Pacific Gas and Electric Company®

James R. Becker
Site Vice President

Diablo Canyon Power Plant
Mail Code 104/6
P. O. Box 56
Avila Beach, CA 93424

805.545.3462
Internal: 691.3462
Fax: 805.545.6445

April 12, 2012

PG&E Letter DCL-12-038
U.S. Nuclear Regulatory Commission

10 CFR 50.90

ATTN: Document Control Desk
Washington, DC 20555-0001

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Response to NRC Request for Additional Information Regarding PG&E Letter DCL-11-072, "License Amendment Request 11-06, Revision to Technical Specification 3.3.5, 'Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation'" dated October 24, 2011

References: 1. PG&E Letter DCL-11-072, "License Amendment Request 11-06, Revision to Technical Specification 3.3.5, 'Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation'" dated October 24, 2011.

Dear Commissioners and Staff:

In Reference 1, Pacific Gas and Electric Company (PG&E) submitted License Amendment Request (LAR) 11-06 to revise the Operating Licenses, to revise Technical Specification (TS) 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation," and to correct the nonconservative First Level Undervoltage Relays TS limits contained in the current TS Surveillance Requirements (SR) 3.3.5.3.

On March 9, 2012, the NRC staff requested additional information required to complete the review of LAR 11-06. Per discussion with the NRC staff on April 4, 2012, a response date of April 12, 2012, was agreed upon. PG&E's responses to the staff's questions are provided in the Enclosure.

This information does not affect the results of the technical evaluation or the significant hazards consideration determination previously transmitted in Reference 1.

PG&E makes no regulatory commitments (as defined by NEI 99-04) in this letter. This letter includes no revisions to existing regulatory commitments.

If you have any questions, or require additional information, please contact Mr. Tom Baldwin at (805) 545-4720.

I state under penalty of perjury that the foregoing is true and correct.

Executed on April 12, 2012.

Sincerely,

James R. Becker
Site Vice President

dngd/4955 SAPN 50464942
Enclosure
cc: Diablo Distribution
cc/enc: Gary W. Butner, Branch Chief, California Department of Public Health
Elmo E. Collins, NRC Region IV
Michael S. Peck, NRC, Senior Resident Inspector
Joseph M. Sebrosky, NRR Project Manager

PG&E Response to NRC Request for Additional Information for Diablo Canyon Power Plant Regarding Technical Specification 3.3.5

NRC Question 4:

*It is stated in clause 5.2 of Calculation No. 9000041128, "Since the two sided T1A uncertainty is calculated at 95% CI (CUDO = 1.96 X σ), the one sided actuation point 95% probability will equal to (1.645 X σ) or in other words: (1.645 / 1.96) * CUDO." Provide a technical justification as to why a one-sided probability distribution of channel uncertainty is used in calculating compliance to the NRC staff's position requiring a 95/95 tolerance limit for this application.*

PG&E Response:

Methodology: The methodology for determining uncertainty for a single side of interest while maintaining 95 percent probability is based on ISA-RP67.04.02-2000, Section 8.1. ISA-RP67.04.02-2000 was issued to provide guidance for implementation of ISA-S67.04-1994, which is endorsed by Regulatory Guide (RG) 1.105, Rev. 3.

Application of Methodology: The Technical Specification analytical limit associated with the load shed function of the First Level Undervoltage Relays is single sided (i.e., only a lower limit exists). The requested change remains consistent with this approach. The above single sided approach was applied to the coincident logic of one of the T1A/B/C (T1x) relays and the T2 relays for the load shed function. T2 is an instantaneous relay, which will actuate before any T1x setpoint is reached. The T2 setpoint combined with uncertainty has sufficient margin to the highest setpoint for T1x to ensure that the T2 relays will have already actuated by the time voltage falls into the detectable range of T1x. Therefore, the uncertainty of 2/2 coincident logic will be entirely dependent on the 95 percent single sided confidence limit of T1x actuation.

NRC Question 5:

Clause 4, "Inputs," lists reference accuracy for the devices used for 4.16 kV Bus Under-Voltage Relay & Timer setpoint calculations. Provide documentation to demonstrate that the reference accuracies used for all these devices are valid for a minimum of 95/95 confidence level as stated in RG 1.105., i.e., - 2σ to 2σ.

PG&E Response:

The reference accuracy or "rack calibration accuracy" is one of many terms used in the Square Root Sum of Squares methodology for calculating total channel uncertainty. Calibration accuracies used to calculate channel uncertainty for this calculation are generally larger and bound the vendor specified accuracy. The ABB 27N and 59N have a repeatability of ±0.1 percent as specified by the vendor. Their fine tune calibration is

performed by a 15-turn 3006 Trimpot® potentiometer, with 0.01 percent adjustability. Therefore, the device reference accuracy is effectively a function of device repeatability. Further it was verified in the electrical maintenance laboratory that the device is repeatable to better than 0.01 V at 12 different setpoints, at 3 different trials.

In addition, 100 percent of the relays are tested by ABB to ensure relays meet the tolerance and repeatability criteria set forth in the vendor documents. This testing ensures that all relays received by Diablo Canyon Power Plant conform to the vendor published reference accuracy thereby meeting the 95/95 criteria.

5.1: ABB 27N Reference Accuracy for Undervoltage (UV) function - The vendor specified repeatability for ABB 27N at T1A (96.5 Vac) is 0.1 percent or approximately ±0.1 Vac. In this calculation a calibration accuracy of ±0.5 Vac is used. Similarly, at T1B (90.5 Vac) and T1C (78.6 Vac) the vendor specified repeatability are ±0.09 Vac and ±0.08 Vac respectively. However, for the purpose of conservatism a calibration tolerance of ±0.5 Vac is used. The selected calibration accuracy, which is more than 5 times larger than the vendor specified repeatability (or 5 x 1.96σ = 9.8σ), will afford a confidence level much higher than 95 percent in achieving the specified setpoint every time.

5.2: ABB 27N Reference Accuracy for Time Delay (TD) function - The ABB 27N vendor reference accuracy (±10 percent of setting or 20 milliseconds, whichever is greater) at T1A (8 seconds) is equal to ±0.8 seconds. In this calculation a calibration accuracy of ±1.0 seconds is used. Similarly, at T1B (5 seconds) and T1C (3 seconds) the vendor reference accuracies are ±0.5 seconds and ±0.3 seconds respectively. However, for the purpose of conservatism a calibration tolerance of ±0.7 seconds and 0.5 seconds are used. The selected calibration accuracies are more than the vendor reference accuracy. Therefore, the confidence in calibration accuracy will exceed 95 percent.

5.3: ABB 59N Reference Accuracy for UV function - The vendor specified repeatability for ABB 59N at T2 (98.0 Vac), B3 (109.25 Vac) and B4 (109.25 Vac) are equal to ±0.098, 0.11 Vac, and 0.11 Vac, respectively. However, in this calculation for the purpose of conservatism, a calibration accuracy of ±0.5 Vac is used. The selected calibration accuracy which is approximately 5 times larger than the vendor reference accuracy (or 5 x 1.96σ = 9.8σ), will afford a confidence level much higher than 95 percent in achieving the specified setpoint every time.

5.4: ABB 59N Reference Accuracy for Reset TD function - The vendor reference accuracy for ABB 59N at T2, B3, and B4 are equal to ±0.020 seconds and the same value is used.

5.5: ABB 62T Timer Reference Accuracy - The 0.5 percent vendor reference accuracy for 3A timer (8.5 seconds) is equal to ±42.5 milliseconds. In this calculation, a ±50 milliseconds calibration accuracy is used. For 3B timer (18.5 seconds) the vendor reference accuracy is equal to ±92.5 milliseconds. In this calculation, a calibration

accuracy of ±100 milliseconds is used. The selected calibration accuracy is more than the vendor reference accuracy. Therefore, the confidence in calibration accuracy will exceed 95 percent.

NRC Question 6:

Please provide diagrams indicating how the different devices described above are connected including the connection of the potential transformers and the relays, to enable the staff to understand the justifications requested above. Indicate what combination of relays are required to ensure that the required protective action is successfully achieved.

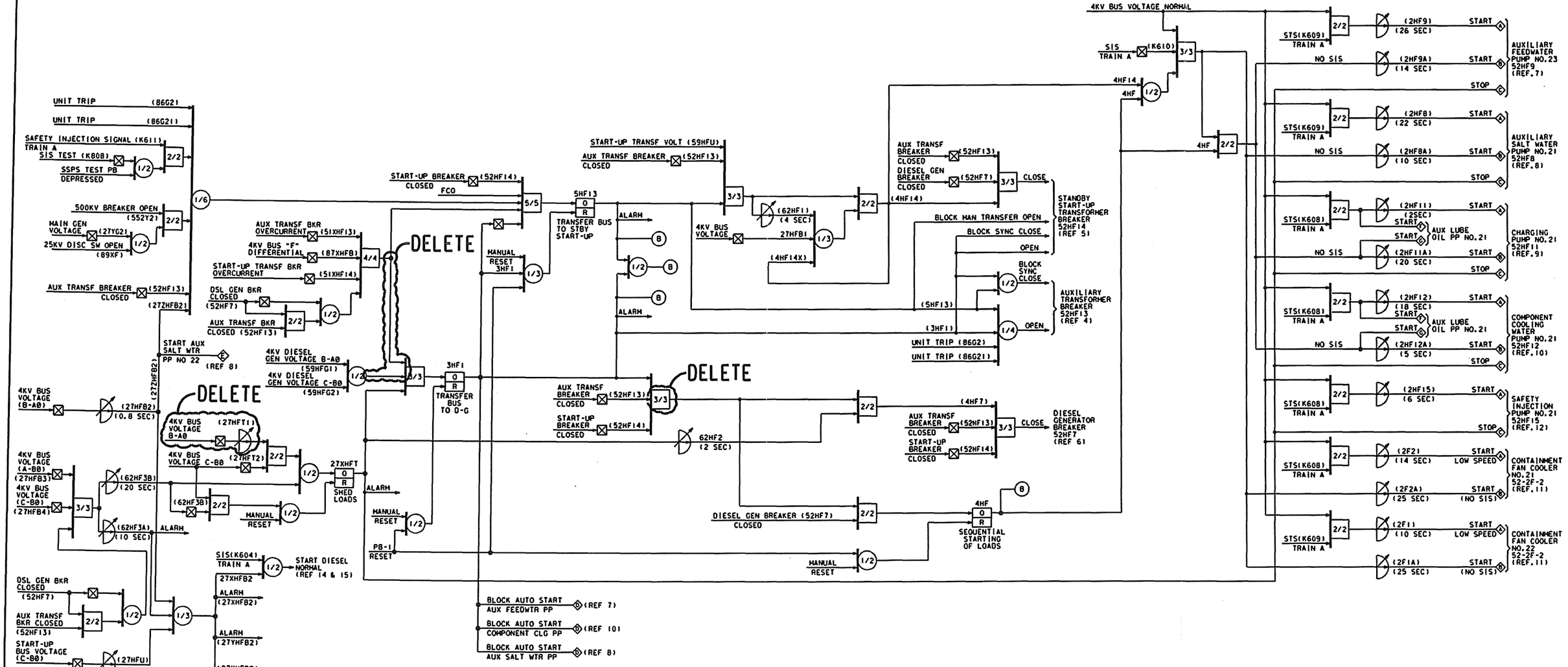
PG&E Response:

Informational logic diagrams, schematics and connection diagrams are attached to this submittal as listed below. Drawings are stamped "PRELIMINARY FOR INFORMATION ONLY" as the design change to implement the new protective logic is still in the development phase. However the following is not expected to change: logic, coincidence, permissive design, and relay connection.

Reference page 2 of Attachment 1, PG&E Drawing 441286, for the following explanation of required relays for protective function. Under the new protective logic design for degraded bus voltage conditions, where bus voltage is less than 80 percent of nominal, the protective load shed function is initiated by the First Level Undervoltage Relays. A combination of either of the three 27HxT1y relays (where x designates the bus "F," "G," or "H" and y designates the degraded voltage level "A," "B," or "C") and the 27HxT2 instantaneous relay are required for initiating the load shed protective function for the respective bus. At degraded voltages between 80 percent of nominal and 91 percent of nominal, the protective load shed function is initiated by the Second Level Undervoltage Relays and remains unchanged from previous design. A two out of two coincident pick-up of the 27HxB3 and 27HxB4 Relays in combination with a timeout of the 62Hx3B Timer Relay is required for initiating the load shed protective function for each bus.

Attachment 1- PG&E Drawing 441286
Attachment 2- PG&E Drawing 441340
Attachment 3- PG&E Drawing 441345
Attachment 4- PG&E Drawing 441349
Attachment 5- PG&E Drawing 441352
Attachment 6- PG&E Drawing 500788

Attachment 1
PG&E Drawing 441286



PRELIMINARY FOR INFORMATION ONLY

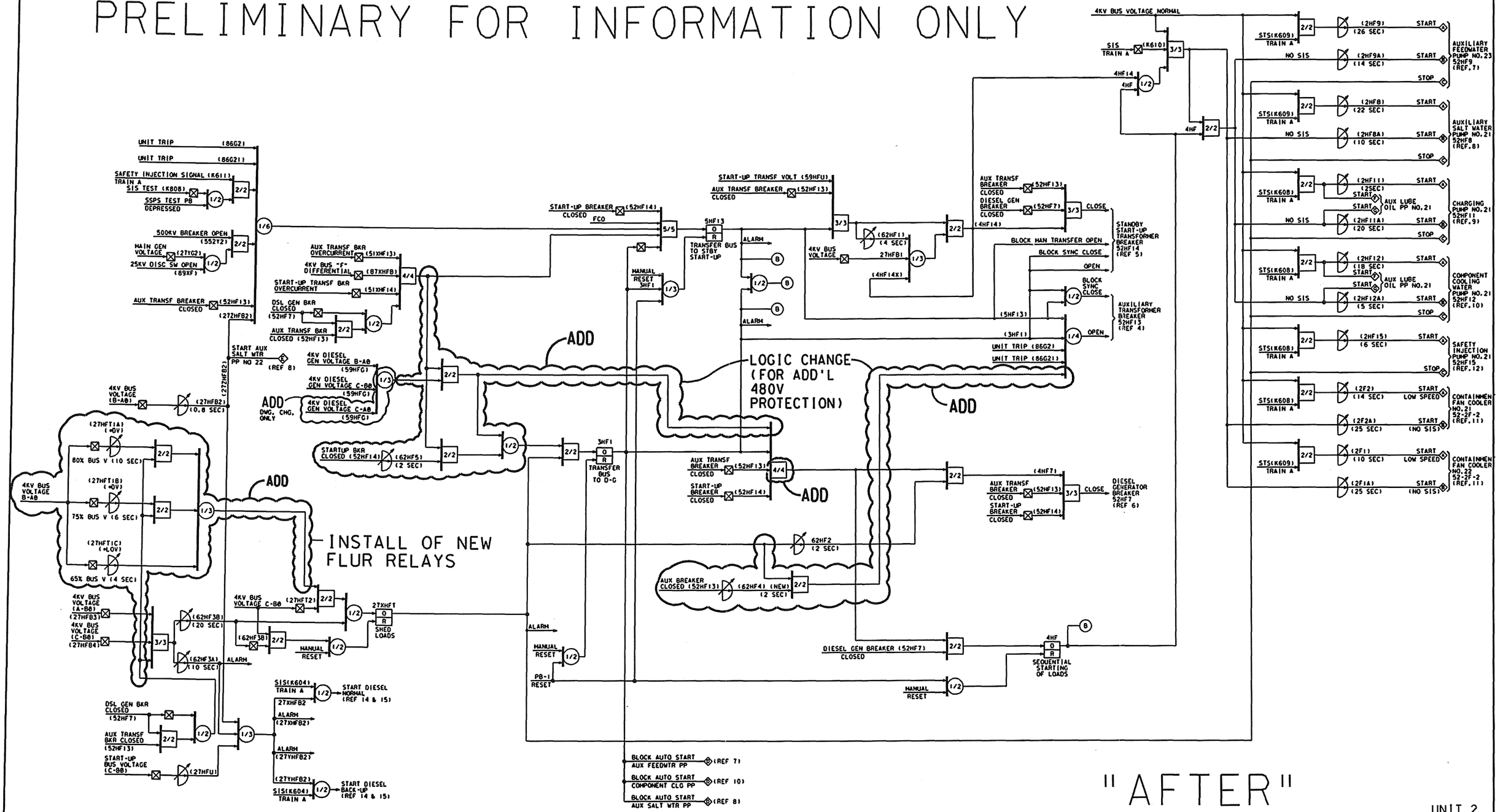
"BEFORE"

UNIT 2

DRAWING No. 441286 SHEET No. 1 REV. No. 9	DDN No. 2000000991 PART 000 VERSION 00 SHEET No. _____ of _____
PREPARED BY: AJL2 DATE: 3/5/12 REVIEWED BY: Dan L Agurrw DATE: 3/5/12 VERIFIED BY: L Ramsey DATE: 3/5/12	SKETCH No. DSK-5000032012 PART 000 VERSION 00 SHEET No. 1 of 4 SKETCH TYPE [1] WALKDOWN PERFORMED: YES [X] NO [ ]

S....Drawings/NCFE/AJL2/U2 BUS F

PRELIMINARY FOR INFORMATION ONLY



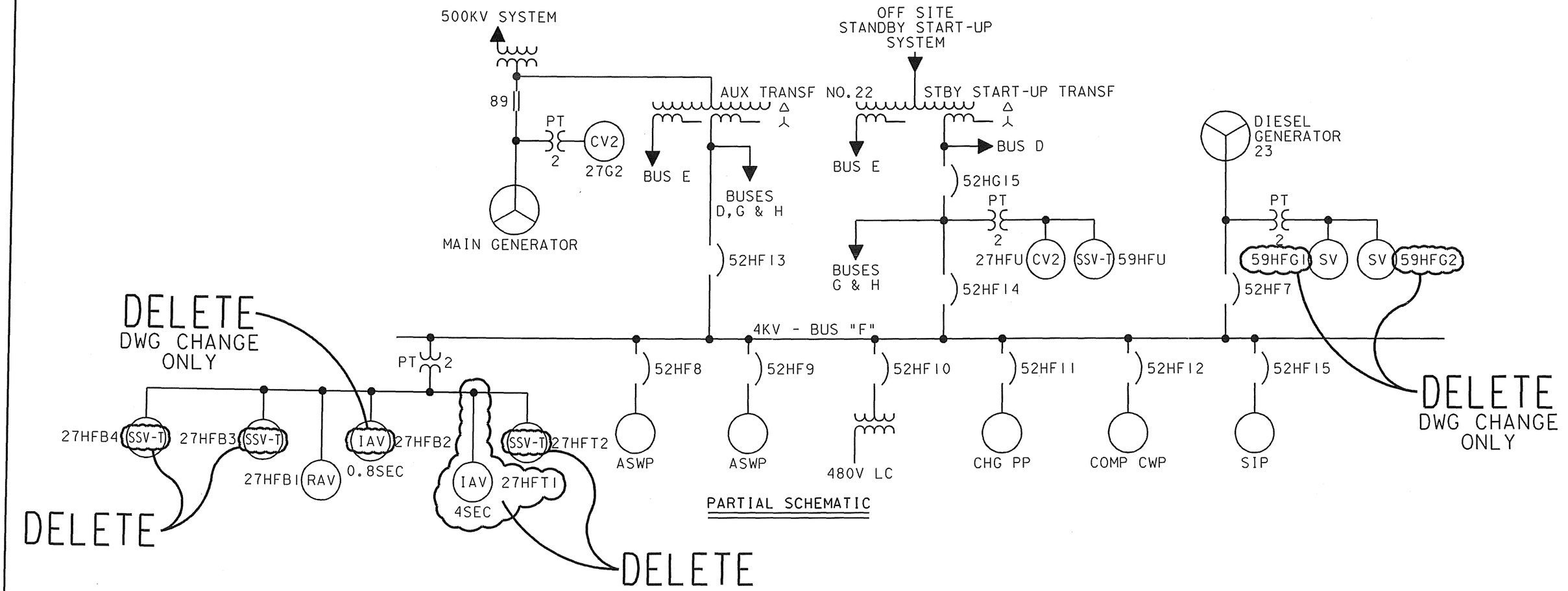
LEGEND:
(=DV) = DEGRADED VOLTAGE
(=LOV) = LOSS OF VOLTAGE

"AFTER"

