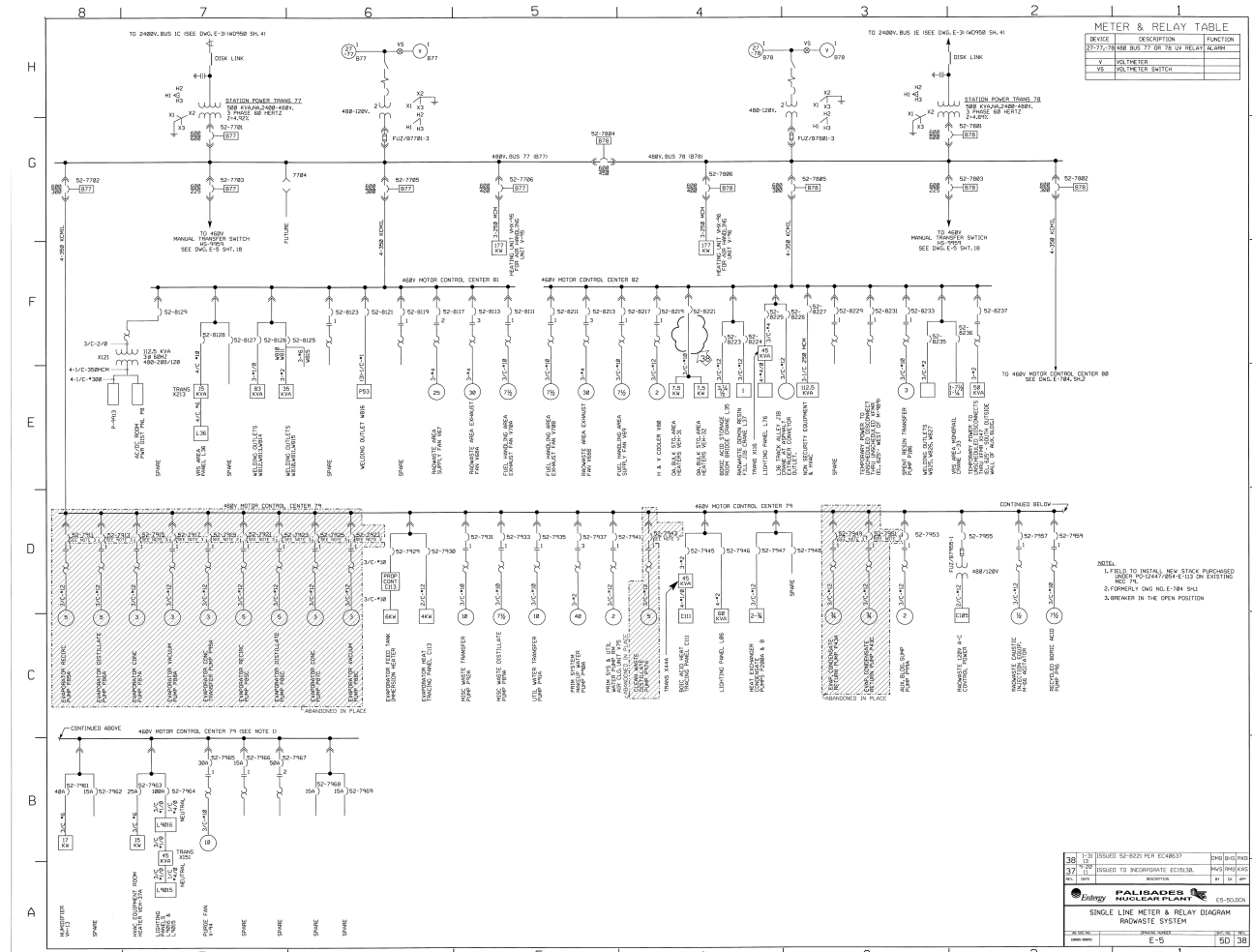
**SINGLE LINE METER & RELAY DIAGRAM  
480 VOLT MOTOR CONTROL CENTERS**



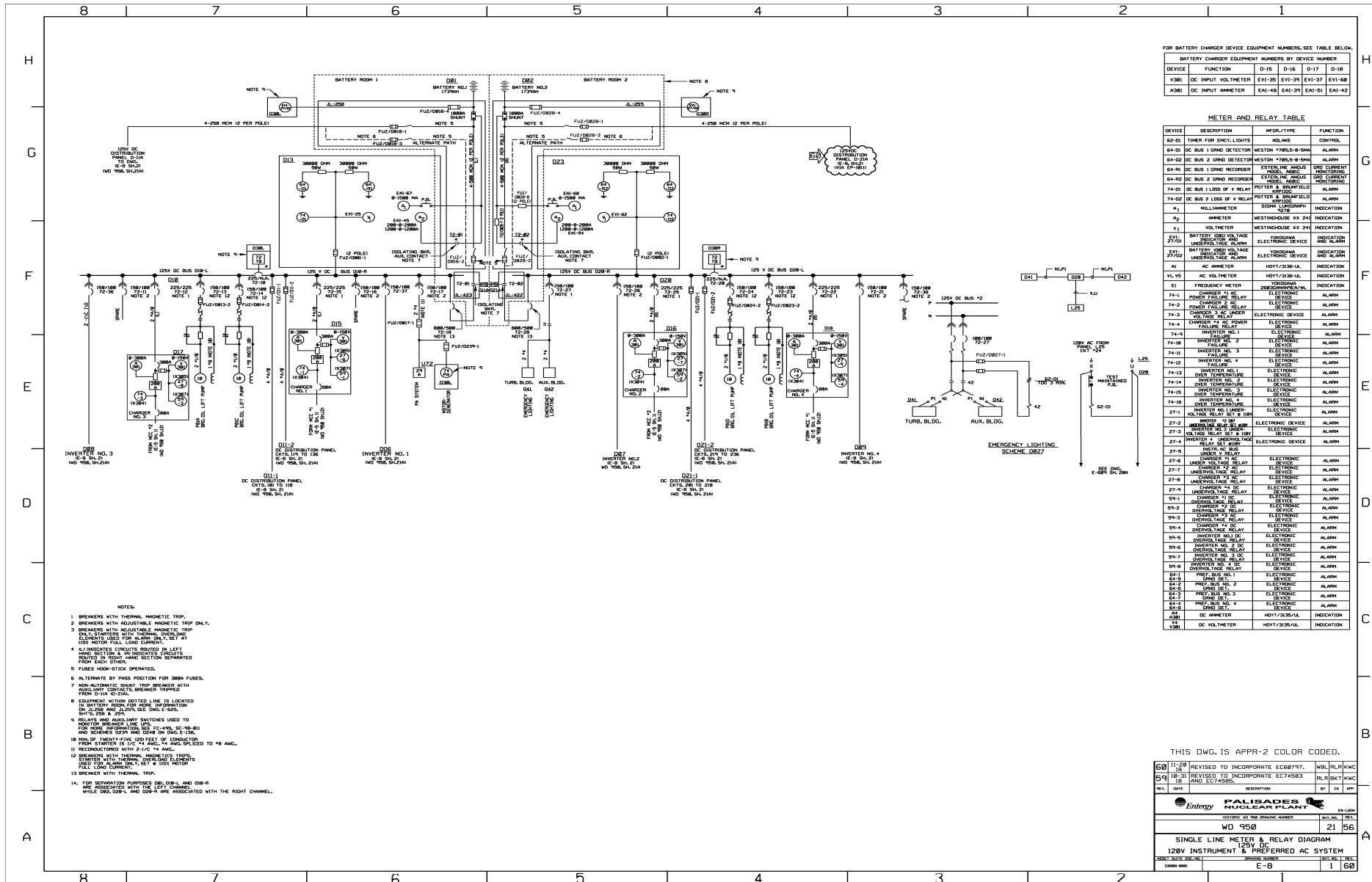
NOTES:  
1. MCC'S 25 & 26 ARE LOCATED IN THE ELECTRICAL EQUIPMENT ROOM OF THE AUXILIARY BUILDING. ADDITIONAL CHANNEL ASSIGNMENT WILL BE AS FOLLOWS:  
MCC 25 - LEFT  
MCC 26 - RIGHT

THIS DWG. IS SOG. COLOR CODED

SINGLE LINE METER & RELAY DIAGRAM  
RADWASTE SYSTEM



SINGLE LINE METER & RELAY DIAGRAM  
125V DC, 120V INSTRUMENT & PREFERRED AC SYSTEM



FOR BATTERY CHARGER DEVICE EQUIPMENT NUMBERS, SEE TABLE BELOW.

DEVICE	FUNCTION	D-15	D-16	D-17	D-18
V81	DC INPUT VOLTMETER	EV1-35	EV1-34	EV1-37	EV1-68
A381	DC INPUT AMPMETER	EAI-48	EAI-34	EAI-51	EAI-42