UNIT 2

DRAWING No. 441286 SHEET No. 1	DDN No. 2000000991 PART 000 VERSION 00
REV. No. 9	SHEET No. ____ of ____
PREPARED BY: AJL2 DATE: 3/5/12	SKETCH No. DSK-5000032012
REVIEWED BY: DATE: 3/5/12	PART 000 VERSION 00 SHEET No. 2 of 4
VERIFIED BY: DATE: 3/5/12	SKETCH TYPE [1]
	WALKDOWN PERFORMED: YES [X] NO [ ]

S....Drawings/NCFE/AJL2/U2 BUS F



PARTIAL SCHEMATIC

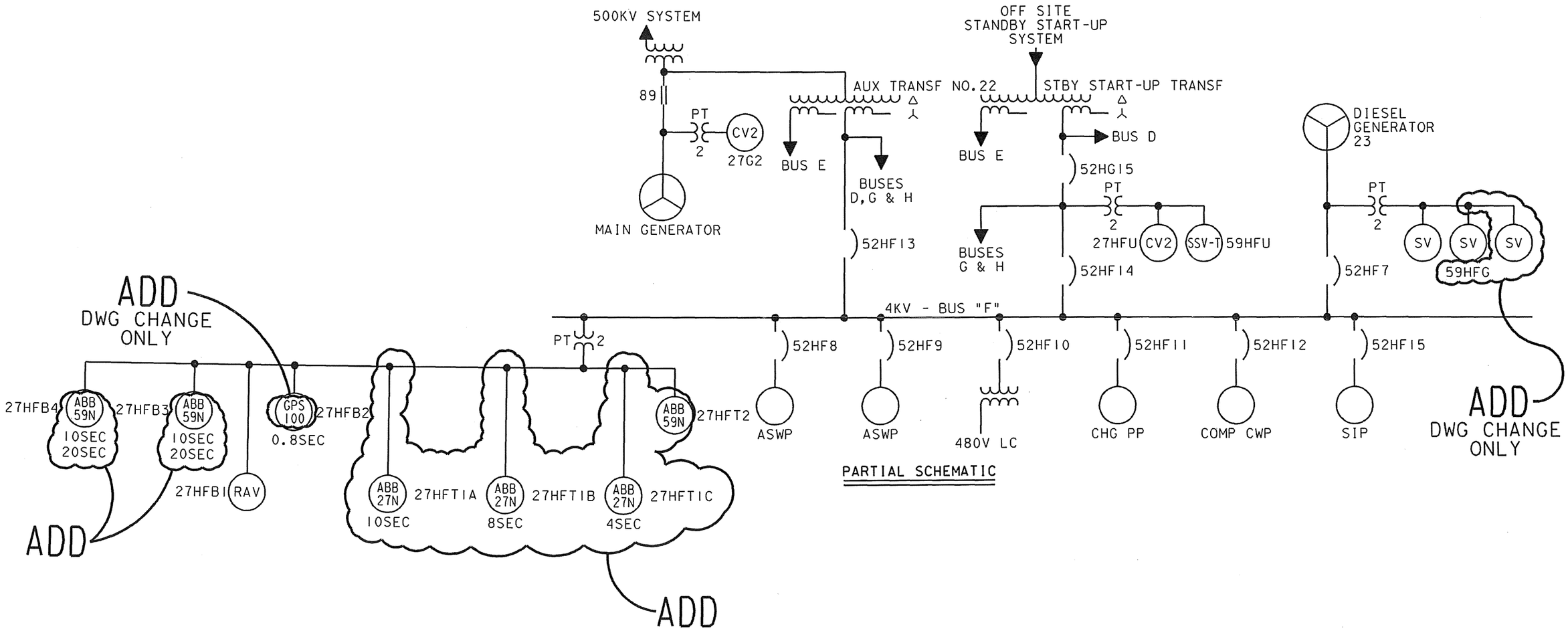
PRELIMINARY FOR INFORMATION ONLY

"BEFORE"

UNIT 2

DRAWING No. 441286 SHEET No. 1 REV. No. 9	DDN No. 2000000991 PART 000 VERSION 00 SHEET No. _____ of _____
PREPARED BY: AJL2 DATE: 3/5/12 REVIEWED BY: David L Bowman DATE: 3/5/12 VERIFIED BY: G Reimers DATE: 3/5/12	SKETCH No. DSK-5000032012 PART 000 VERSION 00 SHEET No. 3 of 4 SKETCH TYPE [1] WALKDOWN PERFORMED: YES [X] NO [ ]

S:...Drawings/NCEE/AJL2/U2 BUS F



PARTIAL SCHEMATIC

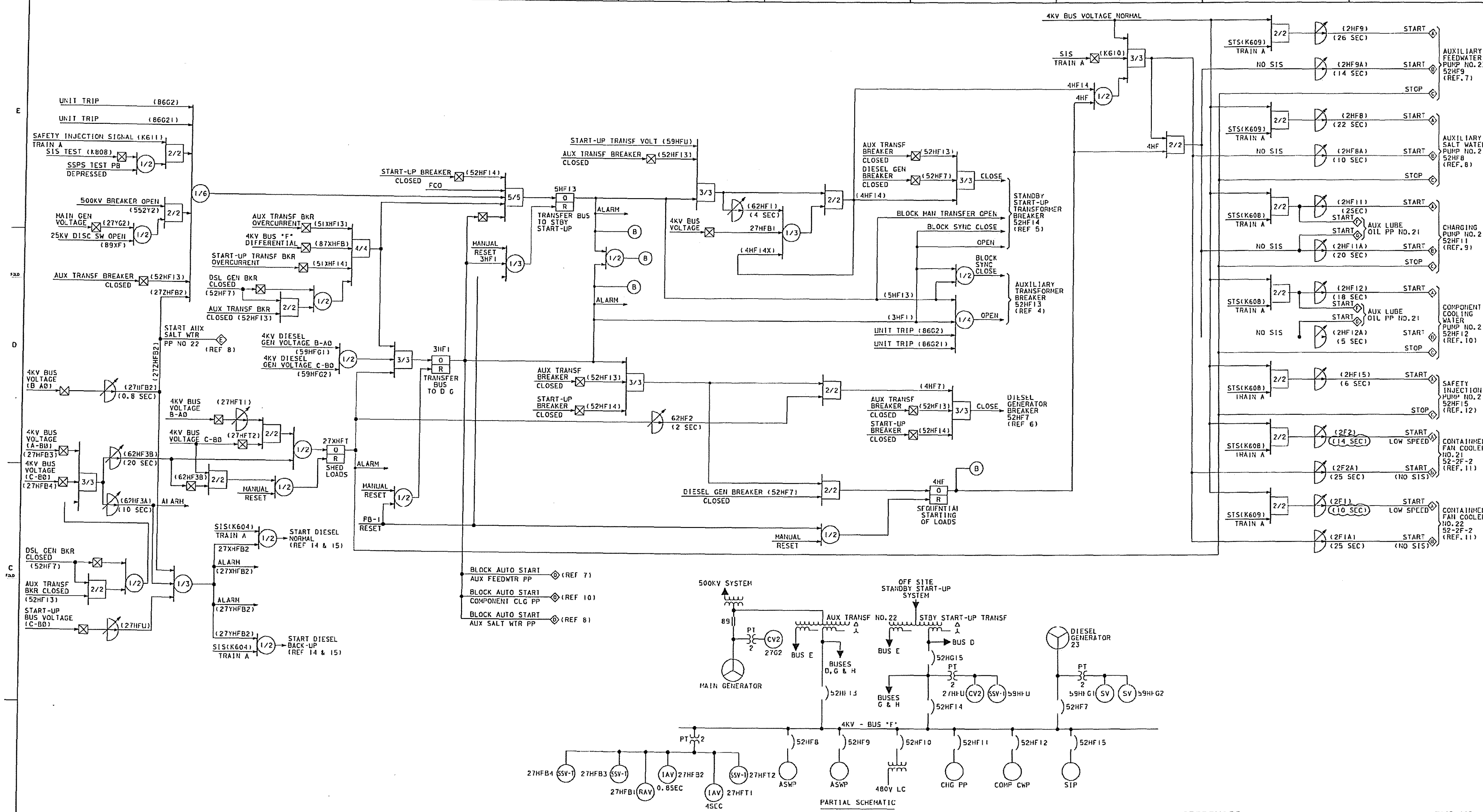
PRELIMINARY FOR INFORMATION ONLY

"AFTER"

UNIT 2

DRAWING No. 441286 SHEET No. 1 REV. No. 9	DDN No. 2000000991 PART 000 VERSION 00 SHEET No. ____ of ____
PREPARED BY: AJL2 DATE: 3/5/12 REVIEWED BY: [signature] DATE: 3/5/12 VERIFIED BY: [signature] DATE: 3/5/12	SKETCH No. DSK-5000032012 PART 000 VERSION 00 SHEET No. 4 of 4 SKETCH TYPE [I] WALKDOWN PERFORMED: YES [X] NO [ ]

S....Drawings/NCFE/AJL2/U2 BUS F



FOR INFORMATION ONLY

REFERENCES

		DWG NO.
1.	LOGIC DIAGRAM SYMBOLS	19425
2.	SCHEM DIAG 4160V BUS SECT F AUTO TRANSFER	441352
3.	SLM & R 4160V SYSTEM SHEET NO.2	441229
4.	SCHEM DIAG AUX TRANSFORMER CKT BREAKER	441349
5.	SCHEM DIAG STANDBY START-UP TRANSFORMER CKT BREAKER	441345
6.	SCHEM DIAG 4160V DIESEL GENERATOR CIRCUIT BREAKER	496276
7.	LOGIC DIAGRAM AUXILIARY FEEDWATER PUMPS	102800
8.	LOGIC DIAGRAM AUXILIARY SALT WATER PUMPS	102790
9.	LOGIC DIAGRAM CENTRIFUGAL CHARGING PUMPS	102789
10.	LOGIC DIAGRAM COMPONENT COOLING WATER PUMP	102792
11.	LOGIC DIAGRAM CONTAINMENT FAN COOLERS	102791
12.	LOGIC DIAGRAM SAFETY INJECTION PUMPS	102794
13.	ELECTRICAL DEVICE LIST	050011
14.	SCHEM DIAG DIESEL GENERATOR CONTROL	496277
15.	SCHEM DIAG DIESEL GENERATOR CONTROL	496278

NOTES

1. LOGIC SYMBOLS ARE DEFINED IN REF 1 -◇ DENOTES INTERCONNECTION TO OTHER LOGIC DIAGRAM
2. ALL THE INDICATORS, ALARMS, AND MANUAL CONTROLS ARE AT THE MAIN CONTROL BOARD UNLESS NOTED OTHERWISE
3. FOR SETTINGS ON ELECTRICAL DEVICES SEE REF 13
4. DEVICE NOTATIONS INDICATE THE OUTPUT DEVICE
5. ALL SAFETY INJECTION SYSTEM (SIS) SIGNALS ARE FROM TRAIN A

NUCLEAR SAFETY RELATED

KEY DWG--SECTION 3

UNIT 2

DATE		REVISION DESCRIPTION		
10-28-2011		REVISED PER DFT-7#1372	ELECTRICAL LOGIC DIAGRAM 4160 VOLT BUS SECTION "F" AUTOMATIC TRANSFER DIABLO CANYON POWER PLANT PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA	DWG SCALE: BILL OF MATL: SUPSDS: 216189 SUPSD BY:
D.D.	JBMX			
R.E.	FAZ1			
I.V.				
P.F.	AGB2			

DRAWING	SHEET	PAGE	REV
441286	1	0	9

RASTER-441286.dgn
DCN-441286.dgn
CAD User: JBMX Date: 10-28-2011

Attachment 2
PG&E Drawing 441340

SHF13PT
4200-1200 P.T.
PA-02
TO ERFDS MUX05-9
ISOLATING MET. POT. TRANSMITTER (YM418A)
REF. 6
CHF 4F
OF
8F
SHF13PT
0A 8A
SHF13
SHF12
27HFT2
INTERLOCK REF. 17
INTERLOCK REF. 17
27HFT1
INTLK REF. 14
SPARE
SPARE
SPARE
SPARE
ALARM REF. 22
PWR SUP REF. 17
SHF13
SHF12
SHF12
4200-120V P.T.
PA-01
PA-02
PA-03
PA-04
SEE FUSE TABLE
UA
UB
OF
UA
UB
UD
UE
UF
SHF12 HØ1
8F6
V
OF
SHH12
UH
UJ
FOR BUS SECT. "H" ONLY
8H6
8H7
8G5
8G4
OG
TG
REF. 17
8H5
8H4
OH
TH
REF. 17
MATCH CIRCLES
8F5
8F4
OF
TF
REF. 17
SHF12
SHF12
SHF12
SHF12
U.V. TEST SW.
SHF12
16
H
15 29HFB2
27HFB1
4 2 10 12 13 15 7
INTRL REF. 17
SP.
POWER SUPPLY
REF. 17
3 11 14 8
SHF12
27HFB2
A6 C1 C3 C5 C7 C9 C11 C13 C14 C15 C17
PWR SUP REF. 17
INTLK REF. 17
INTLK REF. 17
SPARE
SPARE
SPARE
ALARM REF. 22
VA VA VA VA
A7 C2 C4 C6 C8 C10 C12 C16 C18
A8
SHF12
18 17
1
29HFB2
START-UP TRANSFORMER NO. 22 FEEDER
SHF14 SHF14PT
C
B
A
SHF14PT
PA-01
PA-02
PA-03
PA-04
OU
RHF
8F
4F 27HFB3
OF
RHF
27HFB4
SSV
INTERLOCK REF. 17
ICS
SSV
SSV
INTERLOCK REF. 17
ICS
SSV
4U
0U
8U
SHF14PT
SHF14
SHF14
SHF13
0A
DELETE
DELETE
F7 F8 F9 F10 F11 F12 F13 F14 F15
REF 20 REF 11 REF 16 REF 6 REF 14 REF 13 REF 4 REF 5 REF 18
SWGR POTENTIAL INTERLOCK - BUS "F"
G5 G6 G7 G8 G9 G10 G11 G12 G13 G14 G15
REF 20 REF 11 REF 12 REF 15 REF 14 REF 6 REF 14 REF 13 REF 4 REF 5 REF 5
SWGR POTENTIAL INTERLOCK - BUS "G"
H7 H8 H9 H10 H11 H12 H13 H14 H15
REF 20 REF 16 REF 12 REF 6 REF 15 REF 13 REF 4 REF 5 REF 18
SWGR POTENTIAL INTERLOCK - BUS "H"

PRELIM

FOR INFO ONLY

"BEFORE"

UNIT 2

DRAWING No. 441340 SHEET No. 1
REV. No. 31
DDN No. 2000000991 PART 000 VERSION 00
SHEET No. ____ of ____
PREPARED BY: AJL2 DATE: 3/5/12
REVIEWED BY: Dan L Brown DATE: 3/5/12
VERIFIED BY: D. Ramos DATE: 3/5/12
SKETCH No. DSK-5000032112
PART 000 VERSION 00 SHEET No. 1 of 3
SKETCH TYPE 1
WALKDOWN PERFORMED: YES [X] NO [ ]

S Drawings/NCEE/AJL2/

ADD

0A

SHF13PT

0A 8A

SHF13

UB-01 UA-01

SSV2 SSV3 INTLK

SHF7

SHF13 OA

29HFT2 27HFT2

INTLK REF 17 SPARE SPARE INTLK REF 17

RHFA

29HFT2

RHFA

RHF

SHF12

RHFA RHF

RHFA RHF

RHFA RHF

29HFT1A 27HFT1A

SPARE INTLK REF 17 SPARE SPARE

RHFA

29HFT1A

29HFT1B 27HFT1B

SPARE INTLK REF 17 SPARE SPARE

RHFA

29HFT1B

29HFT1C 27HFT1C

SPARE INTLK REF 17 SPARE SPARE

RHFA

29HFT1C

SHF12

W W W

SHF12

27HFB1

INTRL REF. 17 SPARE POWER SUPPLY REF. 17

SHF12

SHF12 SHF12

SHF12 U.V. TEST SW.

SHF12

29HFB2

16 15 H

27HFB2

A6 C1 C3 C5 C7 C9 C11 C13 C14 C15 C17

PWR SUP REF. 17 INTLK REF. 17 INTLK REF. 17 SPARE SPARE SPARE ALARM REF. 22 VA VA VA VA

A7 C2 C4 C6 C8 C10 C12 C16 C18

A8

SHF12

18 17

29HFB2

RHF 4F

RHFA 8F

29HFB3

1 2 A

27HFB3

SPARE SPARE INTLK REF 17 SPARE

RHFA

29HFB3 4 B 3

0F RHF 0F

29HFB4

1 A 2

27HFB4

SPARE SPARE INTLK REF 17 SPARE

RHFA

29HFB4 4 B 3

F7 F8 F9 F10 F11 F12 F13 F14 F15

REF 20 REF 11 REF 16 REF 6 REF 14 REF 13 REF 4 REF 5 REF 18

SWGR POTENTIAL INTERLOCK - BUS "F"

G5 G6 G7 G8 G9 G10 G11 G12 G13 G14 G15

REF 20 REF 11 REF 12 REF 15 REF 14 REF 6 REF 14 REF 13 REF 4 REF 5 REF 5

SWGR POTENTIAL INTERLOCK - BUS "G"

H7 H8 H9 H10 H11 H12 H13 H14 H15

REF 20 REF 16 REF 12 REF 6 REF 15 REF 13 REF 4 REF 5 REF 18

SWGR POTENTIAL INTERLOCK - BUS "H" SHF14

ADD

PRELIM

FOR INFO ONLY

"AFTER"

UNIT 2

OU

SHF13

8F CHF

SHF13

8A1

RHF 25HF 27HFU 59HFU

RHF 8U

8U CHF

DRAWING No. 441340	SHEET No. 1	DDN No. 2000000991	PART 000 VERSION 00
REV. No. 31		SHEET No. ____ of ____	
PREPARED BY: AJL2	DATE: 3/5/12	SKETCH No. DSK-5000032112	
REVIEWED BY: Dayn L Downs	DATE: 3/5/12	PART 000 VERSION 00 SHEET No. 2 of 3	
VERIFIED BY: G Reimers	DATE: 3/5/12	SKETCH TYPE [1]	
		WALKDOWN PERFORMED: YES [X] NO [ ]	

S....Drawings/NCFE/AJL2/

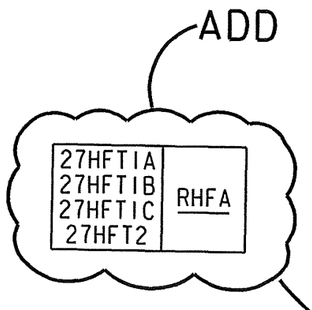
DELETE

27HFTIA, IB, IC

ADD

ADD

ADD



DELETE

ADD

TABLE

BUS SECT F		BUS SECT G		BUS SECT H	
DEVICE	LOC	DEVICE	LOC	DEVICE	LOC
52HF7	SHF7	52HG5	SHG5	52HH7	SHH7
52HF13	SHF13	52HG13	SHG13	52HH13	SHH13
52HF14	SHF14	52HG14	SHG14	52HH14	SHH14
25HF.	RHF	25HG	RHG	25HH	RHH
25X-HF	RHF	25X-HG	RHG	25X-HH	RHH
27HFB1,2	SHF12	27HGB1,2	SHG12	27HHB1,2	SHH12
27HFU	RHF	27HGU	RHG	27HHU	RHH
27HFT1,2	SHF13	27HGT1,2	SHG13	27HHT1,2	SHH13
59HFU	RHF	59HGU	RHG	59HHU	RHH
59HFG	SHF7	59HGG	SHG5	59HHG	SHH7
27HFB3	RHFA	27HGB3	RHGA	27HHB3	RHHA
27HFB4	RHFA	27HGB4	RHGA	27HHB4	RHHA