METER AND RELAY TABLE

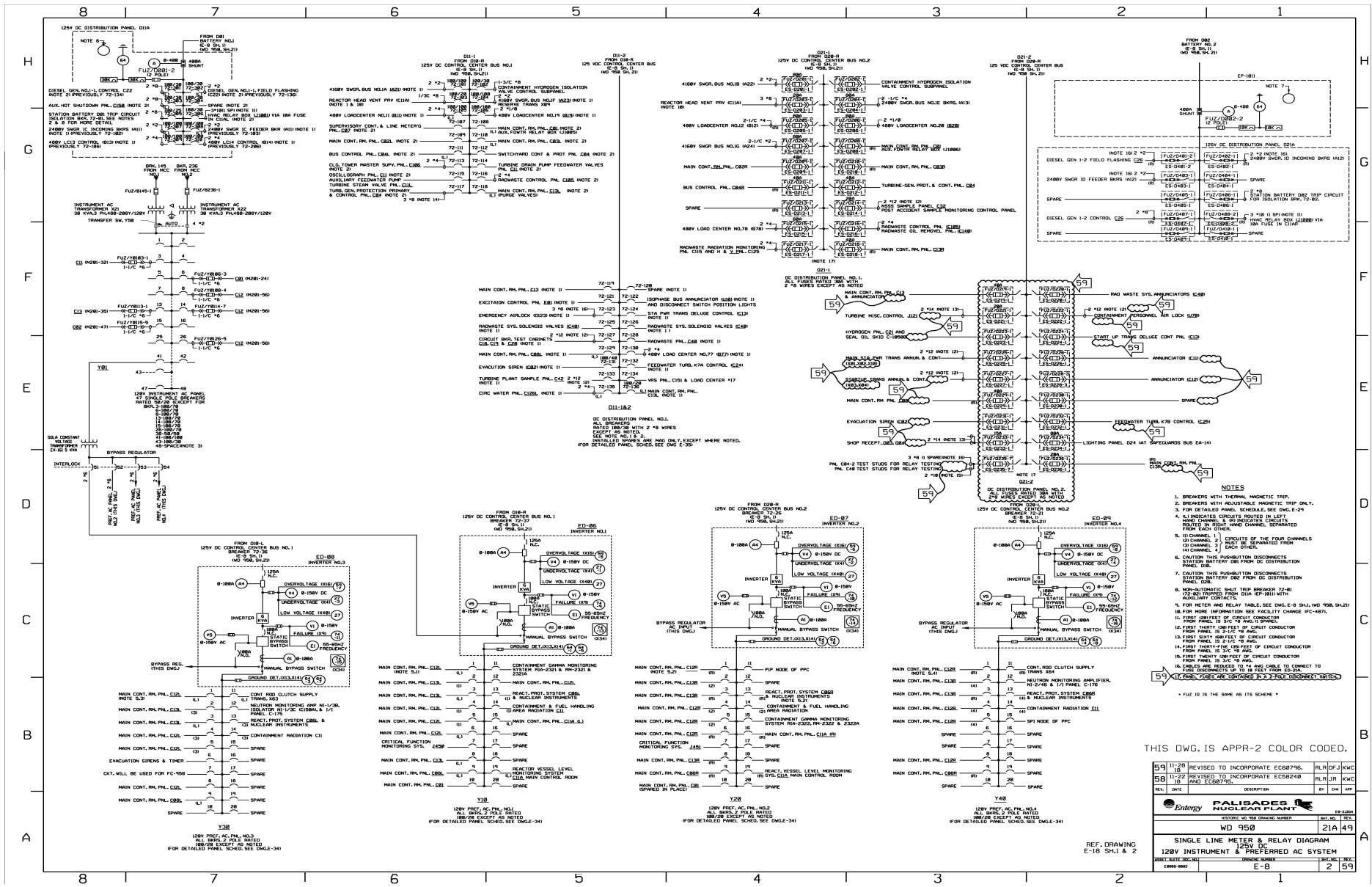
DEVICE	DESCRIPTION	MFG./TYPE	FUNCTION
62-01	TIMER FOR EMERGENCY LIGHTS	ADLAGE	CONTROL
64-01	DC BUS 2 GND DETECTOR	WESTON *79S-9-5AH	ALARM
64-02	DC BUS 1 GND DETECTOR	WESTON *79S-9-5AH	ALARM
64-03	DC BUS 2 GND RECORDER	WESTON *79S-9-5AH	MONITORING
64-04	DC BUS 1 GND RECORDER	WESTON *79S-9-5AH	MONITORING
74-01	DC BUS LOSS OF V RELAY	POTTER & BRIDGMAN	ALARM
74-02	DC BUS 2 LOSS OF V RELAY	POTTER & BRIDGMAN	ALARM
A <sub>1</sub>	MILLIAMMETER	SIGMA LABORATORY	INDICATION
A <sub>2</sub>	AMMETER	WESTINGHOUSE KX 24	INDICATION
V <sub>1</sub>	VOLTMETER	WESTINGHOUSE KX 24	INDICATION
27-01	BATTERY CHARGER NO. 1 UNDERVOLTAGE ALARM	ELECTRONIC DEVICE	ALARM
27-02	BATTERY CHARGER NO. 2 UNDERVOLTAGE ALARM	ELECTRONIC DEVICE	ALARM
A1	AC AMPMETER	HOFF/336-5A	INDICATION
V1, V5	AC VOLTMETER	HOFF/336-5A	INDICATION
E1	FREQUENCY METER	288000000/AVL	INDICATION
74-1	CHARGER #1 AC FAILURE RELAY	ELECTRONIC DEVICE	ALARM
74-2	CHARGER #2 AC FAILURE RELAY	ELECTRONIC DEVICE	ALARM
74-3	CHARGER #3 AC FAILURE RELAY	ELECTRONIC DEVICE	ALARM
74-4	CHARGER #4 AC FAILURE RELAY	ELECTRONIC DEVICE	ALARM
74-5	INVERTER NO. 1 FAILURE RELAY	ELECTRONIC DEVICE	ALARM
74-6	INVERTER NO. 2 FAILURE RELAY	ELECTRONIC DEVICE	ALARM
74-7	INVERTER NO. 3 FAILURE RELAY	ELECTRONIC DEVICE	ALARM
74-8	INVERTER NO. 4 FAILURE RELAY	ELECTRONIC DEVICE	ALARM
74-9	INVERTER NO. 1 OVERTEMPERATURE RELAY	ELECTRONIC DEVICE	ALARM
74-10	INVERTER NO. 2 OVERTEMPERATURE RELAY	ELECTRONIC DEVICE	ALARM
74-11	INVERTER NO. 3 OVERTEMPERATURE RELAY	ELECTRONIC DEVICE	ALARM
74-12	INVERTER NO. 4 OVERTEMPERATURE RELAY	ELECTRONIC DEVICE	ALARM
27-1	INVERTER NO. 1 UNDERVOLTAGE ALARM	ELECTRONIC DEVICE	ALARM
27-2	INVERTER NO. 2 UNDERVOLTAGE ALARM	ELECTRONIC DEVICE	ALARM
27-3	INVERTER NO. 3 UNDERVOLTAGE ALARM	ELECTRONIC DEVICE	ALARM
27-4	INVERTER NO. 4 UNDERVOLTAGE ALARM	ELECTRONIC DEVICE	ALARM
27-5	INVERTER NO. 1 OVERTEMPERATURE RELAY	ELECTRONIC DEVICE	ALARM
27-6	INVERTER NO. 2 OVERTEMPERATURE RELAY	ELECTRONIC DEVICE	ALARM
27-7	INVERTER NO. 3 OVERTEMPERATURE RELAY	ELECTRONIC DEVICE	ALARM
27-8	INVERTER NO. 4 OVERTEMPERATURE RELAY	ELECTRONIC DEVICE	ALARM
59-1	CHARGER #1 DC UNDERVOLTAGE RELAY	ELECTRONIC DEVICE	ALARM
59-2	CHARGER #2 DC UNDERVOLTAGE RELAY	ELECTRONIC DEVICE	ALARM
59-3	CHARGER #3 DC UNDERVOLTAGE RELAY	ELECTRONIC DEVICE	ALARM
59-4	CHARGER #4 DC UNDERVOLTAGE RELAY	ELECTRONIC DEVICE	ALARM
59-5	INVERTER NO. 1 DC UNDERVOLTAGE RELAY	ELECTRONIC DEVICE	ALARM
59-6	INVERTER NO. 2 DC UNDERVOLTAGE RELAY	ELECTRONIC DEVICE	ALARM
59-7	INVERTER NO. 3 DC UNDERVOLTAGE RELAY	ELECTRONIC DEVICE	ALARM
59-8	INVERTER NO. 4 DC UNDERVOLTAGE RELAY	ELECTRONIC DEVICE	ALARM
64-1	PREL. BUS NO. 1	ELECTRONIC DEVICE	ALARM
64-2	PREL. BUS NO. 2	ELECTRONIC DEVICE	ALARM
64-3	PREL. BUS NO. 3	ELECTRONIC DEVICE	ALARM
64-4	PREL. BUS NO. 4	ELECTRONIC DEVICE	ALARM
A1	DC AMPMETER	HOFF/336-5A	INDICATION
V81	DC VOLTMETER	HOFF/336-5A	INDICATION

THIS DWG. IS APPR-2 COLOR CODED.

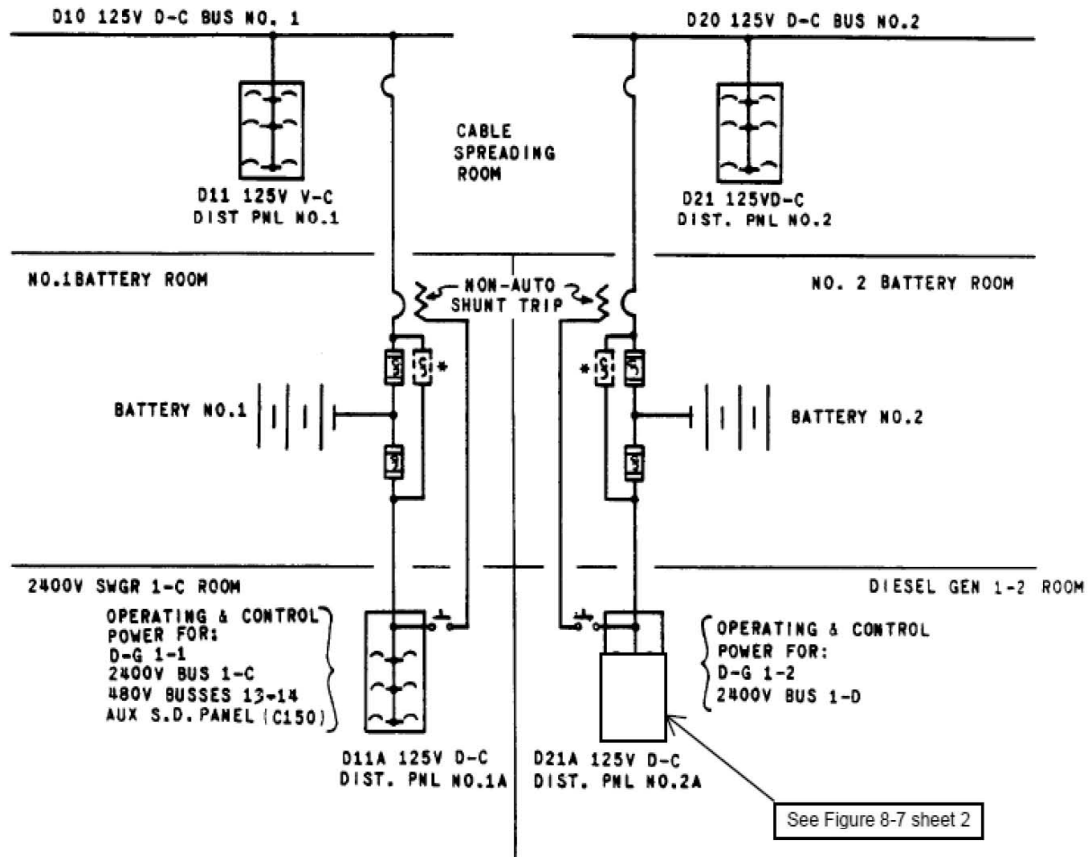
59	11-79	REVISED TO INCORPORATE EC74577.	WD/RLH/INC
15	18	REVISED TO INCORPORATE EC74583 AND EC74585.	AL/BJK/INC
15	18		WT/CL/IMP
NO.	DATE	DESCRIPTION	DESIGNER/CHK
<b>FALSADES NUCLEAR PLANT</b>			
HISTORIC OR NON-DRAWING NUMBER: <b>WD 950</b>			
SHEET NO.: <b>21</b>			REV.: <b>36</b>
SINGLE LINE METER & RELAY DIAGRAM 120V DC 120V INSTRUMENT & PREFERRED AC SYSTEM			
SHEET NO.: <b>E-8</b>			
TOTAL SHEETS: <b>1</b>			