TABLE OF DEVICES

DEVICE NO.	FUNCTION	RATING	MFR	TYPE	CAT NO. & REF DWG NO.	REMARKS
V	VOLTMETER				REF. DWG #2	
V	SYNCHRONIZING VOLTMETER					AT SWGR. RM. (EAST SIDE WALL)
V	SYNCHRONIZING VOLTMETER					AT CHF, CHG, CHH
SYN	4160V SYNCHROSCOPE					AT SWGR. RM. (EAST SIDE WALL)
SYN	4160V SYNCHROSCOPE					AT CHF, CHG, CHH
25HF	SYNCHRONIZING CHECK REL 4KV BUS "F"					
25XHF	SYNCHRONIZING AUX REL 4KV BUS "F"	125VDC	W.E.Corp	SG	1342925	
27HFU	UNDERVOLTAGE RELAY, ST-UP FDR BUS "F"				REF. DWG #2	
27HFB1	UNDERVOLTAGE RELAY BUS "F"					
27HFB2	UNDERVOLTAGE RELAY BUS "F"					
27HFT1	UNDERVOLTAGE TRIP RELAY, BUS "F"					
27HFT2	UNDERVOLTAGE TRIP RELAY, BUS "F"					
27HFB3, B4	UV RELAY BUS "F" (2ND LEVEL)					
52HF7, 13&14	AIR CKT BREAKER 4KV BUS "F"		G.E.Co		REF. DWG #2	
59HFU	OVERVOLTAGE REL ST-UP FDR, 4KV BUS "F"					
59HFG	OVERVOLTAGE REL DIESEL GENERATOR					
YM418A	ISOL. XMTR. TO ERFDS MUX-BUS "F"		ACTION PAK		REF. DWG #9	
YM419B	ISOL. XMTR. TO ERFDS MUX-BUS "G"					
YM420D	ISOL. XMTR. TO ERFDS MUX-BUS "H"					
29HFB2	27HFB2 FLUR CUTOUT SWITCH		ABB		REF. DWG #23	10 POLE SW ASSY.
29HFB3	27HFB3 SLUR CUTOUT SWITCH					
29HFB4	27HFB4 SLUR CUTOUT SWITCH					
29HFT1A	27HFT1A FLUR CUTOUT SWITCH					
29HFT1B	27HFT1B FLUR CUTOUT SWITCH					
29HFT1C	27HFT1C FLUR CUTOUT SWITCH					
29HFT2	27HFT2 FLUR CUTOUT SWITCH					
29HGB2	27HGB2 FLUR CUTOUT SWITCH					
29HHB2	27HHB2 FLUR CUTOUT SWITCH					

PRELIM

FOR INFO ONLY

UNIT 2

DRAWING No. 441340 SHEET No. 1
REV. No. 31

DDN No. 2000000991 PART 000 VERSION 00
SHEET No. _____ of _____

PREPARED BY: AJL2 DATE: 3/5/12
REVIEWED BY: Dan L Dawson DATE: 3/5/12
VERIFIED BY: Jr Ramein DATE: 3/5/12

SKETCH No. DSK-5000032112
PART 000 VERSION 00 SHEET No. 3 of 3
SKETCH TYPE [1]
WALKDOWN PERFORMED: YES [X] NO [ ]

S....Drawings/NCFE/AJL2/

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FOR INFORMATION ONLY

4160 V BUS SECTION "F" (SEE NOTE 4)

TABLE OF DEVICES						
DEVICE NO.	FUNCTION	RATING	MFR	TYPE	CAT NO. & REF DWG NO.	REMARKS
V	VOLTMETER				REF. DWG*2	AT SWGR RM. (EAST SIDE WALL) AT C1W, C1G, C1H
V	SYNCHRONIZING VOLTMETER				↓	
V	SYNCHRONIZING VOLTMETER				↓	AT SWGR RM. (EAST SIDE WALL) AT C1R, C1G, C1H
SYN	4160V SYNCHROSCOPE				↓	
SYN	4160V SYNCHROSCOPE				↓	
25HF	SYNCHRONIZING CHECK REL 4KV BUS *F*	125VDC	W.E.Corp	SG	1342925	
25XHF	SYNCHRONIZING AUX REL 4KV BUS *F*				↓	
27HFU	UNDERVOLTAGE RELAY, ST-UP FOR BUS *F*				REF. DWG*2	
27HFB1	UNDERVOLTAGE RELAY BUS *F*				↓	
27HFB2	UNDERVOLTAGE RELAY BUS *F*				↓	
27HFT1	UNDERVOLTAGE TRIP RELAY, BUS *F*				↓	
27HFT2	UNDERVOLTAGE TRIP RELAY, BUS *F*				↓	
27HFB3, B4	UV RELAY BUS*F*(2ND LEVEL)				↓	
52HF1, 13&14	AIR CKT BREAKER 4KV BUS *F*		G.E.Co		REF. DWG*2	
59HFU	OVERVOLTAGE REL ST-UP FOR, 4KV BUS *F*				↓	
59HFG	OVERVOLTAGE REL DIESEL GENERATOR				↓	
YM418A	ISOL. XMTR. TO ERFDS MUX-BUS *F*		ACTION PAK		REF. DWG*5	
YM419B	ISOL. XMTR. TO ERFDS MUX-BUS *G*		↑		↓	
YM420D	ISOL. XMTR. TO ERFDS MUX-BUS *H*		↓		↓	
29HFB2	27HFB2 FLUR CUTOUT SWITCH		ABB		REF. DWG*23	10 POLE SW ASSY.
29HGB2	27HGB2 FLUR CUTOUT SWITCH		↓		↓	
29HHB2	27HHB2 FLUR CUTOUT SWITCH					

OFF ↑ ON	CONTACTS		POSITION OFF	POSITION ON	REMARKS
	1 o—o 1C	A		X	THIS DWG
	2 o—o 2C	B		X	THIS DWG
	3 o—o 3C	C		X	REF 20
	4 o—o 4C	D		X	SPARE

SYNCHRONIZING SWITCH 52HF7, 52HF13, 52HF14 52HG5, 52HG13, 52HG14, 52HH7, 52HH13 & 52HH14
USED AT LOC. SHF7, SHF13, SHF14, SHG5, SHG13, SHG14 SHH7, SHH13 & SHH14
G.E.Co. TYPE SB-1 MODEL #16SB1CF9

TABLE					
BUS SECT F		BUS SECT G		BUS SECT H	
DEVICE	LOC	DEVICE	LOC	DEVICE	LOC
52HF7	SHF7	52HG5	SHG5	52HH7	SHH7
52HF13	SHF13	52HG13	SHG13	52HH13	SHH13
52HF14	SHF14	52HG14	SHG14	52HH14	SHH14
25HF	RHF	25HG	RHG	25HH	RHH
25XHF	RHF	25XHG	RHG	25XHH	RHH
27HFB2	SHF12	27HGB2	SHG12	27HHB2	SHH12
27HFU	RHF	27HGU	RHF	27HHU	RHH
27HFT1,2	SHF13	27HGT1,2	SHG13	27HHT1,2	SHH13
59HFU	RHF	59HGU	RHG	59HHU	RHH
59HFG	SHF7	59HGG	SHG5	59HHG	SHH7
27HFB3	RHF	27HGB3	RHG	27HHB3	RHH
27HFB4	RHF	27HGB4	RHG	27HHB4	RHH

OFF ↑ ON	CONTACTS		POSITION OFF	POSITION ON	REMARKS
	A11 o—o B11	A		X	THIS DWG
	A12 o—o B12	B	X		SPARE
	A1 o—o B1	C		X	THIS DWG
	A5 o—o B5	D		X	REF 4,5,20
	A6 o—o B6	E	X		SPARE
	A7 o—o B7	F		X	THIS DWG *
	C11 o—o D11	G	X		SPARE
	C10 o—o D11	H		X	VOLTMETER
	C1 o—o D1	J	X		VOLTMETER
	C5 o—o D5	K	X		VOLTMETER
	C6 o—o D6	K		X	VOLTMETER
	C7 o—o D7	L	X		SPARE

SYNCHRONIZING SWITCH 52HF7, 52HF13, 52HF14 52HG5, 52HG13, 52HG14, 52HH7, 52HH13, 52HH14
USED AT LOC. CHF, CHG & CHH
W.E. CORP. TYPE W-2 STYLE *66IA15201
* FOR 52HF7, 52HG5, 52HH7 USED AT LOCATION CHF, CHG & CHH ARE SPARE

REFERENCES:

		BUS F	BUS G	BUS H
1.	DESCRIPTION OF ELECT. SCHEMATIC DIAG. SYMBOLS & CKT DESIGNATIONS--- 050003			
2.	SINGLE LINE METER & RELAY DIAG 4160V SWGR BUS SECTIONS F, G & H---- 441229, 441230			
3.	SINGLE LINE METER & RELAY DIAGRAM 12KV SWGR---------- 441227			
4.	SCHEMATIC DIAGRAM AUXILIARY TRANSFORMER NO. 22---------- 441349			
5.	SCHEMATIC DIAGRAM STARTUP TRANSFORMER NO. 22---------- 441345			
6.	SCHEMATIC DIAGRAM LOAD CENTER TRANSFORMERS---------- 441364			
7.	SINGLE LINE METER & RELAY DIAGRAM 125V DC SYSTEM---------- 441240			
8.	FUSE LIST---------- 066145			
9.	ARRANGEMENT AND DIAGRAM OF CONNECTIONS ERFDS---------- 445399			
10.	SINGLE LINE DIAGRAM 480V SYSTEM----------	441237	441238	441239
11.	SCHEMATIC DIAGRAM AUXILIARY SALT WATER PUMP----------	441287	441287	-
12.	SCHEMATIC DIAGRAM CONTAINMENT SPRAY PUMP----------		441307	441307
13.	SCHEMATIC DIAGRAM COMPONENT COOLING WATER PUMP----------	441311	441311	441311
14.	SCHEMATIC DIAGRAM REACTOR CHARGING PUMP 2-1 & 2-2----------	441312	441312	-
	SCHEMATIC DIAGRAM REACTOR CHARGING PUMP 2-3----------	-	4008751	-
15.	SCHEMATIC DIAGRAM RESIDUAL HEAT REMOVAL PUMP----------	-	441309	441309
16.	SCHEMATIC DIAGRAM AUXILIARY FEEDWATER PUMP----------	441302	-	441302
17.	SCHEMATIC DIAGRAM 4160V BUS AUTOMATIC TRANSFER----------	441352	441353	441354
18.	SCHEMATIC DIAGRAM SAFETY INJECTION PUMP----------	441315	-	441315
19.	SCHEMATIC DIAGRAM 4KV DIESEL GENERATORS----------	496275	441355	441355
20.	SCHEMATIC DIAGRAM 4KV DIESEL GENERATORS CKT. BKR----------	496276	441356	441356
21.	SCHEMATIC DIAGRAM 4160V AUTOMATIC TRANSFER----------	441352	441353	441354
22.	SCHEMATIC DIAGRAM - MAIN ANNUNCIATOR----------	500788	500787	500786
23.	WIRING DIAGRAM - 4KV SWITCHGEAR BUS----------	441570	441585	441594

EQUIPMENT LOCATION

SHF7	SWITCHGEAR 4KV BUS *F* CUBICLE 7
CHF	CONTROL BOARD ENG. SAFEGUARD BUS *F*
RHF	ENG. SAFEGUARD RELAY BOARD BUS *F*
HOI	HOT SHUT-DOWN REMOTE CONT. PNL. 1
SHF5J	SWGR 4KV BUS *F* SYNC. PNL. 1
SHF13PT	SWGR 4KV BUS *F* CUB 13 POT. TRANSF.

P.G.&E. SYSTEM PHASE SEQUENCE A-C-B

FUSE TABLE

LOC. NO.	MFR'S NO.	PG&E NO.
SHF12	UA	FU-13
SHG12	UB	FU-14
SHH12	UD	FU-15
	UE	FU-19
	UF	FU-NOV
SHH12	UH	FU-18A
	UJ	FU-18B

AB BC CA OFF ←	CONTACTS		CONTACTS OFF	POSITION A-B	B-C	C-A
	A11 o—o B11	A		X		
	A12 o—o B12	B			X	X
	A1 o—o B1	C				X
	A5 o—o B5	D		X		
	A6 o—o B6	E			X	
	A7 o—o B7	F				X

VOLTMETER SWITCH
USED AT LOC. CHF, CHG, CHH
W.E. CORP. TYPE W-2

AB BC CA OFF ←	CONTACTS		POSITION OFF	A-B	B-C	C-A
	1 o—o 1C	A		X		X
	2 o—o 2C	B		X	X	
	3 o—o 3C	C			X	
	4 o—o 4C	D				X

VOLTMETER SWITCH
G.E. CO. TYPE SB-1
USED AT LOC. SHF7, SHG5 & SHH7

SECT.		CIRCUIT NO.	ERFDS	ERFDS ISOLATING XMTER
BUS	F	FSH0	MUX05-9	YM418A
BUS	G	GSH0	MUX06-7	YM419B
BUS	H	HSH0	MUX07-8	YM420D

NOTES
1. POTENTIAL TRANSFORMERS & SECONDARY FUSES ARE LOCATED IN IDENTIFIED CELL.
2. A, B, C, A SECONDARY POTENTIALS OF PT'S : PHASE A-C, C-B & B-A FOR METERING. PHASE C-B FOR SYNCHRONIZING.
3. DISCONNECT SEAL IN CONTACT OF RELAY TO MAKE SELF-RESET.
4. 4160V BUS SECTION "G" & "H" SIMILAR TO BUS SECTION "F" SEE TABLE .
5. DELETED
6. FEEDER CABLE FROM UNIT 1 DISCONNECTED AND SPARED BELOW THE SWGR. ROOM CABLE TRAY.
7. CONTACT C1-C2 MAY ALLOW VOLTAGE READING ACROSS AN INTERNAL HIGH IMPEDANCE TRIP CIRCUIT MONITOR (TCM) WHERE NO VOLTAGE IS EXPECTED DURING POST MAINTENANCE TESTING. THE TCM FUNCTION IS NOT USED WITH AUTO TRANSFER SCHEME TO START D/G NOR WILL IT AFFECT ITS FUNCTION. (REF: 663332-220 PAGES 12-11, 6-17)

POTENTIAL & SYNCHRONIZING DIAGRAM 4160V BUS SECTION "F"

4160V BUS SECTION "G" & "H" SIMILAR. SEE TABLE

TO 125V RELAY BOARD DC BUS *F* CKT. NO. 11BU REF. 1

125VDC CONTROL SYNCHRONIZING RELAY

NUCLEAR SAFETY RELATED

KEY DWG. SECTION 2

UNIT 2

DATE	
11-29-2010	
D.D.	JBHK
R.E.	FAZI
I.V.	
P.E.	R2M5

REVISION DESCRIPTION: REVISED PER DFT-7972

ELECTRICAL
SCHEMATIC DIAGRAM
POTENTIAL & SYNCHRONIZING DIAGRAM
4160V BUS SECTIONS F, G, & H

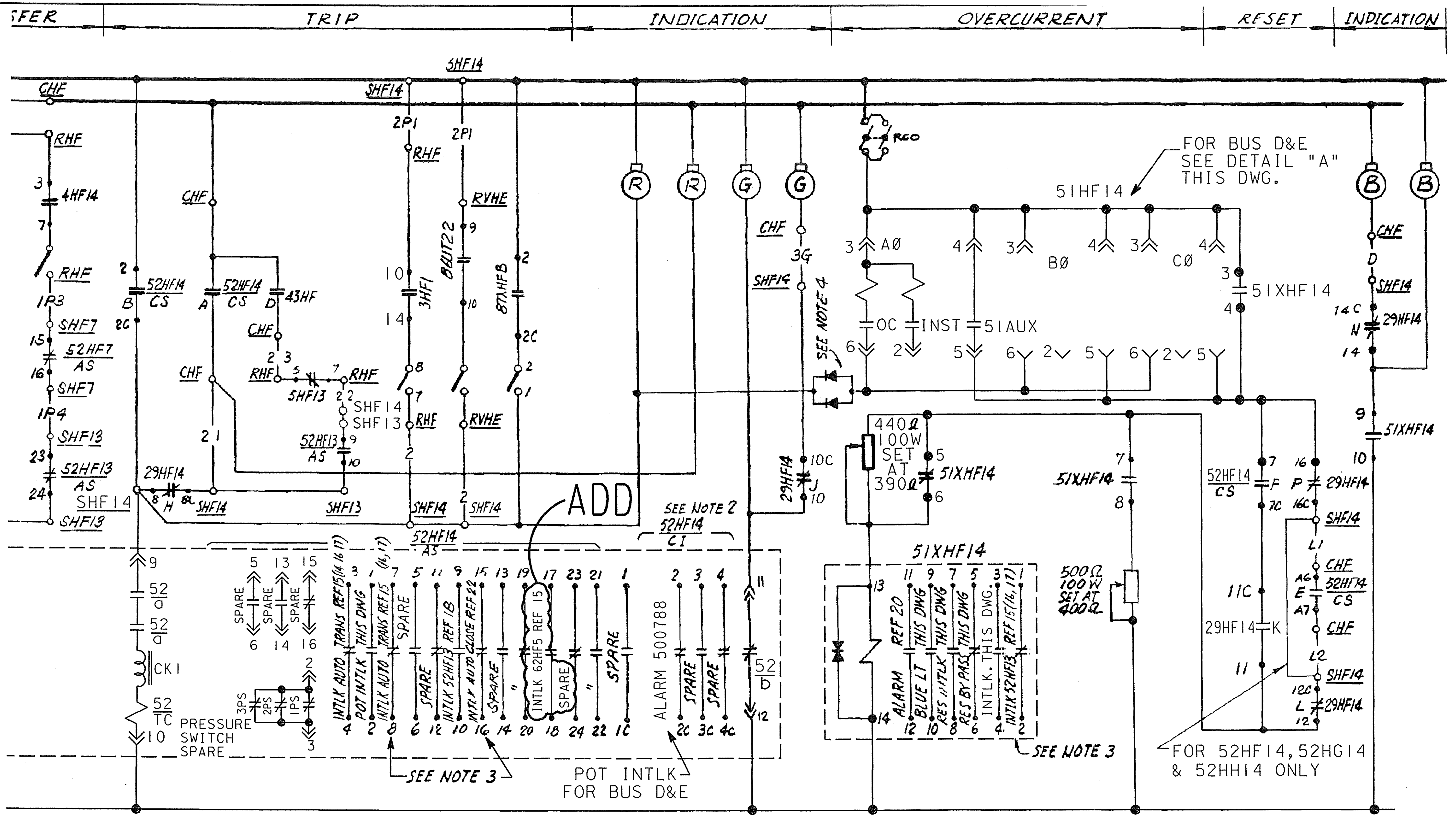
DIABLO CANYON POWER PLANT
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

DWG SCALE	
BILL OF MATL	
SIPSDSH	
SIPSD BYI	
DRAWING	441340
SHEET	1
PAGE	0
REV	31

U1-437614

RASTER-441340.dgn
DGN-441340.dgn
CAD User:dBMK Date:11-29-2010

Attachment 3
PG&E Drawing 441345



125 V D C CONTROL SCHEMATIC DIAGRAM FOR CIRCUIT BREAKER 52HF14 CKT Nº F14H

CIRCUIT BREAKERS 52HD5, 52HE13, 52HG14 AND 52HH14 ARE SIMILAR SEE TABLE BELOW

UNIT 2

PRELIMINARY - FOR INFORMATION ONLY

DRAWING No. 441345	SHEET No. 1	DDN No. 2000000991 PART 000 VERSION 00	
REV. No. 17		SHEET No. ____ of ____	
PREPARED BY: AJL2	DATE: 3/5/12	SKETCH No. DSK-5000032109	
REVIEWED BY: [signature]	DATE: 3/5/12	PART 000 VERSION 00 SHEET No. 1 of 2	
VERIFIED BY: [signature]	DATE: 3/5/12	SKETCH TYPE I WALKDOWN PERFORMED: YES X NO	

S....Drawings/NCFF/AJL2/U2 BUS F

DEVICE TABLE

DEVICE Nº	FUNCTION	RATING OR RANGE	MFR	TYPE	CAT Nº OR REF DWG	REMARKS
3HF1	DIESEL AUTO TRANSFER INTLK RELAY	—	—	—	15	
5HF13	START UP AUTO TRANSFER TRIP RELAY	—	—	—	15	
25XHF	4 KV BUS F SYNCHRONISM CHECK AUX RELAY	—	—	—	13	
51HF14	START UP TRANSFORMER 22 OC RELAY	—	—	—	5	
51XHF14	↓ ↓ ↓ AUX RELAY	24 V D C	G E	HFA	12HFA51A46H	
52HF13	4KV BUS F FDR CKT BKR (AUX TRANSFORMER)	—	—	—	(5 & 18)	
63UT22	START UP TRANSFORMER 22 SUDDEN PRESS RELAY	—	—	—	4	
63XUT22	↓ ↓ ↓ AUX RELAY	125V D C	W	A R	606B017A09	
63YUT22	↓ AUX RELAY	0.2/2.0AMP	GE	HAA	12HAA15A4F	
87UT22	DIFFERENTIAL RELAY	—	—	—	(4 & 8)	
87XUT22	↓ ↓ ↓ AUX RELAY	125V D C	W	A R	606B017A09	
87XHFB	4KV BUS F DIFFERENTIAL AUX RELAY	—	—	—	11	
27DCHF14	CONTROL BUS DC UV RELAY	125V DC	AGASTAT	EGPD		
27DC1HF14	↓ ↓ ↓ ↓ ↓	↓	↓	↓		
62HF5	STARTUP CLOSE-IN TIMER BUS F	125VDC	ABB	62T	15	
62HF14	BKR CLOSING SPRING TIME DELAY RELAY	125VDC	AGASTAT	ETR		
4HF14	4 KV BUS F AUTO TRANSFER RELAY	—	—	—	15	
86UT22	START UP TRANSFORMER 22 TRIP LOCKOUT RELAY	125V DC	W	WL		
43HF	4 KV BUS F TRANSFER SWITCH	—	—	—	18	
52HF14	4KV BUS F FDR. FOR CKT. BKR. (ST-UP) TRANSF.	——	——	——	(5)	

ADD

ADD
DWG CHANGE
ONLY

EQUIPMENT LOCATION

CH	CONTROL BOARD STATION ELECTRIC
CHE	CONTROL BOARD, ENGINEERED SAFEGUARD BUS F
RHF	RELAY BOARD ENGINEERED SAFEGUARD BUS F
RHFA	AUX RELAY BOARD ENGINEERING SAFEGUARD BUS F
SHF14	SWITCHGEAR 4 KV BUS F, CUBICLE 14
RVHE	STATION ELECTRIC RELAY BOARD E
TQU22	START UP TRANSF Nº 22 CONTROL CABINET

ADD

UNIT 2

DRAWING No. 441345 SHEET No. 1
REV. No. 17

DDN No. 2000000991 PART 000 VERSION 00
SHEET No. ____ of ____

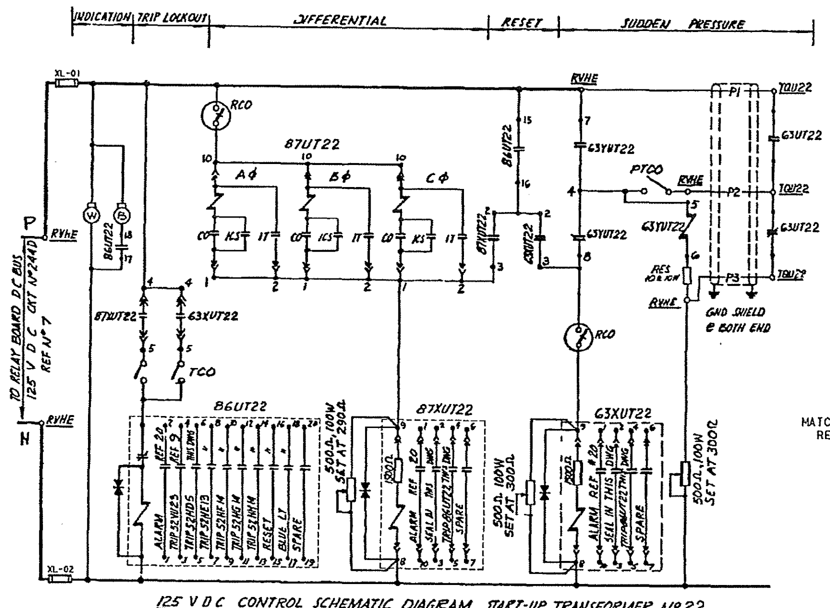
PREPARED BY: AJL2 DATE: 3/5/12
REVIEWED BY: [signature] DATE: 3/9/12
VERIFIED BY: [signature] DATE: 3/5/12

SKETCH No. DSK-5000032109
PART 000 VERSION 00 SHEET No. 2 of 2
SKETCH TYPE [I]
WALKDOWN PERFORMED: YES [X] NO [ ]

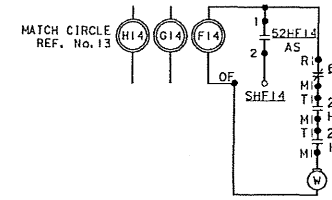
PRELIMINARY - FOR INFORMATION ONLY

S....Drawings/NCFE/AJL2/U2 BUS F

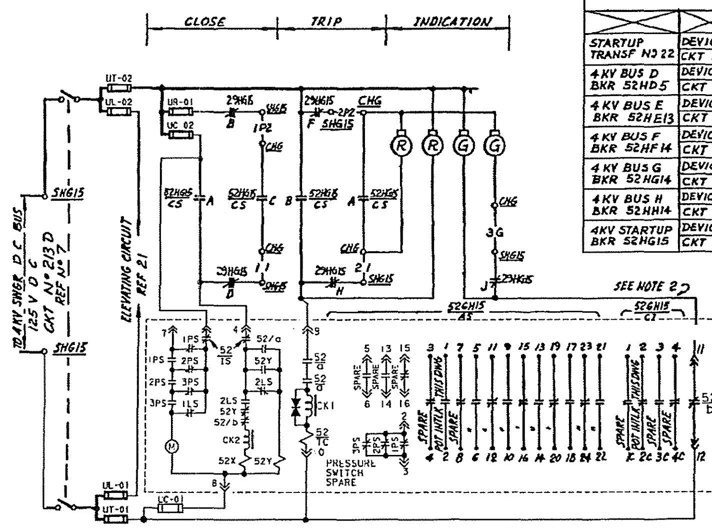
441345



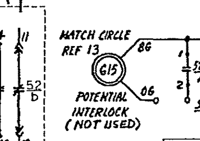
125 V D C CONTROL SCHEMATIC DIAGRAM START-UP TRANSFORMER Nº 22 PROTECTIVE RELAYING CKT Nº THU1



POTENTIAL INTERLOCK ⊕



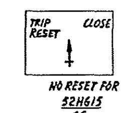
125 V D C CONTROL SCHEMATIC DIAGRAM FOR CKT BKR 52HG15 CKT Nº G15H



ALARM CIRCUITS		OVER-CURRENT	ISO SW LOCAL	DIFF	SUDDEN PRESS	TRIP LOCKOUT
STARTUP TRANSF NO 22	DEVICE NO	—	—	87XUT22	63XUT22	86UT22
	CKT NO	—	—	AD2911D	AY2908D	AY2939D
4 KV BUS D BKR 52HD5	DEVICE NO	51XHD5	29HD5			
	CKT NO	AT2907D	AY2937D			
4 KV BUS E BKR 52HE13	DEVICE NO	51XHE13	29HE13			
	CKT NO	AT29HD	AY2938D			
4 KV BUS F BKR 52HF14	DEVICE NO	51XHF14	29HF14			
	CKT NO	AT4404DF	AY4417DF			
4 KV BUS G BKR 52HG14	DEVICE NO	51XHG14	29HG14			
	CKT NO	AT4304DG	AY4317DG			
4 KV BUS H BKR 52HH14	DEVICE NO	51XHH14	29HH14			
	CKT NO	AT4204DH	AY4217DH			
4KV STARTUP BKR 52HG15	DEVICE NO	—	29HG15			
	CKT NO	—	AY4318DG			

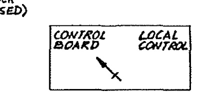
DEVICE TABLE

DEVICE Nº	FUNCTION	RATING OR RANGE	MFR	TYPE	CAT Nº OR REF DWG	REMARKS
3HF1	DIESEL AUTO TRANSFER INTLK RELAY	—	—	—	15	
5HF13	START UP AUTO TRANSFER TRIP RELAY	—	—	—	15	
25XHF	4 KV BUS F SYNCHRONISM CHECK AUX RELAY	—	—	—	13	
51HF14	START UP TRANSFORMER 22 OC RELAY	—	—	—	5	
51XHF14	↓ ↓ ↓ AUX RELAY	24 V D C	G E	HFA	12HFA51A46H	
52HF13	4 KV BUS F FDR CKT BKR (AUX TRANSFORMER)	—	—	—	(5 & 18)	
63UT22	START UP TRANSFORMER 22 SUDDEN PRESS RELAY	—	—	—	4	
63XUT22	AUX RELAY	125V D C	W	AR	606B017A09	
63YUT22	AUX RELAY	02/20 AMP	GE	HAA	12HAA15A4F	
87UT22	DIFFERENTIAL RELAY	—	—	—	(4 & 8)	
87XUT22	↓ ↓ ↓ AUX RELAY	125V D C	W	AR	606B017A09	
87XHFB	4 KV BUS F DIFFERENTIAL AUX RELAY	—	—	—	11	
27DCHF14	CONTROL BUS DC UV RELAY	125V DC	16ASTAT	EGPD		
27DC1HF14	↓ ↓ ↓ ↓ ↓	↓	↓	↓		
62HF14	BKR CLOSING SPRING TIME DELAY RELAY	↓	↓	ETR		
4HF14	4 KV BUS F AUTO TRANSFER RELAY	-	-	-	15	
86UT22	START UP TRANSFORMER 22 TRIP LOCKOUT RELAY	125V DC	W	WL		
43HF	4 KV BUS F TRANSFER SWITCH	—	—	—	18	
52HF14	4KV BUS F FDR.FOR CKT.BKR.(ST-UP) TRANSF.	—	—	—	(5)	



CONTACTS		TRIP RESET	NORMAL AFTER TRIP	NORMAL AFTER CLOSE	CLOSE	REMARKS
1—1C	A				X	THIS DWG
2—2C	B	X				THIS DWG
3—3C	C	X			X	SPARE
4—4C	D				X	SPARE
5—5C	E		X	X		SPARE
7—7C	F			X	X	SPARE

CONTROL SWITCH 52HG15/CS
USED AT LOCATION SHG15

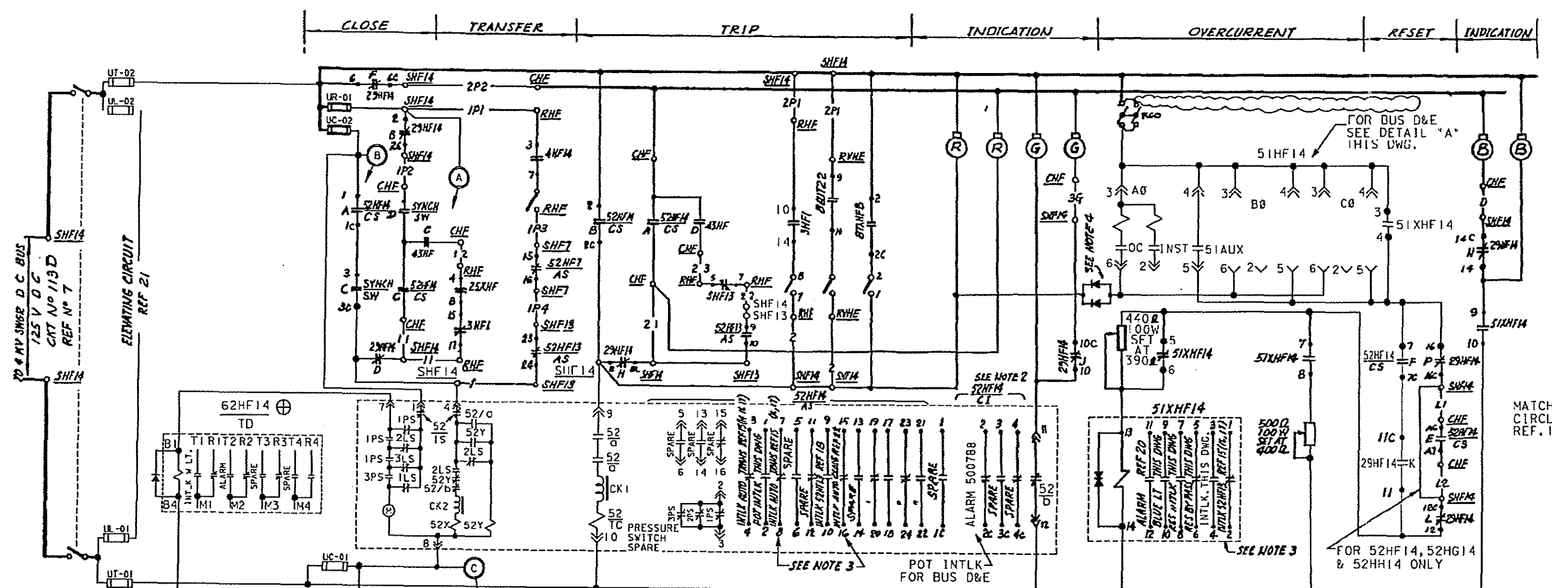


CONTACTS		POSITIONS CONTROL BOARD	POSITIONS LOCAL	REMARKS
1—1C	A		X	ALARM
2—2C	B	X		INTERLOCK
3—3C	C		X	SPARE
4—4C	D	X		INTERLOCK
5—5C	E		X	SPARE
6—6C	F	X		INTERLOCK
7—7C	G		X	SPARE
8—8C	H	X		INTERLOCK
9—9C	I		X	SPARE
10—10C	J	X		GREEN LIGHT
11—11C	K		X	SPARE
12—12C	L	X		SPARE
13—13C	M		X	SPARE
14—14C	N	X		SPARE
15—15C	O		X	SPARE
16—16C	P	X		SPARE

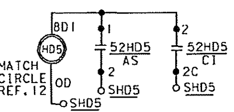
ISOLATING SWITCH 29HG15
USED AT LOCATION SHG15

NOTES:

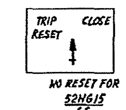
1. DELETED
2. CELL INTERLOCK SWITCHES ARE SHOWN WITH BREAKER IN OPERATING POSITION.
3. THE EQUIVALENT CONTACT FOR BREAKER 52HD5 AND 52HE13, IS A SPARE CONTACT.
4. TRIPPING DIODE PG&E DESIGN STD DWG. No. 455021 ASSEMBLY No. 2.
5. FOR DESCRIPTION OF CIRCUIT BREAKER INTERNAL DEVICES SEE REF. 23, 24 & 25.
6. ⊕INDICATES FOR BUS F, G, & H ONLY.



125 V D C CONTROL SCHEMATIC DIAGRAM FOR CIRCUIT BREAKER 52HF14 CKT Nº F14H
CIRCUIT BREAKERS 52HD5, 52HE13, 52HG14 AND 52HH14 ARE SIMILAR SEE TABLE BELOW



POTENTIAL INTERLOCK
(FOR BUS D & E ONLY)
(NOT USED)



CONTACTS		TRIP RESET	NEUTRAL AFTER TRIP	NEUTRAL AFTER CLOSE	CLOSE	REMARKS
A3—B3	A	X				THIS DWG
A12—B12	B		X	X		SPARE
A1—B1	C				X	THIS DWG
A6—A5	D	X	X			SPARE
—A7	E			X	X	SPARE
B6—B5	F	X	X			SPARE
—B7	G			X	X	SPARE

CONTROL SWITCH 52HG15/CS
USED AT LOCATION CHG
SPRING RETURN TO NEUTRAL
(Ⓦ TYPE W 2 STYLE Nº 505A638G01)

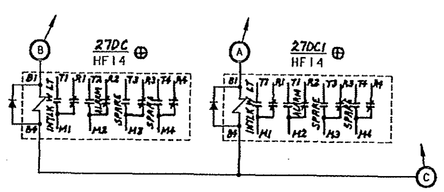
EQUIPMENT LOCATION

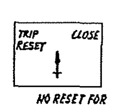
- CH — CONTROL BOARD STATION ELECTRIC
- CHF — CONTROL BOARD, ENGINEERED SAFEGUARD BUS F
- RHF — RELAY BOARD ENGINEERED SAFEGUARD BUS F
- SHF14 — SWITCHGEAR 4 KV BUS F, CUBICLE 14
- RVHE — STATION ELECTRIC RELAY BOARD E
- TQU22 — START UP TRANSF Nº 22 CONTROL CABINET

REFERENCES

	DWG. NO.
1. DESCRIPTION OF ELECTRICAL SCHEMATIC DIAGRAM SYMBOLS & CKT DESIGNATIONS	050003
2. LIST OF EQUIPMENT LOCATION CODES	103013
3. SINGLE LINE METER & RELAY DIAG 12 KV START-UP SYSTEM	437530
4. ↓ 4160V SYSTEM BUS SECT. D&E	441228
5. ↓ 4160V SYSTEM BUS SECT. F	441229
6. ↓ 4160V SYSTEM BUS SECT. G&H	441230
7. ↓ 250/125 V DC SYSTEM	441240
8. SCHEMATIC DIAGRAM STAND BY START-UP TRANSF.NO.22 & ASSOCIATED CIR.BKRS. SH.1	441344
9. ↓ STAND BY START-UP TRANSF.NO.21 & ASSOCIATED CIR.BKRS. SH.2 (U1)	437660
10. ↓ 4160 V BUS DIFFERENTIAL SH.1 (BUS SECT. D&E)	441342
11. ↓ 4160 V ↓ SH.2 (BUS SECT.F G&H))	441343
12. ↓ BUS POTENTIAL AND SYNCHRONIZING 4160V SYSTEM SH.1 (D&E)	441339
13. ↓ ↓ 4160V SYSTEM SH.2 (F G&H)	441340
14. ↓ 4160 V BUS SECTION D & E AUTOMATIC TRANSFER	441351
15. ↓ F	441352
16. ↓ G	441353
17. ↓ H	441354
18. ↓ AUXILIARY TRANSFORMER 22 & ASSOCIATED CIR BKRS SH.2	441349
19. ↓ START-UP TRANSF.11 & ASSOCIATED CKTS.BKRS.SH.2	437619
20. ↓ MAIN ANNUNCIATOR SH.16,17,18 & 19	500786,87,88,89