- NOTES:
- BREAKERS WITH THERMAL MAGNETIC TRIP.
  - BREAKERS WITH ADJUSTABLE MAGNETIC TRIP ONLY.
  - BREAKERS WITH ADJUSTABLE MAGNETIC TRIP ON STARTERS WITH THERMAL OVERLOAD ELEMENTS USED FOR ALARMS ONLY AT 15% MOTOR FULL LOAD CURRENT. SET AT 15% MOTOR FULL LOAD CURRENT.
  - ALL INVERTERS EXCEPT NOTED IN LEFT HAND SECTION & 30 INDICATES CIRCUITS BOUNDED IN RIGHT HAND SECTION SEPARATED FROM EACH OTHER.
  - FUSES HOOR-STON OPERATED.
  - ALTERNATE BY PASS POSITION FOR 388A FUSES.
  - NON-MAGNETIC TRIP BREAKERS WITH ADJUSTABLE CONTACT BREAKER TRIPPED FROM D11A CONTROL.
  - EQUIPMENT WITH DOTTED LINE IS LOCATED IN BATTERY ROOM FOR MORE INFORMATION ON 388A AND 30% SEC DWG. E-628.
  - RELAYS AND AUXILIARY SWITCHES USED TO MONITOR BREAKER LINE UP. FC-440, SC-40-011 AND SCHEMATIC 0299 AND 0210 IN DWG. E-130.
  - MIN. W. ELEMENTS OF THE EQUIPMENT OF CONNECTION FROM STARTER IS 1/4" 4 ANG. MIN. IS APPLIED TO 1/8 ANG.
  - RECONDUCTED WITH 2-1/2" 4 ANG.
  - STARTER WITH THERMAL OVERLOAD ELEMENTS USED FOR FULL LOAD CURRENT.
  - BREAKER WITH THERMAL TRIP.
  - FOR SEPARATION PURPOSES DB1, D11-L AND D18-R ARE ASSOCIATED WITH THE LEFT CHANNEL. WHILE D20, D20-L AND D28-R ARE ASSOCIATED WITH THE RIGHT CHANNEL.