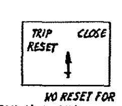
21. 4160V SWITCHGEAR MFR DRAWING — REC.DWG.NO.663360
22. SCHEMATIC DIAGRAM 4KV DIESEL GEN & ASSOC CIRCUITS BREAKERS — DWG.NO.441356
23. SCHEMATIC DIAGRAM VENDOR'S — REC.DWG.NO.6009838-65
24. P.D.S. CONTROL CIRCUITS SCHEMATIC DIAGRAM — REC.DWG.NO.6009838-69
25. P.D.S. CONTROL CIRCUITS SCHEMATIC DIAG(FOR 52HE13 ONLY) — REC.DWG.NO.6009838-162





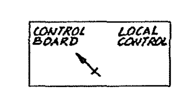
CONTACTS		TRIP RESET	NORMAL AFTER TRIP	NORMAL AFTER CLOSE	CLOSE	REMARKS
1—1C	A				X	THIS DWG
2—2C	B	X				THIS DWG
3—3C	C	X			X	SPARE
4—4C	D				X	SPARE
5—5C	E		X	X		SPARE
7—7C	F			X	X	THIS DWG

CONTROL SWITCHES 52HD5/CS, 52HE13/CS, 52HF14/CS, 52HG14/CS, 52HH14/CS USED AT LOCATIONS SHD5, SHE13, SHF14, SHG14 & SHH14



CONTACTS		TRIP RESET	NEUTRAL AFTER TRIP	NEUTRAL AFTER CLOSE	CLOSE	REMARKS
A3—B3	A	X				THIS DWG
A12—B12	B		X	X		SPARE
A1—B1	C				X	THIS DWG
A6—A5	D	X	X			SPARE
—A7	E			X	X	THIS DWG
B6—B5	F	X	X			SPARE
—B7	G			X	X	SPARE

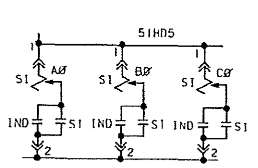
CONTROL SWITCHES 52HD5/CS, 52HE13/CS, 52HF14/CS, 52HG14/CS, 52HH14/CS USED AT LOCATIONS CH CHE CHG & CHH
SPRING RETURN TO NEUTRAL
(Ⓦ TYPE W 2 STYLE Nº 505A638G01)



CONTACTS		POSITIONS CONTROL BOARD	POSITIONS LOCAL	REMARKS
1—1C	A		X	ALARM
2—2C	B	X		INTERLOCK
3—3C	C		X	SPARE
4—4C	D	X		INTERLOCK
5—5C	E		X	SPARE
6—6C	F	X		INTERLOCK
7—7C	G		X	SPARE
8—8C	H	X		INTERLOCK
9—9C	I		X	SPARE
10—10C	J	X		GREEN LIGHT
11—11C	K		X	RESET
12—12C	L	X		RESET
13—13C	M		X	SPARE
14—14C	N	X		BLUE LIGHT
15—15C	O		X	SPARE
16—16C	P	X		INTERLOCK

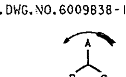
ISOLATING SWITCHES 29HD5 29HE13, 29HF14 29HG14 & 29HH14 USED AT LOCATIONS SHD5, SHE13, SHF14 SHG14 & SHH14

FOR INFORMATION ONLY



DETAIL 'A'
(FOR BUS D & E ONLY)

CIRCUIT BKR Nº	CIRCUIT Nº	BUS SECT	125 V D C CKT Nº	BUS DIFFERENTIAL RELAY	BUS DIFFERENTIAL LOCATION	BUS DIFFERENTIAL CONTACT	CKT BKR OVERCURRENT RELAY	CKT BKR OVERCURRENT LOCATION	CKT BKR OVERCURRENT CONTACT	SYNCHRONISM CHECK RELAY	SYNCHRONISM CHECK LOCATION	SYNCHRONISM CHECK CONTACT	START UP AUTO TRANSFER CLOSE RELAY	START UP AUTO TRANSFER CLOSE LOCATION	START UP AUTO TRANSFER CLOSE CONTACT	START-UP AUTO TRANSFER INTLK RELAY	START-UP AUTO TRANSFER INTLK LOCATION	START-UP AUTO TRANSFER INTLK CONTACT	AUX TRANSFORMER 22 BUS FDR BKR BKR Nº	AUX TRANSFORMER 22 BUS FDR BKR LOCATION	AUX TRANSFORMER 22 BUS FDR BKR CONTACT	DIESEL AUTO TRANSFER INTLK RELAY	DIESEL AUTO TRANSFER INTLK LOCATION	DIESEL AUTO TRANSFER INTLK CONTACT CLOSE	DIESEL AUTO TRANSFER INTLK CONTACT TRIP	MANUAL TRANSFER SWITCH SW Nº	MANUAL TRANSFER SWITCH LOCATION	MANUAL TRANSFER SWITCH CONTACT CLOSE		MANUAL TRANSFER SWITCH CONTACT TRIP		TRANSFORMER LOCKOUT RELAY	TRANSFORMER LOCKOUT LOC	TRANSFORMER LOCKOUT CONTACT	START-UP AUTO TRANSFER CLOSE BKR NO.	START-UP AUTO TRANSFER CLOSE LOCATION	START-UP AUTO TRANSFER CLOSE CONTACT
52HF14	F14H	F	113 D	87XHFB	SHF14	2 2C	51XHF14	SHF14		25XHF	RHF	4-8	4HF14	RHE	3-7	5HF13	RHF	15-17	52HF13	SHF13	9-10	3HF1	RHF	15-17	14-16	43HF	CHF	C		D		86UT22	RVHE	9-10	52HF7, 52HF13	SHF5, SHF13	15-16, 23-24
52HG14	G14H	G	213 D	87XHGB	SHG14	2 2C	51XHG14	SHG14		25XHG	RHG	4-8	4HG14	RHG	3-7	5HG13	RHG	15-17	52HG13	SHG13	9-10	3HG1	RHG	15-17	14-16	43HG	CHG	C		D		86UT22	RVHE	11-12	52HG5, 52HG13	SHG5, SHG13	15-16, 23-24
52HH14	H14H	H	314 D	87XHHB	SHH14	2 2C	51XHH14	SHH14		25XHH	RHH	4-8	4HH14	RHH	3-7	5HH13	RHH	15-17	52HH13	SHH13	9-10	3HH1	RHH	15-17	14-16	43HH	CHH	C		D		86UT22	RVHE	13-14	52HH7, 52HH13	SHH7, SHH13	15-16, 23-24
52HD5	D05H	D	340 D	87XHDB	SHD5	2 2C	51XHD5	SHD5		25XHD	RVHD	4-8	4HD5	RVHD	3-7	5HD4	RVHD	3-6	52HD4	SHD4	9-10	—	—	—	—	43HD	CH	C		D		86UT22	RVHE	5-6	52HD4	SHD4	23-24
52HE13	E13H	E	234 D	87XHEB	SHE13	2 2C	51XHE13	SHE13		25XHE	RVHE	4-8	4HE13	RVHE	3-7	5HE14	RVHE	3-6	52HE14	SHE14	9-10	—	—	—	—	43HE	CH	C		D		86UT22	RVHE	7-8	52HE4	SHE14	23-24



NUCLEAR SAFETY RELATED

KEY DWG. SECTION 2

UNIT 2

DATE 12/9/04		DESCRIPTION	COORDINATION	
DWN.	HIBF	Revised per FCT 029733	NUCL.	-
R.E.	SMB5		MECH.	-
INDEP. VERIFIER	-		ELEC.	-
			CIVIL	-
			PIPING	-
P.E.	RWB7		I&C	-
REVISION INFORMATION				

SCHEMATIC DIAGRAM
STANDBY STARTUP TRANSFORMER
No. 22 AND ASSOCIATED CIRCUIT BREAKERS

DIABLO CANYON POWER PLANT
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

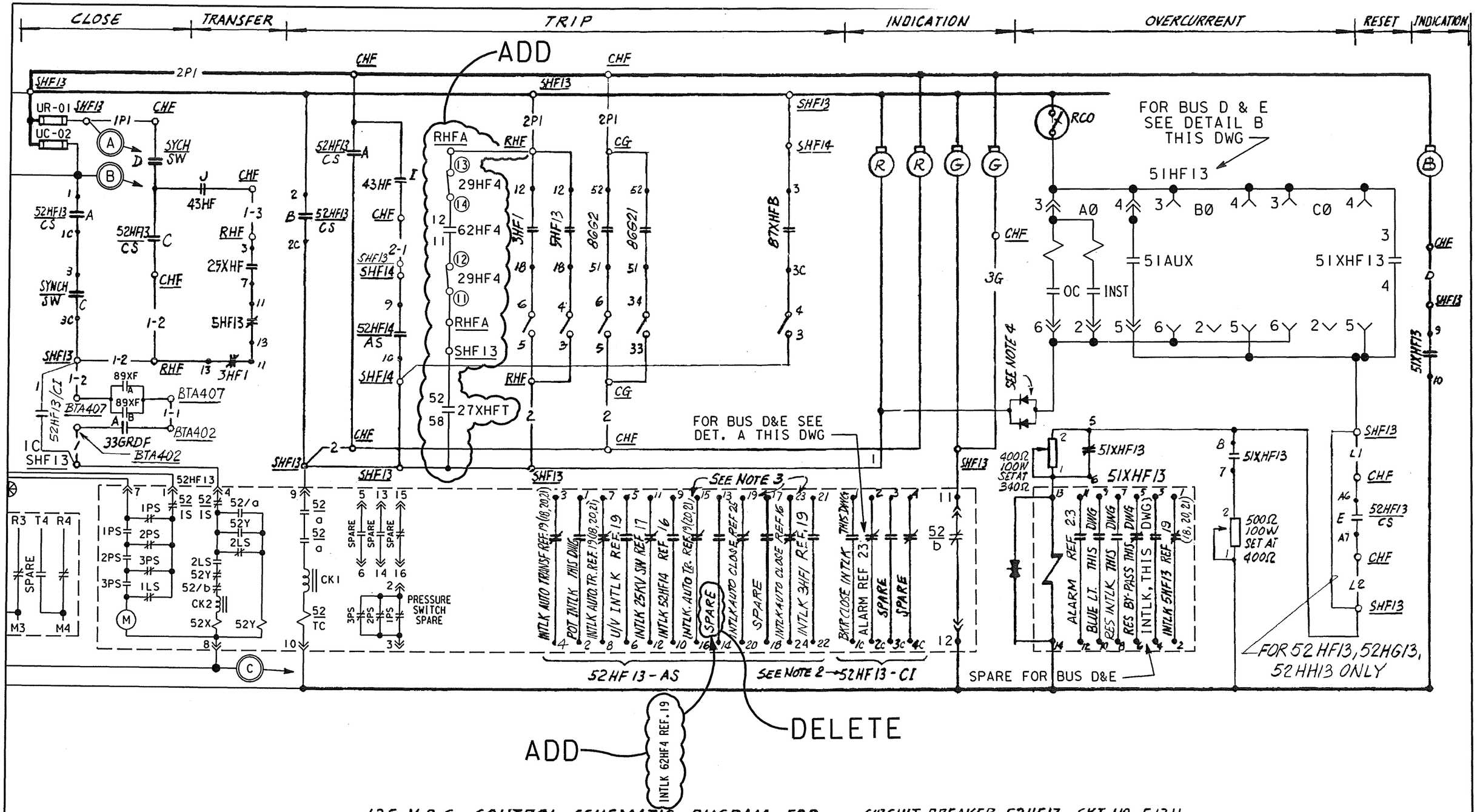
REGISTERED PROFESSIONAL ENGINEER RICHARD WILLIAM BECKER E 9776 ELECTRICAL STATE OF CALIFORNIA

DWG SCALE
BILL OF MATL
SUPSDS
SUPSD BY
SHEET NO. 1 OF

441345 REV 17

U1-437619

Attachment 4
PG&E Drawing 441349



125 V.D.C. CONTROL SCHEMATIC DIAGRAM FOR CIRCUIT BREAKER 52HF13 CKT Nº F13H
AIR CIRCUIT BREAKERS 52HD4, 52HE14, 52HG13 AND 52HH13 ARE SIMILAR SEE TABLE BELOW

UNIT 2

DRAWING No. 441349 SHEET No. 1	DDN No. 2000000991 PART 000 VERSION 00
REV. No. 17	SHEET No. ____ of ____
PREPARED BY: AJL2 DATE: 3/5/12	SKETCH No. DSK-5000032110
REVIEWED BY: Dan L Brown DATE: 3/5/12	PART 000 VERSION 00 SHEET No. 1 of 2
VERIFIED BY: E Reimer DATE: 3/5/12	SKETCH TYPE [1]
	WALKDOWN PERFORMED: YES [X] NO [ ]

PRELIMINARY – FOR INFORMATION ONLY

S:...Drawings/NCEE/AJL2/

DEVICE No.	FUNCTION	RATING OR RANGE	MFR	TYPE	CAT No. OR REF. DWG.	REMARKS
3HF1	DIESEL #13 AUTO TRANSFER INTLK RELAY	—	—	—	19	
5HF13	4KV BUS F START-UP AUTO TRANSFER TRIP RELAY	—	—	—	19	
25XHF	4 KV. BUS F SYNCHRONISM CHECK AUX. RELAY	—	—	—	11	
51AT22	AUX. TRANSFORMER 22 OVERCURRENT RELAY	—	—	—	4	
51XAT22	↓ ↓ ↓ ↓ AUX. RELAY	125V.D.C.	W	AR	606B017A09	
51HF13	4KV BUS F FDR. O/C RELAY (AUX. TRANSF.)	—	—	—	5	
51XHF13	↓ ↓ AUX. RELAY	24V.D.C.	GE	HFA	12HFA51A46H	
52HF14	↓ ↓ CKT BKR (START-UP TRANSF.)	—	—	—	5 & 6	
63AT22	AUX. TRANSFORMER 22 SUDDEN PRESSURE RELAY	—	—	—	3	
63XAT22	↓ ↓ ↓ ↓ AUX. RELAY	125V.D.C.	W	AR	606B017A09	
63YAT22	↓ ↓ ↓ ↓ AUX. RELAY	0.2~2.0 AMP	GE	HAA	12HAA15A4F	
86G2	UNIT TRIP LOCKOUT RELAY	—	—	—	12	
86G21	↓ ↓ ↓ ↓	—	—	—	13	
87AT22	AUX. TRANSFORMER 22 DIFFERENTIAL RELAY	—	—	—	4	
87XAT22	↓ ↓ ↓ ↓ AUX. RELAY	125V.D.C.	W	AR	606B017A09	
87XHFB	4 KV BUS F DIFFERENTIAL AUX RELAY	—	—	—	9	
89XD, E, F, G, H	25 KV MOTOR OPERATED DISC. AUX SWITCH	—	—	—	17	
33GRDD, E, F, G, H	25 KV ISO PHASE BUS GROUND SWITCH	—	—	—	17	CONTACT IS CLOSED WHEN GRD. SW. IS OPEN
52HF13	4KV BUS F FDR CKT BKR (AUX TRANSF)	—	—	—	5	
27DCHF13	CONTROL BUS DC UV RELAY	125VDC	AGASTAT	EGPD	050011	
27DC1HF13	CONTROL BUS DC UV RELAY	125VDC	AGASTAT	EGPD	050011	
62HF4	AUX CLOSE-IN TIMER BUS F	125VDC	ABB	62T	19	
62HF13	BKR CLOSING SPRING TIME DELAY REL	125VDC	AGASTAT	ETR	050011	

ADD

EQUIPMENT LOCATION

RHF	ENG SFGRD RELAY BOARD BUS F
RHFA	ENG SFGRD AUX RELAY BOARD BUS F
BTA401	TERM BOX A401 FOR DEVICE 89XF
BTA402	↓ ↓ A402 ↓ ↓ 33GRSF
RG	RELAY BOARD GENERATOR
CG	CONTROL BOARD GENERATOR
RVHD	STATION ELECTRIC RELAY BOARD D
CHF	CONTROL BOARD ENG SAFEGUARD BUS F
SHF13	SWITCH GEAR 4 KV BUS F CUBICLE 13
TQA22	AUX TRANSF. 22 CONTROL CAB.
CH	CONTROL BOARD STATION ELECTRIC

ADD

PRELIMINARY - FOR INFORMATION ONLY

UNIT 2

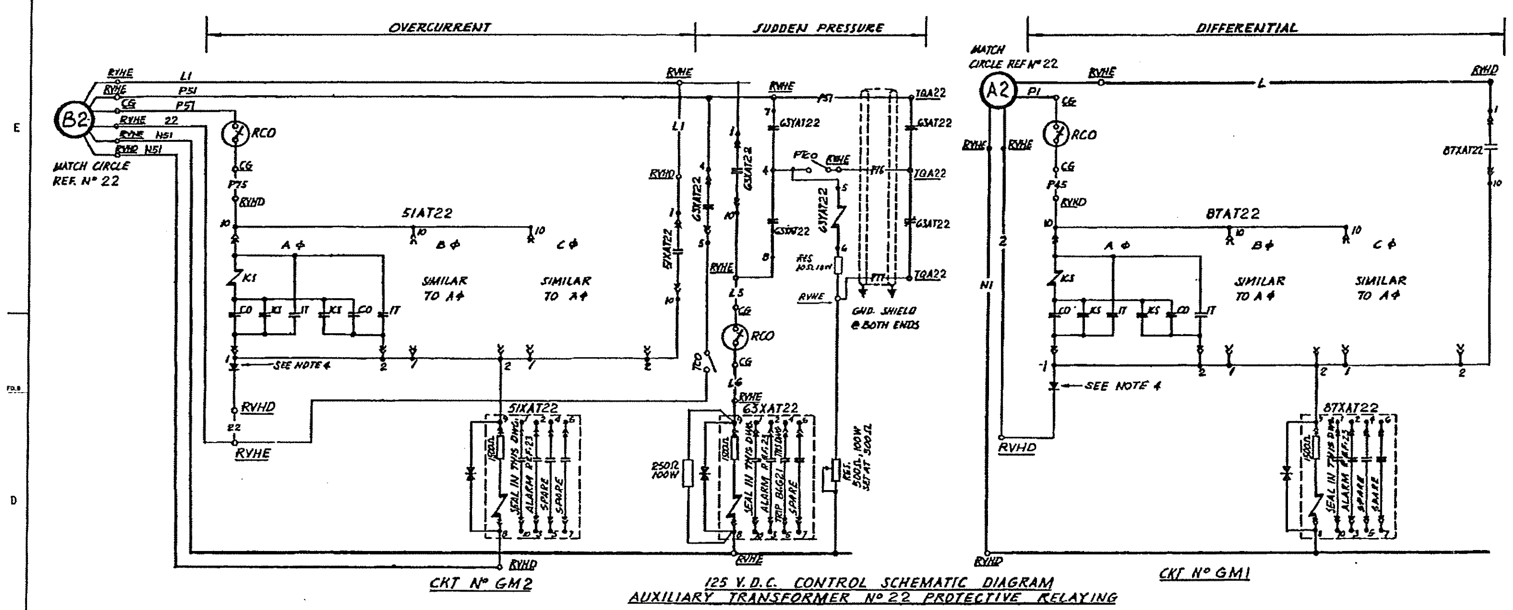
DRAWING No. 441349 SHEET No. 1
REV. No. 17

DDN No. 2000000991 PART 000 VERSION 00
SHEET No. ____ of ____

PREPARED BY: AJL2 DATE: 3/5/12
REVIEWED BY: Doug K Brown DATE: 3/5/12
VERIFIED BY: G Reeman DATE: 3/5/12

SKETCH No. DSK-5000032110
PART 000 VERSION 00 SHEET No. 2 of 2
SKETCH TYPE [I]
WALKDOWN PERFORMED: YES [X] NO [ ]

S....Drawings/NCFE/AJL2/



125 V.D.C. CONTROL SCHEMATIC DIAGRAM
AUXILIARY TRANSFORMER N° 22 PROTECTIVE RELAYING

DEVICE N°	FUNCTION	RATING OR RANGE	MFR	TYPE	CAT N° OR REF. DWG.	REMARKS
3HF1	DIESEL "B AUTO TRANSFER INTLK RELAY	—	—	—	19	
5HF13	4KV BUS F START-UP AUTO TRANSFER TRIP RELAY	—	—	—	19	
25XHF	4 KV. BUS F SYNCHRONISM CHECK AUX RELAY	—	—	—	11	
51AT22	AUX. TRANSFORMER 22 OVERCURRENT RELAY	—	—	—	4	
51XAT22	↓ AUX RELAY	125 V.D.C.	W	AR	606B017A09	
51HF13	4 KV BUS F FDR. O/C RELAY (AUX. TRANSF.)	—	—	—	5	
51XHF13	↓ AUX. RELAY	24 V.D.C.	GE	HFA	12HFA51A46H	
52HF14	↓ CKT BKR (START-UP TRANSF.)	—	—	—	5 & 16	
63AT22	AUX. TRANSFORMER 22 SUDDEN PRESSURE RELAY	—	—	—	3	
63XAT22	↓ AUX. RELAY	125 V.D.C.	W	AR	606B017A09	
63YAT22	↓ AUX. RELAY	0.2-2.0 AMP	GE	HAA	12HAA15A4F	
86G2	UNIT TRIP LOCKOUT RELAY	—	—	—	12	
86G21	↓	—	—	—	13	
87AT22	AUX. TRANSFORMER 22 DIFFERENTIAL RELAY	—	—	—	4	
87XAT22	↓ AUX. RELAY	125 V.D.C.	W	AR	606B017A09	
87XHFB	4 KV BUS F DIFFERENTIAL AUX RELAY	—	—	—	9	
89XD,E,F,G,H	25 KV MOTOR OPERATED DISC. AUX SWITCH	—	—	—	17	
33GRDD,E,F,G,H	25 KV ISO PHASE BUS GROUND SWITCH	—	—	—	17	CONTACT IS CLOSED WHEN GRD. SW. IS OPEN
52HF13	4KV BUS F FDR CKT BKR (AUX TRANSF)	—	—	—	5	
27DCHF13	CONTROL BUS DC UV RELAY	25VDC	AGASTAT	EGPD	050011	
27DC1HF13	CONTROL BUS DC UV RELAY	25VDC	AGASTAT	EGPD	050011	
62HF13	BKR CLOSING SPRING TIME DELAY REL	25VDC	AGASTAT	ETR	050011	

ALARM CIRCUIT TABLE

		O.C.	SUDDEN PRESSURE	DIFF.
AUX. TRANSFORMER N° 12	DEVICE N°	51XAT22	63XAT22	87XAT22
	CKT. N°	AI2908D	AY2907D	AD2900D
4 KV BUS D CKT BKR 52HD4	DEVICE N°	51XHD4		
	CKT. N°	AI2906D		
4 KV BUS E CKT BKR 52HE14	DEVICE N°	51XHE14		
	CKT. N°	AI2910D		
4 KV BUS F CKT BKR 52HF13	DEVICE N°	51XHF13		
	CKT N°	AI4403DF		
4 KV BUS G CKT BKR 52HG13	DEVICE N°	51XHG13		
	CKT N°	AI4303DG		
4 KV BUS H CKT BKR 52HH13	DEVICE N°	51XHH13		
	CKT N°	AI4203DH		

EQUIPMENT LOCATION

- RHF — ENG SFGRD RELAY BOARD BUS F
- BTA407 — TERM BOX A407 FOR DEVICE 89XF
- BTA402 — ↓ ↓ A402 ↓ ↓ 33GRSF
- RG — RELAY BOARD GENERATOR
- CG — CONTROL BOARD GENERATOR
- RVHD — STATION ELECTRIC RELAY BOARD D
- CHF — CONTROL BOARD ENG SAFEGUARD BUS F
- SHF13 — SWITCH GEAR 4 KV BUS F CUBICLE 13
- TQA22 — AUX TRANSF. 22 CONTROL CAB.
- CH — CONTROL BOARD STATION ELECTRIC

CONTACTS	TRANSFER TO AUX	OFF	TRANSFER TO START-UP	REMARKS	REF. DWG
A	X			SPARE	
B		X		SPARE	
C			X	CLOSE START-UP TRANSF. BKR	16
D	X			TRIP START-UP TRANSF. BKR	16
E		X		SPARE	
F			X	SPARE	
G	X			SPARE	
H		X		SPARE	
I			X	TRIP AUX. TRANSF. BKR	THIS DWG.
J	X			CLOSE AUX. TRANSF BKR.	THIS DWG.
K		X		SPARE	
L			X	SPARE	

TRANSFER SWITCH 43HD, 43HE, 43HF, 43HG, 43HH SPRING RETURN TO OFF USED AT LOCATIONS CH CHF CHG & CHH

CONTACTS	TRIP	NORMAL AFTER TRIP	NORMAL AFTER CLOSE	CLOSE	REMARKS
1-1C A				X	THIS DWG
2-2C B	X				THIS DWG
3-3C C	X			X	SPARE
4-4C D				X	SPARE
5-5C E		X	X		SPARE
6-6C F			X	X	SPARE

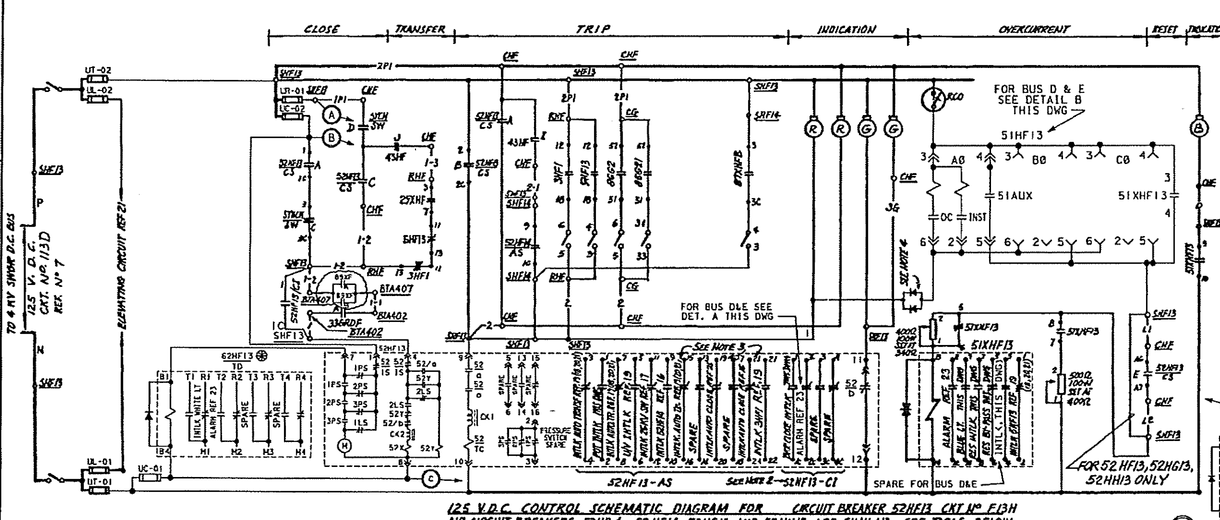
CONTROL SWITCH 52HF13/CS, 52HG13/CS, 52HH13/CS, 52HD4/CS, 52HE14/CS USED AT LOCATIONS SHF13, SHG13, SHH13, SHD4 & SHE14

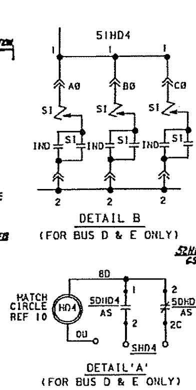
NO RESET FOR 52HF13/CS, 52HG13/CS, 52HH13/CS

CONTACTS	TRIP RESET	NEUTRAL AFTER TRIP	NEUTRAL AFTER CLOSE	CLOSE	REMARKS
A	X				THIS DWG
B		X	X		SPARE
C				X	THIS DWG
D	X	X			SPARE
E			X	X	THIS DWG
F	X	X			SPARE
G			X	X	SPARE

CONTROL SWITCHES 52HF13/CS, 52HG13/CS, 52HH13/CS, 52HD4/CS, 52HE14/CS USED AT LOCATIONS CH, CHF, CHG & CHH, SPRING RETURN TO NEUTRAL (Ⓦ TYPE W-2 STYLE N° 505A638G01)

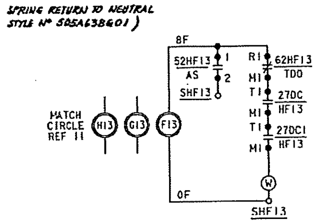
FOR INFORMATION ONLY





125 V.D.C. CONTROL SCHEMATIC DIAGRAM FOR CIRCUIT BREAKER 52HF13 CKT N° F13H
AIR CIRCUIT BREAKERS 52HD4, 52HE14, 52HG13 AND 52HH13 ARE SIMILAR SEE TABLE BELOW

CIRCUIT BKR. NO.	CIRCUIT NO.	BUS SECT	125 V.D.C. CKT. NO.	UNIT TRIP LOCKOUT RELAY	UNIT TRIP LOCKOUT LOCATION	UNIT TRIP LOCKOUT CONTACT	BUS DIFFERENTIAL RELAY	BUS DIFFERENTIAL LOCATION	BUS DIFFERENTIAL CONTACT	CKT BKR OVERCURRENT RELAY	CKT BKR OVERCURRENT LOCATION	CKT BKR OVERCURRENT CONTACT	SYNCHRONISM CHECK RELAY	SYNCHRONISM CHECK LOCATION	SYNCHRONISM CHECK CONTACT	DIESEL AUTO. TRANSFER INTLK. RELAY	DIESEL AUTO. TRANSFER INTLK. LOCATION	DIESEL CONTACT CLOSE	DIESEL CONTACT TRIP	START-UP AUTO. TRANSFER INTLK. RELAY	START-UP LOCATION	START-UP CONTACT CLOSE	START-UP CONTACT TRIP	MANUAL TRANSFER SW. SW. NO.	MANUAL LOCATION	MANUAL CONTACT CLOSE	MANUAL CONTACT TRIP	START-UP TRANSF. 22 BUS FEEDER BREAKER BKR. NO.	LOCATION	CONTACT	25KV ISO-PH. BUS DISC. AUX. SW. SWITCH	LOCATION	CONTACT	25KV ISO-PH. BUS GRD. AUX SW. SWITCH	LOCATION	CONTACT
52HD4	D04H	D	340D	86G2 86G21	CG	33-34	87XHDB	SHD5	3-3C	51XHD4	SHD4		25XHD	RVHD	3-7	—	—			5HD4	RVHD	2-5	1-7	43HD	CH	J	I	52HD5	SHD5	9-10	89XD	BTA410	A	33GRDD	BTA405	A
52HE14	E14H	E	234D	86G2 86G21	CG	35-36	87XHEB	SHE13	3-3C	51XHE14	SHE14		25XHE	RVHE	3-7	—	—			5HE14	RVHE	2-5	1-7	43HE	CH	J	I	52HE13	SHE13	9-10	89XE	BTA411	A	33GRDE	BTA406	A
52HF13	F13H	F	113D	86G2 86G21	CG	51-52	87XHFB	SHF14	3-3C	51XHF13	SHF13		25XHF	RHF	3-7	3HF1	RHF	11-13	12-18	5HF13	RHF	11-13	12-18	43HF	CHF	J	I	52HF14	SHF14	9-10	89XF	BTA407	A/B	33GRDF	BTA402	A
52HG13	G13H	G	213D	86G2 86G21	CG	53-54	87XHGB	SHG14	3-3C	51XHG13	SHG13		25XHG	RHG	3-7	3HG1	RHG	11-13	12-18	5HG13	RHG	11-13	12-18	43HG	CHG	J	I	52HG14	SHG14	9-10	89XG	BTA408	C/G	33GRDG	BTA403	A
52HH13	H13H	H	314D	86G2 86G21	CG	55-56	87XHHB	SHH14	3-3C	51XHH13	SHH13		25XHH	RHH	3-7	3HH1	RHH	11-13	12-18	5HH13	RHH	11-13	12 18	43HH	CHH	J	I	52HH14	SHH14	9-10	89XH	BTA409	D/F	33GRDH	BTA404	A



Ⓟ POTENTIAL INTERLOCK

NOTES

2. CELL INTERLOCK SWITCHES ARE SHOWN WITH BREAKER IN OPERATING POSITION.
3. CONTACTS (15-16),(19-20),(23-24) ARE SPARES ON BKRS 52HD4 & 52HE14.
4. TRIPPING DIODE ASSEMBLY #2 P.G.&E DSGN. STD DWG #455021.
5. FOR DESCRIPTION OF CIRCUIT BREAKER INTERNAL DEVICES, SEE REF. #26, 27 & 28.
6. ⊛ INDICATES FOR BUS F,G & H ONLY.

REFERENCES

1. DESCRIPTION OF ELECTRICAL SCHEMATIC DIAGRAM SYMBOLS & CIRCUIT DESIGNATIONS DWG N° 050003
2. LIST OF EQUIPMENT LOCATION CODES — 103013
3. SINGLE LINE METER & RELAY DIAG GENERATOR / MAIN TRANSFORMERS & EXCITATION — 441226
4. ↓ 4160 V SYSTEM BUS SECTION D & E SH 1 OF 3 — 441228
5. ↓ F SH 2 OF 3 — 441229
6. ↓ G & H SH 3 OF 3 — 441230
7. ↓ 125V DC SYSTEM — 441240
8. SCHEMATIC DIAGRAM 4160 V BUS DIFFERENTIAL SH 1 (BUS D & E) — 441342
9. ↓ SH 2 (BUS F, G & H) — 441343
10. BUS POTENTIAL & SYNCHRONIZING 4160 V SYSTEM SH 1 (BUS D & E) — 441339
11. ↓ SH 2 (BUS F, G & H) — 441340
12. GENERATOR CONTROL SH 1 — 441245
13. ↓ SH 2 — 441246
14. ↓ SH 3 — 441247
15. AUXILIARY TRANSFORMER N° 22 & ASSOCIATED CIRCUIT BREAKERS SH1 — 441348
16. STAND-BY START-UP TRANSFORMER N° 22 & ASSOCIATED CIR. BKRS SH2 — 441345
17. 25 KV ISO-PHASE BUS MOTOR OPERATED DISCONNECT SWITCH — 441267
18. 4160 V BUS SECTION D & E AUTOMATIC TRANSFER — 441351
19. ↓ F — 441352
20. ↓ G — 441353
21. ↓ H — 441354
22. AUXILIARY TRANSFORMER N° 21 & ASSOCIATED CIR BKRS SH 2 — 441347
23. MAIN ANNUNCIATOR SH. 16, 17, 18 & 19 — 500786, 87, 88, 89
24. 4 KV SWGR MFR DWGS — 663360
25. SCHEMATIC DIAGRAM 4KV DIESEL GEN & ASSOC CKT BKRS — 441356
26. VENDORS SCHEMATIC DIAGRAM — REC DWG NO. 6009838-65
27. P.D.S. CONTROL CIRCUITS SCHEMATIC DIAGRAM (FOR 52HE14 ONLY) — REC DWG NO. 6009838-162
28. P.D.S. CONTROL CIRCUITS SCHEMATIC DIAGRAM — REC DWG 6009838-69

P.G.&E. SYSTEM PHASE SEQUENCE A-C-B

NUCLEAR SAFETY RELATED

REGISTERED PROFESSIONAL ENGINEER RICHARD WILLIAM BECKER E 9776 ELECTRICAL STATE OF CALIFORNIA

KEY DWG. SECTION 2

UNIT 2

DATE 12/9/04		DESCRIPTION	COORDINATION	
DWN.	MIBF	Revised per FCT 028635 & FCT 025615-01	NUCL.	-
R.E.	SMB5		MECH.	-
INDEP. VERIFIER	-		ELEC.	-
			CIVIL	-
			PIPING	-
P.E.	RWB7		I&C	
REVISION INFORMATION				

ELECTRICAL
SCHEMATIC DIAGRAM
AUXILIARY TRANSFORMER NO. 22
AND ASSOCIATED CIRCUIT BREAKERS

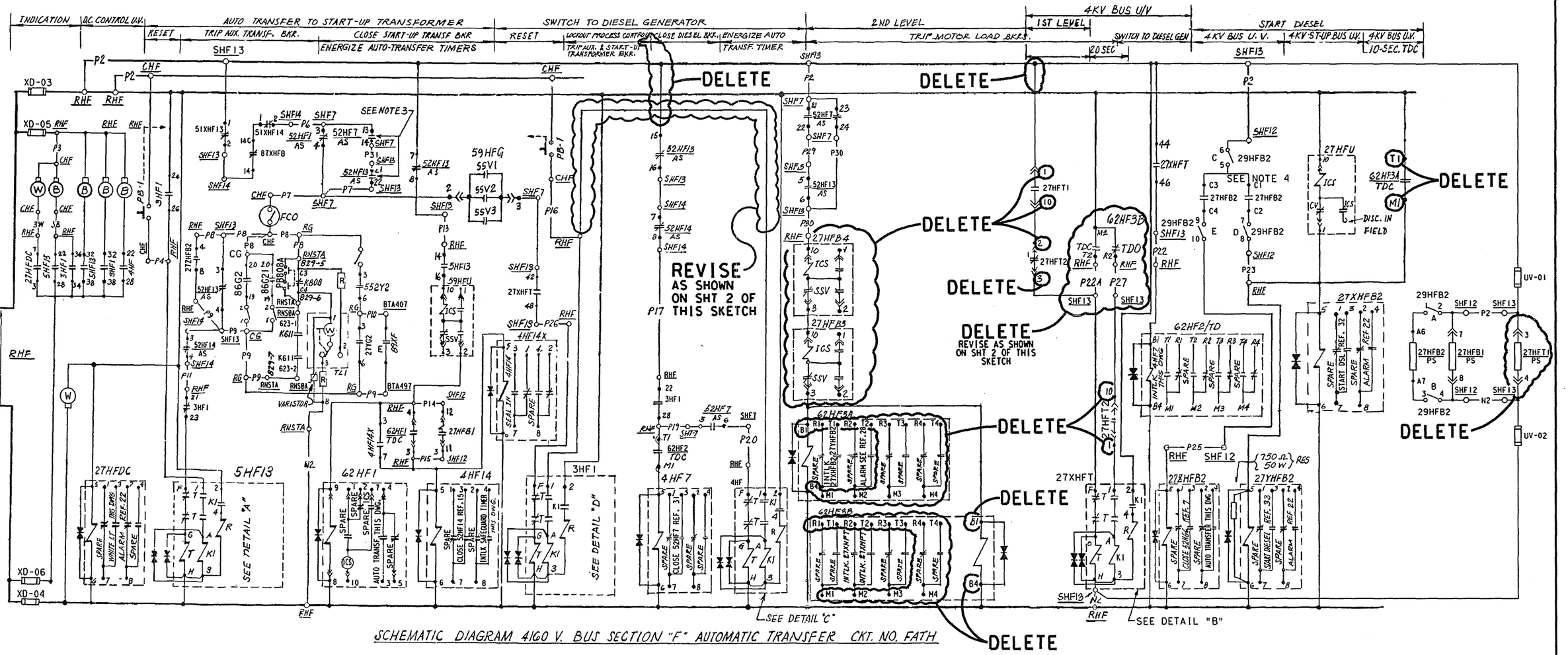
DIABLO CANYON POWER PLANT
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