**SINGLE LINE METER & RELAY DIAGRAM**  
**125V DC, 120V INSTRUMENT & PREFERRED AC SYSTEM**



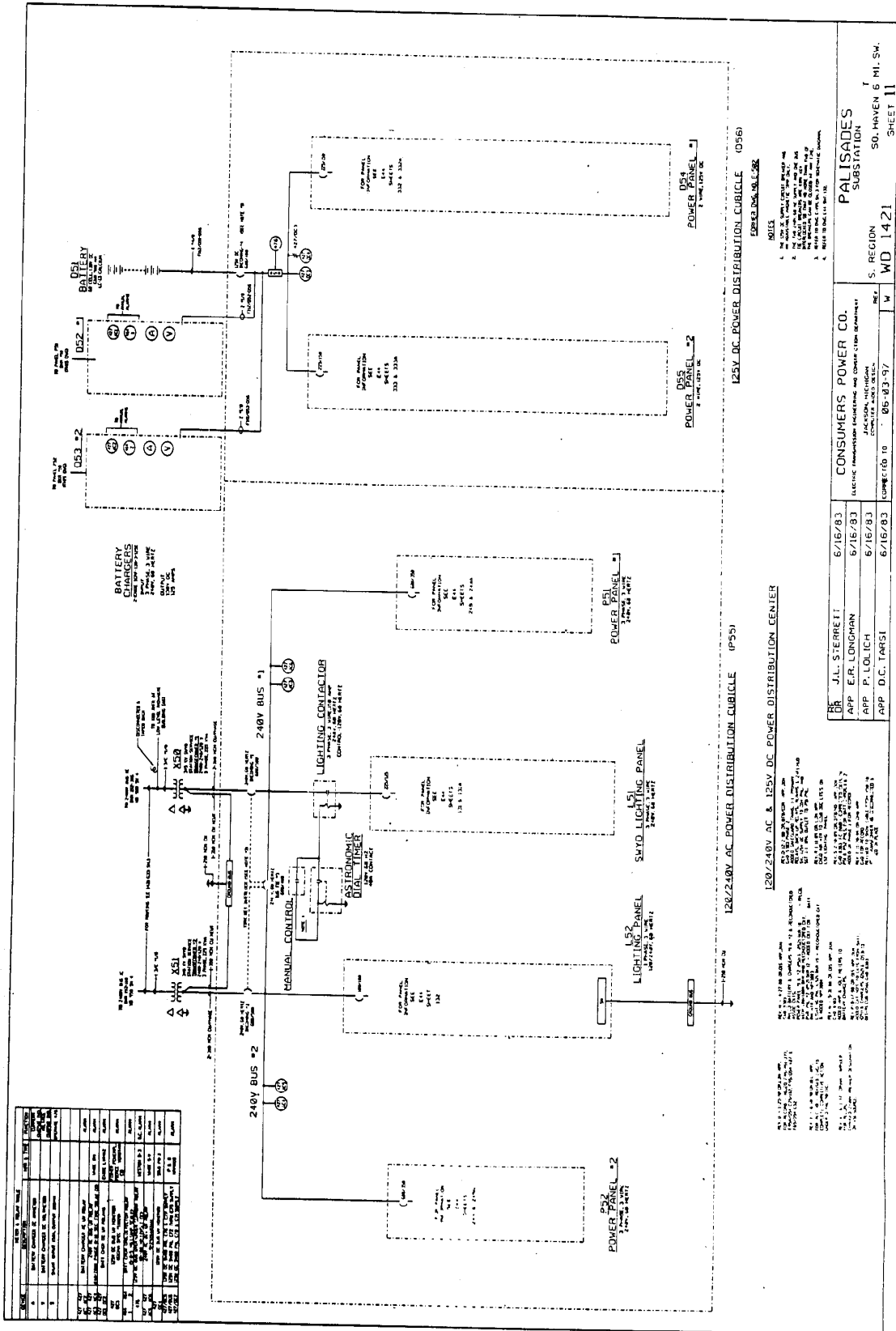
125 V DC SYSTEM  
AUXILIARY SHUTDOWN LAYOUT



\* THESE FUSES INSTALLED ONLY DURING PERIODS OF MAINTENANCE WHEN BATTERY OPEN-CIRCUITED



**SUBSTATION**  
**120/240V AC & 125V DC POWER DISTRIBUTION CENTER**



NO.	DESCRIPTION	DATE	BY	CHKD.
1	ISSUED FOR PERMIT	6/16/83	JLS	JLS
2	REVISION 1	6/16/83	JLS	JLS
3	REVISION 2	6/16/83	JLS	JLS
4	REVISION 3	6/16/83	JLS	JLS
5	REVISION 4	6/16/83	JLS	JLS
6	REVISION 5	6/16/83	JLS	JLS
7	REVISION 6	6/16/83	JLS	JLS
8	REVISION 7	6/16/83	JLS	JLS
9	REVISION 8	6/16/83	JLS	JLS
10	REVISION 9	6/16/83	JLS	JLS
11	REVISION 10	6/16/83	JLS	JLS
12	REVISION 11	6/16/83	JLS	JLS
13	REVISION 12	6/16/83	JLS	JLS
14	REVISION 13	6/16/83	JLS	JLS
15	REVISION 14	6/16/83	JLS	JLS
16	REVISION 15	6/16/83	JLS	JLS
17	REVISION 16	6/16/83	JLS	JLS
18	REVISION 17	6/16/83	JLS	JLS
19	REVISION 18	6/16/83	JLS	JLS
20	REVISION 19	6/16/83	JLS	JLS
21	REVISION 20	6/16/83	JLS	JLS
22	REVISION 21	6/16/83	JLS	JLS
23	REVISION 22	6/16/83	JLS	JLS