DWG SCALE
BILL OF MATL
SUPSDS
SUPSD BY
SHEET NO. 1 OF

441349 REV 17

UI-437621

Attachment 5
PG&E Drawing 441352



SCHEMATIC DIAGRAM 4160 V. BUS SECTION "F" AUTOMATIC TRANSFER CKT. NO. FATH

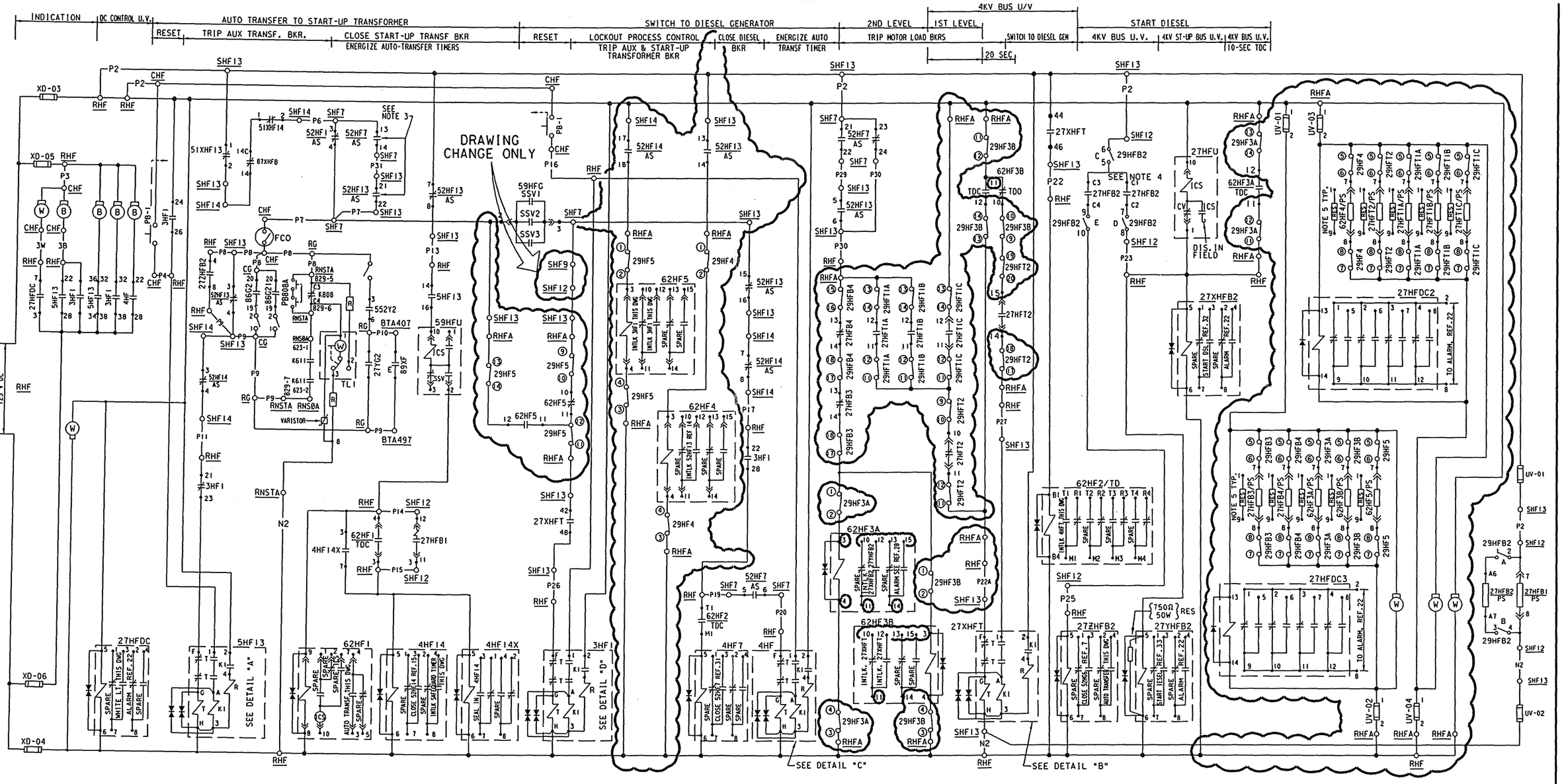
PRELIM-FOR INFO ONLY

"BEFORE"

UNIT 2

DRAWING No. 441352 SHEET No. 1 REV. No. 26	DDN No. 2000000991 PART 000 VERSION 00 SHEET No. _____ of _____
PREPARED BY: AJL2 DATE: 2/24/12 REVIEWED BY: Dan L Newman DATE: 3/5/12 VERIFIED BY: G Reimon DATE: 3/5/12	SKETCH No. DSK-5000032111 PART 000 VERSION 00 SHEET No. 1 of 3 SKETCH TYPE [I] WALKDOWN PERFORMED: YES [X] NO [ ]

S....Drawings/NCFE/AJL2



SCHEMATIC DIAGRAM 4160 V. BUS SECTION "F" AUTOMATIC TRANSFER CKT. NO. FATH

PRELIM-FOR INFO ONLY

"AFTER"

ADD ITEMS WITHIN REVISION BUBBLES

NOTE:
5. RESISTOR BETWEEN TERMINALS 1 & 9 INTERNALLY CONNECTED (JUMPERED) INSIDE RELAY.

FIELD/DRAFTING NOTE:
THIS SCHEMATIC REDRAWN FOR CLARITY

UNIT 2

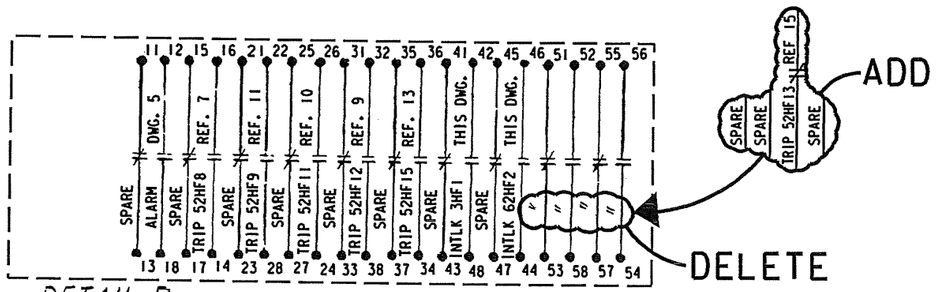
DRAWING No. 441352 SHEET No. 1	DDN No. 2000000991 PART 000 VERSION 00
REV. No. 26	SHEET No. _____ of _____
PREPARED BY: AJL2 DATE: 3/14/12	SKETCH No. DSK-5000032111
REVIEWED BY: Gary L. Howard DATE: 3/29/12	PART 000 VERSION 00 SHEET No. 2 of 3
VERIFIED BY: K Ramirez DATE: 3/29/12	SKETCH TYPE [I]
	WALKDOWN PERFORMED: YES [X] NO [ ]

ALARM CIRCUIT TABLE

	4 KV BUS SECT. F UNDERVOLTAGE	4KV BUS SECT. F AUTOMATIC TRANSFER		4KV BUS SECT. F BUS OR STAR-UP FOR BUS U.V.		D.C. CONTROL UNDERVOLTAGE
DEVICE	27XHFT	5HF13	3HF1	27XHFB2	27YHFB2	27HFDC, 27HFB2 & 27HFT1)
CKT. Nº	AV4403DF	AY4412DF		AV4404DF		AV4406DF

DELETE

27HFDC2, 27HFDC3 — ADD



ADD

DELETE

DETAIL B RELAY CONTACT DEVELOPMENT OF 27XHFT (SEE NOTE 2)

REFERENCES

		DWG Nº 050003
1.	DESCRIPTION OF ELECT. SCHEMATIC DIAG. SYMBOLS & CIRCUIT DESIGNATIONS	
2.	SINGLE LINE METER & RELAY DIAG. 4160 V SYSTEM (BUS SECT. F.)	441229
3.	SCHEMATIC DIAG. 4 KV SYSTEM AUTOMATIC TRANSFER (BUS SECT. D & E)	441351
4.	(BUS SECT. G)	441353
5.	(BUS SECT H)	441354
6.	4 KV BUS POTENTIAL & SYNCHRONIZING SH 2 (BUS SECT F, G & H)	441340
7.	AUX. SALT WATER PUMPS	441287
8.	CONTAINMENT FAN COOLERS	441313
9.	COMPONENT COOLING WATER PUMPS	441311
10.	CHARGING PUMPS	441312
11.	AUX. FEEDWATER PUMPS	441302
12.	4160 V BUS DIFFERENTIAL SH 2	441343
13.	SAFETY INJECTION PUMPS	441315
14.	AUX. TRANSFORMER Nº 22 & ASSOCIATED CKT BKRS, SH. 2	441347
15.	START-UP TRANSFORMER Nº 22 & ASSOCIATED CKT BKRS, SH. 2	441345
16.	DIESEL GENERATORS & ASSOCIATED CKT. BKRS, SH 2	441356
17.	GENERATOR CONTROL SHEET Nº 1	441245
18.	GENERATOR CONTROL SHEET Nº 2	441246
19.	4KV DIESEL GENERATORS CONTROL SH. 1	437667
20.	25KV ISOPHASE BUS MOTOR OP. DISC. SW	441267
21.	LOGIC DIAG 4160 V. BUS SECTIONS F AUTO TRANSFER	441286
22.	SCHEMATIC DIAG. MAIN ANNUNCIATOR SH 18	500788
23.	SINGLE LINE METER & RELAY DIAG. 125V DC SYSTEM	441240
24.	SCHEMATIC DIAG GEN CONTROL SHEET Nº 3	441247
25.	LIST OF EQUIPMENT LOCATION CODES	103013
26	SOLID STATE PROTECTION SYSTEM MFR DWG.	REC. NO. 663231
27.	FUNCTIONAL DIAGRAMS MFR DWGS	663195
28	SCHEM. DIAG. MAIN ANNUNCIATOR SH. 26	DWG. NO. 502092
29.	SCHEM. DIAG. SSPS OUTPUT RELAYS, TRAIN A	503089
30.	LIST OF ELECTRICAL DEVICES	DWG. No. 050011
31.	S/D 4160V DIESEL GEN. CONTROL NO. 23 & ASSOC. CKT. BKR	DWG. No. 496276
32.	SHT. 1	DWG Nº 496277
33.	SHT. 2	" 496278
34.	WIRING DIAGRAM - 4KV SWITCHGEAR BUS "F"	441570

TABLE OF DEVICES

DEVICE Nº.	FUNCTION	RATING OR RANGE	MFR	TYPE	CAT. Nº OR REF. DWG	REMARKS
3HF1	DIESEL AUTO TRANSFER INTERLOCKING RELAY	125 VDC	ELECTRO SWITCH	LORTIER SERIES 24	7825DD	ELECTRIC RESET
4HF	DIESEL AUTO TRANSFER CONTROL RELAY		ELECTRO SWITCH	LORTIER SERIES 24	7823DD	ELECTRIC RESET
4HF7	DIESEL AUTO TRANSFER CLOSE RELAY		W	SG	1342925	
4HF14	START-UP AUTO TRANSFER CLOSE RELAY		W	SG	1342925	
5HF13	START-UP AUTO TRANSFER TRIP RELAY		ELECTRO SWITCH	LORTIER SERIES 24	7825DD	ELECTRIC RESET
27HFDC	DC CONTROL BUS UNDERVOLTAGE RELAY		W	SG	1342925	
27HFDC2	DC RELAY POWER SUPPLY MONITOR RELAY	125VDC	OMRON	MY41250C	D957783	
27HFDC3	DC RELAY POWER SUPPLY MONITOR RELAY	125VDC	OMRON	MY41250C	D957783	
27HFB1	4 KV BUS F AUTO TRANSFER UNDERVOLTAGE RELAY	—	—	—	(2 & 6)	1-30, RESIDUAL VOLTAGE DECAY
27HFB2	4 KV BUS F START DIESEL UNDERVOLTAGE RELAY	—	—	—	(2 & 6)	
27XHFB2	4KV BUS F START DIESEL UNDERVOLTAGE AUX RELAY	125 VDC	W	SG	1342925	
27YHFB2	4KV BUS F START DIESEL UNDERVOLTAGE AUX RELAY		W	SG	1342925	ADD
27HFT1	4 KV BUS F UNDERVOLTAGE TRIP RELAY (1ST LEVEL)	—	ABB	27N	(2 & 6)	
27HFT2	4 KV BUS F UNDERVOLTAGE TRIP RELAY (1ST LEVEL)	—	ABB	59N	(2 & 6)	INSTANTANEOUS
27HFU	4 KV BUS F UNDERVOLTAGE RELAY (1ST-UP TRANSF.)	—	—	—	(2 & 6)	
27HFB3, B4	4kV BUS F U/V TRIP RELAY (2ND LEVEL)	—	—	—	(2 & 6)	REF 30
29HFB2	27HFB2 FLUR CUTOUT SWITCH				(34)	10 POLE SW ASSY.
4HF14X	START-UP AUTO TRANSFER CLOSE AUX RELAY	125 VDC	W	SG	1342925	
27XHFT	4 KV BUS UNDERVOLTAGE TRIP AUX. RELAY	125 VDC	ELECTRO SWITCH	LORTIER SERIES 24	7825DD	ELECTRIC RESET
27YHFB2	4 KV BUS F START DIESEL U/V AUX. RELAY		W	SG	1342925	
27YG2	GENERATOR UNDERVOLTAGE AUX. RELAY	—	—	—	(17)	
51XHF13	4 KV BUS F FDR. O/C AUX. RELAY (AUX. TRANSFORMER)	—	—	—	(14)	
51XHF14	4KV BUS F FDR. O/C AUX. RELAY (START-UP TRANSFORMER)	—	—	—	(15)	
52HF7	4 KV. BUS F FDR. CKT. BKR (DIESEL GENERATOR)	—	—	—	(2 & 16)	
52HF13	4 KV. BUS F FDR. CKT. BKR (AUX. TRANSFORMER)	—	—	—	(2 & 14)	
52HF14	4 KV. BUS F FDR. CKT BKR (START-UP TRANSFORMER)	—	—	—	(2 & 15)	
59HFU	4KV BUS F FDR. O/V AUX. RELAY (START-UP TRANSFORMER)	—	—	—	(2 & 6)	INSTANTANEOUS
59HFG	4 KV BUS F FDR. O/V RELAY (DIESEL GENERATOR)	—	—	—	(2 & 6)	"
62HF1	START-UP AUTO TRANSFER TIMER BUS F	48/125DC	W	TD5	293B3014A13	0.2 TO 4 SEC.
62HF2	DIESEL AUTO TRANSFER TIMER BUS F	120 V. D.C.	AGASTAT	ETR	ETR14D3B	0.55-15 SEC.
86G2	UNIT TRIP LOCKOUT RELAY	—	—	—	(17)	
86G21	UNIT TRIP LOCKOUT RELAY	—	—	—	(18)	
	87XHFB	—	—	—	(12)	
552Y2	500 KV P.C.B. AUX. RELAY	—	—	—	(18)	CONTACT IS CLOSED WHEN 500KV BKRS ARE OPEN
62HF3A	START DIESEL TIME DELAY BUS F	125 VDC	AGASTAT	ETR	ETR-14D-3B-003	TIMER SET @ 10 SEC.
62HF3B	XFR TO DIESEL TIME DELAY BUS F	125 VDC	AGASTAT	ETR	ETR-14D-3D-003	TIMER SET @ 20 SEC.
62HF4	AUX CLOSE-IN TIMER BUS F	—	—	ABB	627	TIMER SET @ 2 SEC
62HF5	STARTUP CLOSE-IN TIMER BUS F	—	—	ABB	627	TIMER SET @ 2 SEC
89XF	25 KV MOTOR OP. DISC. AUX. SW.	—	—	—	(20)	CONTACT IS CLOSED WHEN DISC. SW. IS OPEN
K608/S1S	SAFETY INJECTION AUX. RELAY	—	—	—	(29)	
K609/S1S		—	—	—	(29)	
K610/S1S		—	—	—	(29)	
K611/S1S		—	—	—	(29)	

ADD

ADD

27HFT1A, 1B, 1C

DELETE

ADD

62HF4, 62HF5

EQUIPMENT LOCATION

BTH106	TERMINAL BOX H106
RHF	ENG. SAFEGUARD RELAY BOARD BUS F
RHFA	ENG SAFEGUARD RELAY AUX BOARD BUS F
CHF	CONTROL BOARD ENG SAFEGUARD BUS F
CG	CONTROL BOARD MAIN GENERATOR
RG	GENERATOR RELAY BOARD
SHF7	SWGR 4KV BUS F CUBICLE 7
RNSOA	RACK NU SAFEGD OUTPUT A
RNSTA	RACK NU SAFEGD TEST A
BTA407	TERM BOX A407 FOR DEVICE 89XF

ADD

PRELIM

FOR INFO ONLY

UNIT 2

DRAWING No. 441352 SHEET No. 1 REV. No. 26

DDN No. 2000000991 PART 000 VERSION 00 SHEET No. ____ of ____

PREPARED BY: AJL2 DATE: 3/5/12

REVIEWED BY: [signature] DATE: 3/5/12

VERIFIED BY: [signature] DATE: 3/5/12

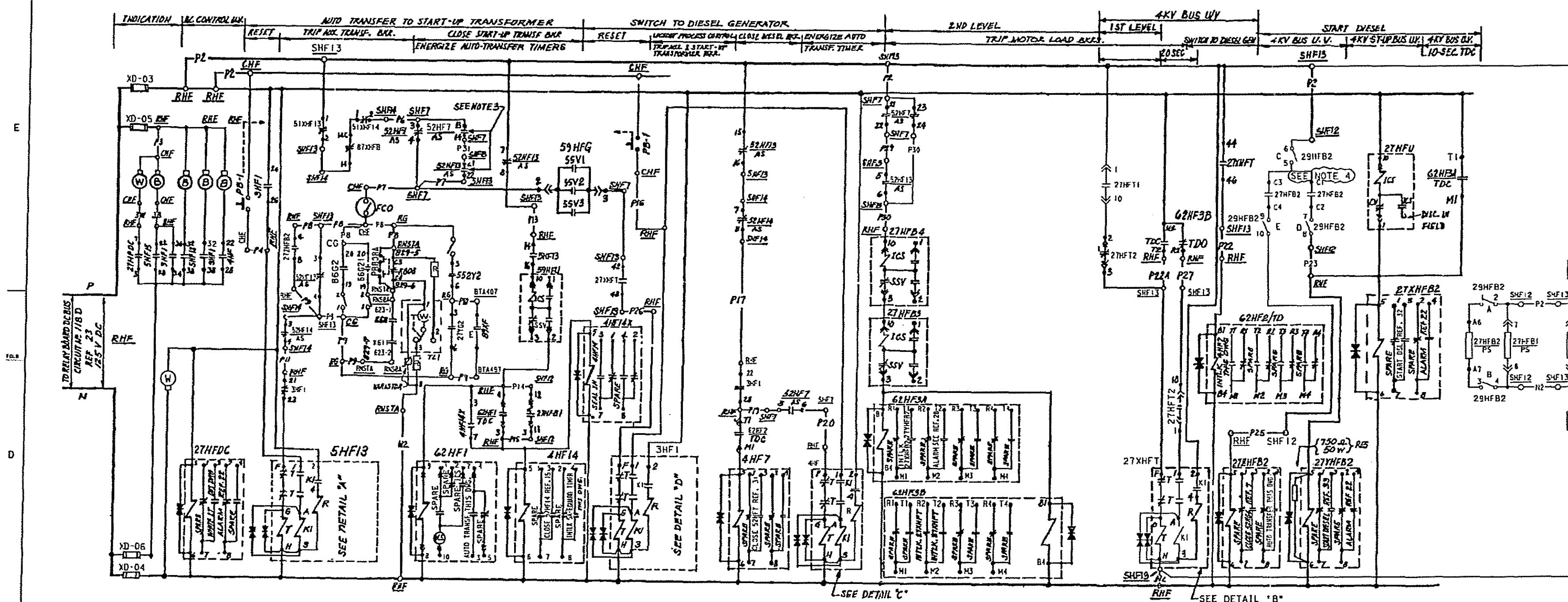
SKETCH No. DSK-5000032111

PART 000 VERSION 00 SHEET No. 3 of 3

SKETCH TYPE [1]