24	REVISION 23	6/16/83	JLS	JLS
25	REVISION 24	6/16/83	JLS	JLS
26	REVISION 25	6/16/83	JLS	JLS
27	REVISION 26	6/16/83	JLS	JLS
28	REVISION 27	6/16/83	JLS	JLS
29	REVISION 28	6/16/83	JLS	JLS
30	REVISION 29	6/16/83	JLS	JLS
31	REVISION 30	6/16/83	JLS	JLS
32	REVISION 31	6/16/83	JLS	JLS
33	REVISION 32	6/16/83	JLS	JLS
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96	REVISION 95	6/16/83	JLS	JLS
97	REVISION 96	6/16/83	JLS	JLS
98	REVISION 97	6/16/83	JLS	JLS
99	REVISION 98	6/16/83	JLS	JLS
100	REVISION 99	6/16/83	JLS	JLS
101	REVISION 100	6/16/83	JLS	JLS

**125V DC POWER DISTRIBUTION CUBICLE (D56)**  
 240V BUS #1  
 240V BUS #2  
 BATTERY BANK  
 BATTERY CHARGERS  
 LIGHTING PANEL #1  
 LIGHTING PANEL #2  
 LIGHTING PANEL #3  
 POWER PANEL #1  
 POWER PANEL #2  
 POWER PANEL #3

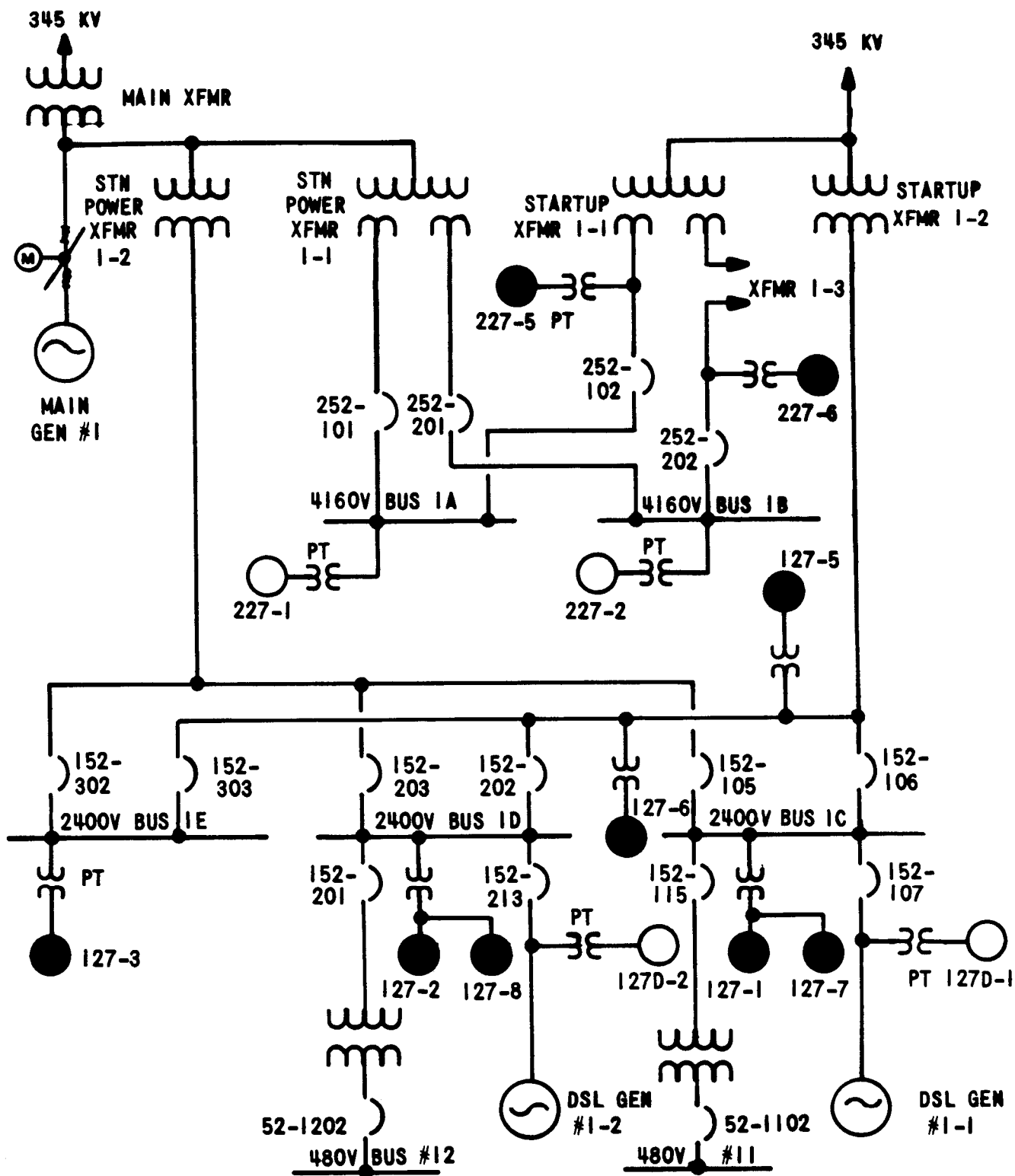
**120/240V AC & 125V DC POWER DISTRIBUTION CENTER (P35)**  
 240V BUS #1  
 240V BUS #2  
 MANUAL CONTROL  
 LIGHTING CONTROLLER  
 ASTRONOMIC DIMMER  
 LIGHTING PANEL #1  
 LIGHTING PANEL #2  
 LIGHTING PANEL #3  
 SWD LIGHTING PANEL

**NOTES**  
 1. SEE SHEET 1 FOR GENERAL NOTES.  
 2. SEE SHEET 2 FOR WIRING DETAILS.  
 3. SEE SHEET 3 FOR EQUIPMENT SPECIFICATIONS.  
 4. SEE SHEET 4 FOR MATERIALS LIST.  
 5. SEE SHEET 5 FOR CONSTRUCTION DETAILS.  
 6. SEE SHEET 6 FOR TESTING PROCEDURES.  
 7. SEE SHEET 7 FOR MAINTENANCE PROCEDURES.  
 8. SEE SHEET 8 FOR SAFETY PROCEDURES.  
 9. SEE SHEET 9 FOR ENVIRONMENTAL REQUIREMENTS.  
 10. SEE SHEET 10 FOR INTERFERENCE REQUIREMENTS.

DR	J.L. STERRETT	6/16/83
APP	E.R. LONDMAN	6/16/83
APP	P. LOLICH	6/16/83
APP	D.C. TARSİ	6/16/83

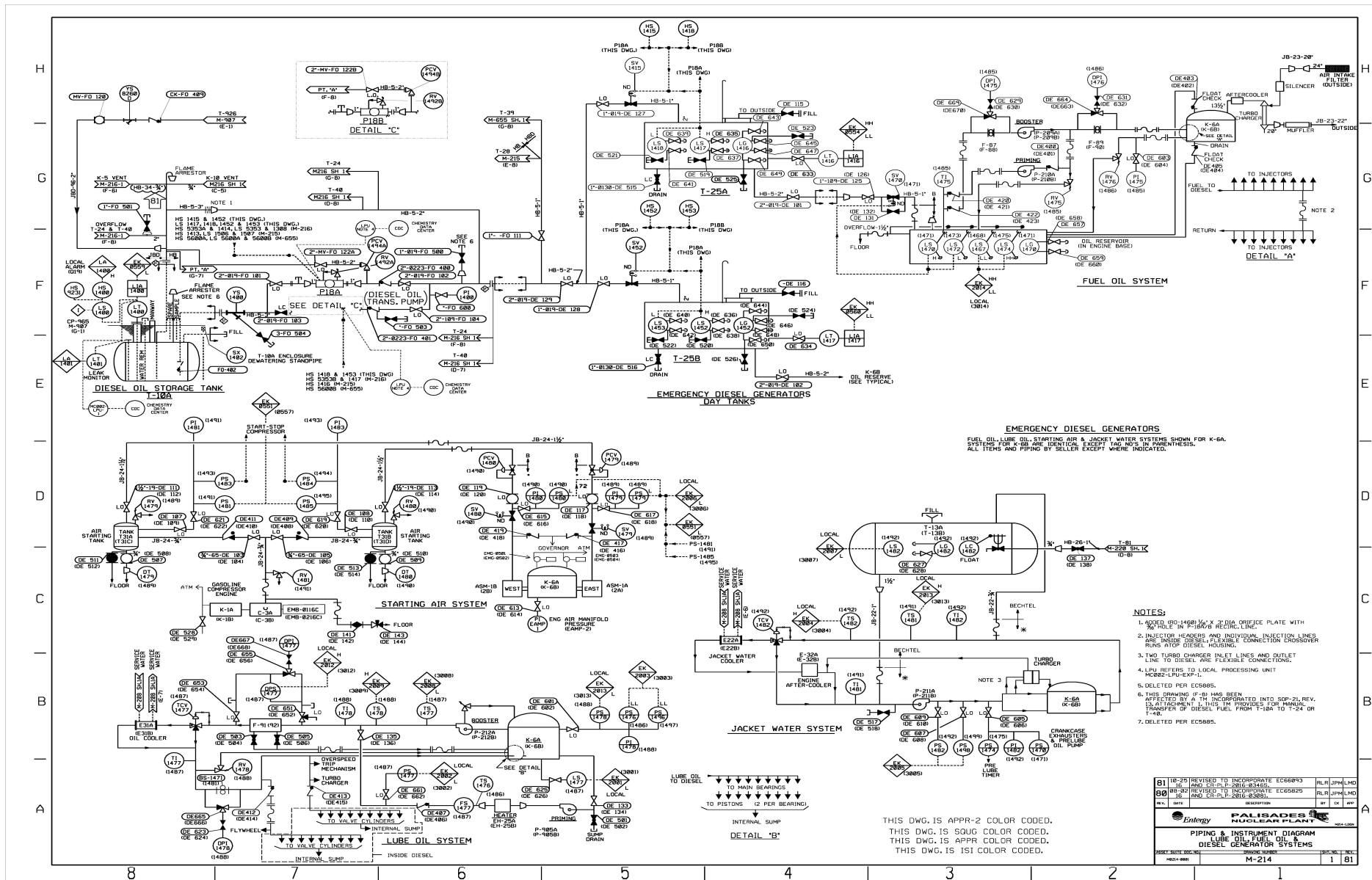
CONSUMERS POWER CO.  
 125V DC POWER DISTRIBUTION CENTER  
 120/240V AC & 125V DC POWER DISTRIBUTION CENTER  
 S. REGION  
 WD 1421  
 50. HAVEN 6 MI. SW.  
 SHEET 11

VOLTAGE PROTECTION SENSORS LOCATION

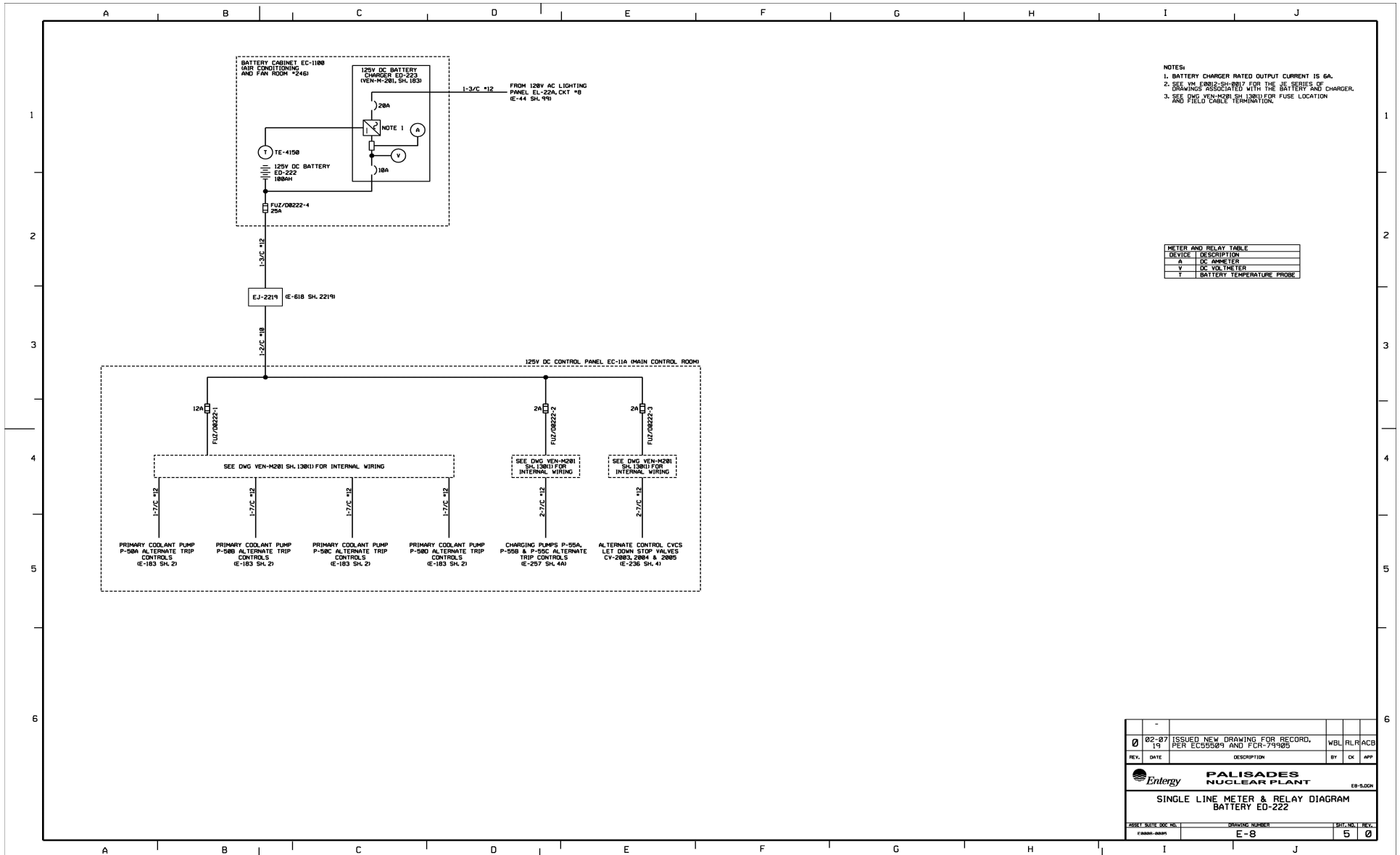


● = VOLTAGE PROTECTION SENSOR

PIPING & INSTRUMENT DIAGRAM  
LUBE OIL, FUEL OIL AND DIESEL GENERATOR SYSTEMS



BATTERY SUPPLY FOR ALTERNATE CONTROLS  
CREDITED IN FIRE SCENARIOS



- NOTES:
1. BATTERY CHARGER RATED OUTPUT CURRENT IS 6A.
  2. SEE IWM 68012-SH-8817 FOR THE I.E. SERIES OF DRAWINGS ASSOCIATED WITH THE BATTERY AND CHARGER.
  3. SEE DWG VEN-M281 SH. 138(1) FOR FUSE LOCATION AND FIELD CABLE TERMINATION.

METER AND RELAY TABLE	
DEVICE	DESCRIPTION
A	DC AMPMETER
Y	DC VOL-THE-TER
T	BATTERY TEMPERATURE PROBE

0	02-07	ISSUED NEW DRAWING FOR RECORD, PER ECC55509 AND PCR-74985	WBL	RLR	ACB
REV.	DATE	DESCRIPTION	BY	CHK	APP.
<b>PALISADES NUCLEAR PLANT</b> <small>EB-5,02N</small>			SINGLE LINE METER & RELAY DIAGRAM BATTERY ED-222		
<small>SHEET</small> 0835 <small>DOC NO.</small>	<small>DRAWING NUMBER</small> E-8		<small>SHT. NO.</small> 5	<small>REV.</small> 0	