WALKDOWN PERFORMED: YES [X] NO [ ]

S....Drawings/NCFE/AJL2



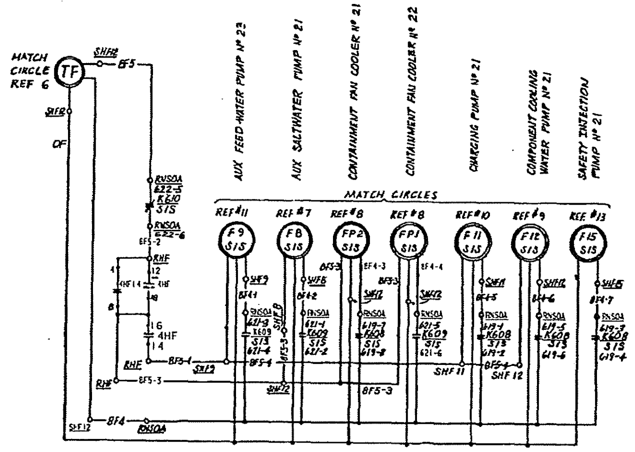
SCHEMATIC DIAGRAM 4160 V. BUS SECTION "F" AUTOMATIC TRANSFER CKT. NO. FATH

TABLE OF DEVICES

DEVICE Nº	FUNCTION	RATING OR RANGE	MFR.	TYPE	CAT. Nº OR REF. DWG	REMARKS
3HF1	DIESEL AUTO TRANSFER INTERLOCKING RELAY	125 V.DC.	ELECTRO SWITCH	LORLER SERIES 24	7825DD	ELECTRIC RESET
4HF	DIESEL AUTO TRANSFER CONTROL RELAY		ELECTRO SWITCH	LORLER SERIES 24	7823DD	ELECTRIC RESET
4HF7	DIESEL AUTO TRANSFER CLOSE RELAY		W	SG	1342925	
4HF14	START-UP AUTO TRANSFER CLOSE RELAY		W	SG	1342925	
5HF13	START-UP AUTO TRANSFER TRIP RELAY		ELECTRO SWITCH	LORLER SERIES 24	7825DD	ELECTRIC RESET
27HFDC	DC CONTROL BUS UNDERVOLTAGE RELAY		W	SG	1342925	
27HFB1	4KV BUS F AUTO TRANSFER UNDERVOLTAGE RELAY	—	—	—	(2 & 6)	1-30, RESIDUAL VOLTAGE DECAY
27HFB2	4KV BUS F START DIESEL UNDERVOLTAGE RELAY	—	—	—	(2 & 6)	
27XHFB2	4KV BUS F START DIESEL UNDERVOLTAGE AUX RELAY	125 V.DC.	W	SG	1342925	
27YHFB2	4KV BUS F START DIESEL UNDERVOLTAGE AUX RELAY		W	SG	1342925	
27HFT1	4KV BUS F UNDERVOLTAGE TRIP RELAY (1ST LEVEL)	—	—	—	(2 & 6)	
27HFT2	4KV BUS F UNDERVOLTAGE TRIP RELAY (1ST LEVEL)	—	—	—	(2 & 6)	INSTANTANEOUS
27HFU	4KV BUS F UNDERVOLTAGE RELAY (ST-UP RANGE)	—	—	—	(2 & 6)	
27HFB3, B4	4KV BUS F U/V TRIP RELAY (2ND LEVEL)	—	—	—	(2 & 6)	REF. 30
29HFB2	27HFB2 FLUR CUTOUT SWITCH				(34)	10 POLE SW ASSY.
4HF14X	START-UP AUTO TRANSFER CLOSE AUX. RELAY	125VDC	W	SG	1342925	
27XHFT	4KV BUS UNDERVOLTAGE TRIP AUX. RELAY	125VDC	ELECTRO SWITCH	LORLER SERIES 24	7825DD	ELECTRIC RESET
27XHFB2	4KV BUS F START DIESEL U/V AUX. RELAY		W	SG	1342925	
27YG2	GENERATOR UNDERVOLTAGE AUX. RELAY	—	—	—	(17)	
51XHF13	4KV BUS F FDR. O/C AUX. RELAY (AUX. TRANSFORMER)	—	—	—	(14)	
51XHF14	4KV BUS F FDR. O/C AUX. RELAY (START-UP TRANSFORMER)	—	—	—	(15)	
52HF7	4KV BUS F FDR. CKT BKR (DIESEL GENERATOR)	—	—	—	(2 & 16)	
52HF13	4KV BUS F FDR. CKT BKR (AUX. TRANSFORMER)	—	—	—	(2 & 14)	
52HF14	4KV BUS F FDR. CKT BKR (START-UP TRANSFORMER)	—	—	—	(2 & 15)	
59HFU	4KV BUS F FDR. O/V AUX. RELAY (START-UP TRANSFORMER)	—	—	—	(2 & 6)	INSTANTANEOUS
59HFG	4KV BUS F FDR. O/V RELAY (DIESEL GENERATOR)	—	—	—	(2 & 6)	"
62HF1	START-UP AUTO TRANSFER TIMER BUS F	48/125DC	W	TDS	273B30UUS	0.2 TO 4 SEC.
62HF2	DIESEL AUTO TRANSFER TIMER BUS F	125V. DC.	AGASTAT	ETR	ETRM038	0.55-15 SEC.
86GB	UNIT TRIP LOCKOUT RELAY	—	—	—	(17)	
86G21	UNIT TRIP LOCKOUT RELAY	—	—	—	(18)	
	87XHFB	—	—	—	(12)	
552Y2	500 KV P.C.B. AUX. RELAY	—	—	—	(18)	CONTACT IS CLOSED WHEN 500KV BKRS ARE OPEN
62HF3A	START DIESEL TIME DELAY BUS F	125VDC	AGASTAT	ETR	ETR-14D-3D-003	TIMER SET @ 10 SEC.
62HF3B	XFR TO DIESEL TIME DELAY BUS F	125VDC	AGASTAT	ETR	ETR-14D-3D-003	TIMER SET @ 20 SEC.
89XF	25 KV MOTOR OP. DISC. AUX. SW.	—	—	—	(20)	CONTACT IS CLOSED WHEN DISC. SW. IS OPEN
K608/SIS	SAFETY INJECTION AUX. RELAY	—	—	—	(29)	
K609/SIS	↓	—	—	—	(29)	
K610/SIS	↓	—	—	—	(29)	
K611/SIS	↓	—	—	—	(29)	

EQUIPMENT LOCATION

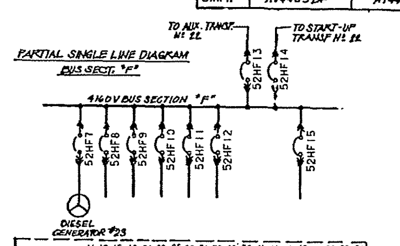
- BTH106 TERMINAL BOX H106
- RHF ENG. SAFEGUARD RELAY BOARD BUS F
- CHF CONTROL BOARD ENG SAFEGUARD BUS F
- CG CONTROL BOARD MAIN GENERATOR
- RG GENERATOR RELAY BOARD
- SHF7 SWGR 4KV BUS F CUBICLE 7
- RNSOA RACK NU SAFEGD OUTPUT A
- RNSTA RACK NU SAFEGD TEST A
- BTA407 TERM BOX A407 FOR DEVICE 89XF



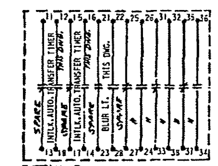
POTENTIAL FOR AUTO-TRANSFER & ENGINEERED SAFEGUARD TIMERS CKT. NO. FATH

ALARM CIRCUIT TABLE

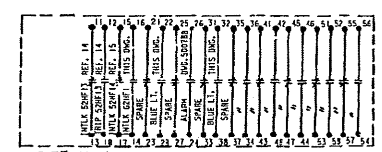
	4 KV BUS SECT. F UNDERVOLTAGE	4KV BUS SECT. F AUTOMATIC TRANSFER		4KV BUS SECT. F BUS OR STAR-UP FOR BUS U.V.		D.C. CONTROL UNDERVOLTAGE
DEVICE	27XHFT	5HF13	3HF1	27XHFB2	27YHFB2	27HFDC, 27HFB2 & 27HFT1
CKT. Nº	AV4403DF	AV4412DF		AV4404DF		AV4406DF



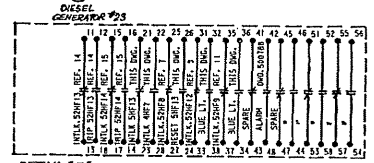
PARTIAL SINGLE LINE DIAGRAM BUS SECT. "F"



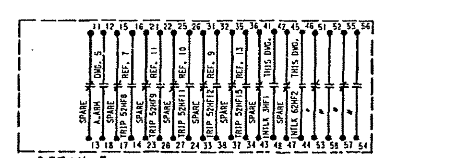
DETAIL C RELAY CONTACT DEVELOPMENT OF 4HF (SEE NOTE 2)



DETAIL A RELAY CONTACT DEVELOPMENT OF 5HF13 (SEE NOTE 2)



DETAIL "D" RELAY CONTACT DEVELOPMENT OF 3HF1 (SEE NOTE 2)



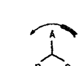
DETAIL B RELAY CONTACT DEVELOPMENT OF 27XHFT (SEE NOTE 2)

NOTES:

1. TEST RELAY CONTACT OPENS DURING TEST.
2. CONTACTS ARE SHOWN IN RESET POSITION.
3. THESE CONTACTS PERMIT TRIPPING OF THE UNIT AUX. TRANSF. BKR. ON 2nd LEVEL U/V WHEN THE DSL GEN. AND THE UNIT AUX. TRANSF. ARE PARALLELED.
4. CONTACT C1-C2 MAY ALLOW VOLTAGE READING ACROSS AN INTERNAL HIGH IMPEDANCE TRIP CIRCUIT MONITOR (TCM) WHERE NO VOLTAGE IS EXPECTED DURING POST MAINTENANCE TESTING. THE TCM FUNCTION IS NOT USED WITH AUTO TRANSFER SCHEME TO START D/G NOR WILL IT AFFECT ITS FUNCTION. (REF: 663332-220 PAGES 12-11, 6-17)

REFERENCES

1. DESCRIPTION OF ELECT. SCHEMATIC DIAG. SYMBOLS & CIRCUIT DESIGNATIONS — DWG Nº 050003
2. SINGLE LINE METER & RELAY DIAG. 4160 V SYSTEM (BUS SECT. F.) — 441229
3. SCHEMATIC DIAG. 4 KV SYSTEM AUTOMATIC TRANSFER (BUS SECT. D & E) — 441351
4. (BUS SECT G) — 441355
5. (BUS SECT H) — 441354
6. 4 KV BUS POTENTIAL & SYNCHRONIZING SH 2 (BUS SECT F, G & H) — 441340
7. AUX. SALT WATER PUMPS — 441287
8. CONTAINMENT FAN COOLERS — 441313
9. COMPONENT COOLING WATER PUMPS — 441311
10. CHARGING PUMPS — 441312
11. AUX. FEEDWATER PUMPS — 441302
12. 4160 V BUS DIFFERENTIAL SH 2 — 441343
13. SAFETY INJECTION PUMPS — 441315
14. AUX. TRANSFORMER Nº 22 & ASSOCIATED CKT BKRS, SH 2 — 441349
15. START-UP TRANSFORMER Nº 22 & ASSOCIATED CKT BKRS, SH 2 — 441345
16. DIESEL GENERATORS & ASSOCIATED CKT. BKRS, SH 2 — 441356
17. GENERATOR CONTROL SHEET Nº 1 — 441245
18. GENERATOR CONTROL SHEET Nº 2 — 441246
19. 4KV DIESEL GENERATORS CONTROL SH 1 — 437667
20. 25KV ISOPHASE BUS MOTOR OP. DISC. SW — 441267
21. LOGIC DIAG 4160 V. BUS SECTIONS F AUTO TRANSFER — 441286
22. SCHEMATIC DIAG. MAIN ANNUNCIATOR SH 18 — 500788
23. SINGLE LINE METER & RELAY DIAG. 125V DC SYSTEM — 441240
24. SCHEMATIC DIAG GEN CONTROL SHEET Nº 3 — 441247
25. LIST OF EQUIPMENT LOCATION CODES — 103013
26. SOLID STATE PROTECTION SYSTEM MFR DWG. — REC. NO. 663231
27. FUNCTIONAL DIAGRAMS MFR DWGS — 663195
28. SCHEM. DIAG. MAIN ANNUNCIATOR SH. 26 — DWG. NO. 502092
29. SCHEM. DIAG. SSPS OUTPUT RELAYS, TRAIN A — 503089
30. LIST OF ELECTRICAL DEVICES — DWG. NO. 050011
31. S/D 4160V DIESEL GEN. CONTROL NO. 23 & ASSOC. CKT. BKR — DWG. NO. 496276
32. SHT. 1 — DWG # 496277
33. SHT. 2 — # 496278
34. WIRING DIAGRAM - 4KV SWITCHGEAR BUS "F" 441570



P.G.&E. SYSTEM PHASE SEQUENCE A-C-B

FOR INFORMATION ONLY

NUCLEAR SAFETY RELATED

KEY DWG. SECTION 2

UNIT 2

DATE	07-14-2010
D.D.	JBMX
R.E.	FxC2
I.V.	
P.E.	R2H5

REVISION DESCRIPTION: REVISED PER DFT-7*788

ELECTRICAL SCHEMATIC DIAGRAM 4160V BUS SECTION "F" AUTOMATIC TRANSFER

DIABLO CANYON POWER PLANT
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

DWG SCALE:
BILL OF MATL:
SUPSDS:
SUPSD BY:

DRAWING	SHEET	PAGE	REV
441352	1	0	26

UI-437625

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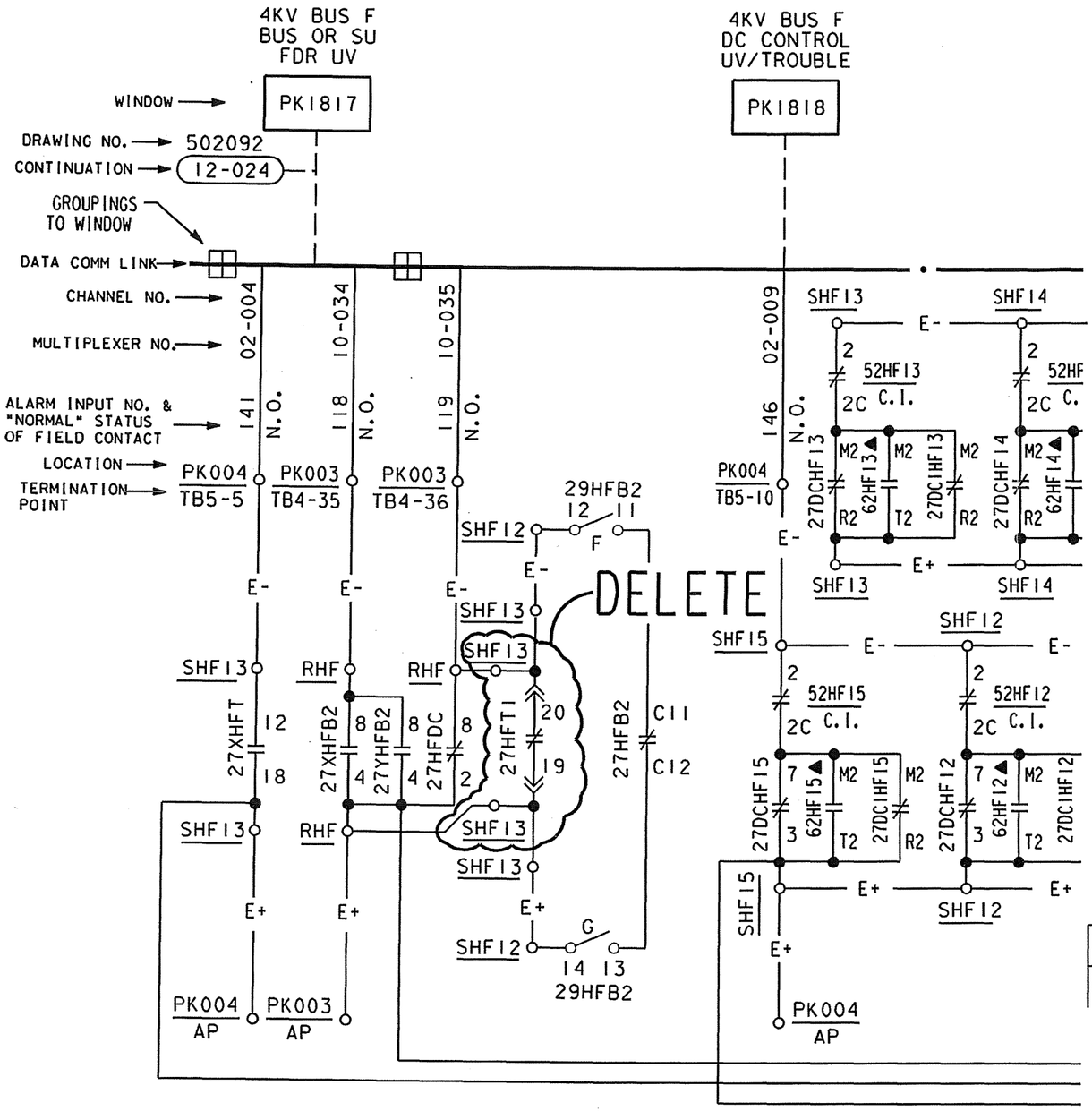
DGN=441352.dgn
CAD User:JBMX Date:07-14-2010

Attachment 6
PG&E Drawing 500788



AV4403DF 4KV BUS-F UV

AV4404DF 4KV BUS-F BUS OR STUP FDR UV

AV4406DF 4KV BUS-F AUTO XFR CONT UV OR UV RELAY FAILURE

AV4407DF 4KV BUS-F PPS DC CONT UV TROUBLE

TABLE OF DEVICES

DEVICE NUMBER	FUNCTION	CATALOG NO. OR REF DWG	REMARKS
3HF1	DIESEL AUTO TRANSFER INTERLOCKING RELAY	441352	
5HF13	STARTUP AUTO TRANSFER TRIP RELAY	441352	
5VD2	12KV BUS D AUTO TRANSFER TRIP RELAY	441350	
5VE8	12KV BUS E AUTO TRANSFER TRIP RELAY	441350	
27DC1HF7,27DCHF7	DC CONTROL BUS UV RELAY	441356	
27DC1HF8,27DCHF8	DC CONTROL BUS UV RELAY	441287	
27DC1HF9,27DCHF9	DC CONTROL BUS UV RELAY	441307	
27DC1HF11,27DCHF11	DC CONTROL BUS UV RELAY	441309	
27DC1HF12,27DCHF12	DC CONTROL BUS UV RELAY	441311	
27DC1HF13,27DCHF13	DC CONTROL BUS UV RELAY	441349	
27DC1HF14,27DCHF14	DC CONTROL BUS UV RELAY	441345	
27DC1HF15,27DCHF15	DC CONTROL BUS UV RELAY	441315	
27HFDC	DC CONTROL BUS F UV RELAY	441352	
27VDDC	DC CONTROL BUS D UV RELAY	441350	
27VEDC	DC CONTROL BUS E UV RELAY	441350	
27XHDT	4KV BUS D UV TRIP AUX RELAY	441351	
27XHFB2	4KV BUS F START DIESEL UV AUX RELAY	441352	
27XHFT	4KV BUS F UV TRIP AUX RELAY	441352	
27XVDT	12KV BUS D UV TRIP RELAY	441350	
27XVET	12KV BUS E UV TRIP		
27XVUB2			

PRELIM

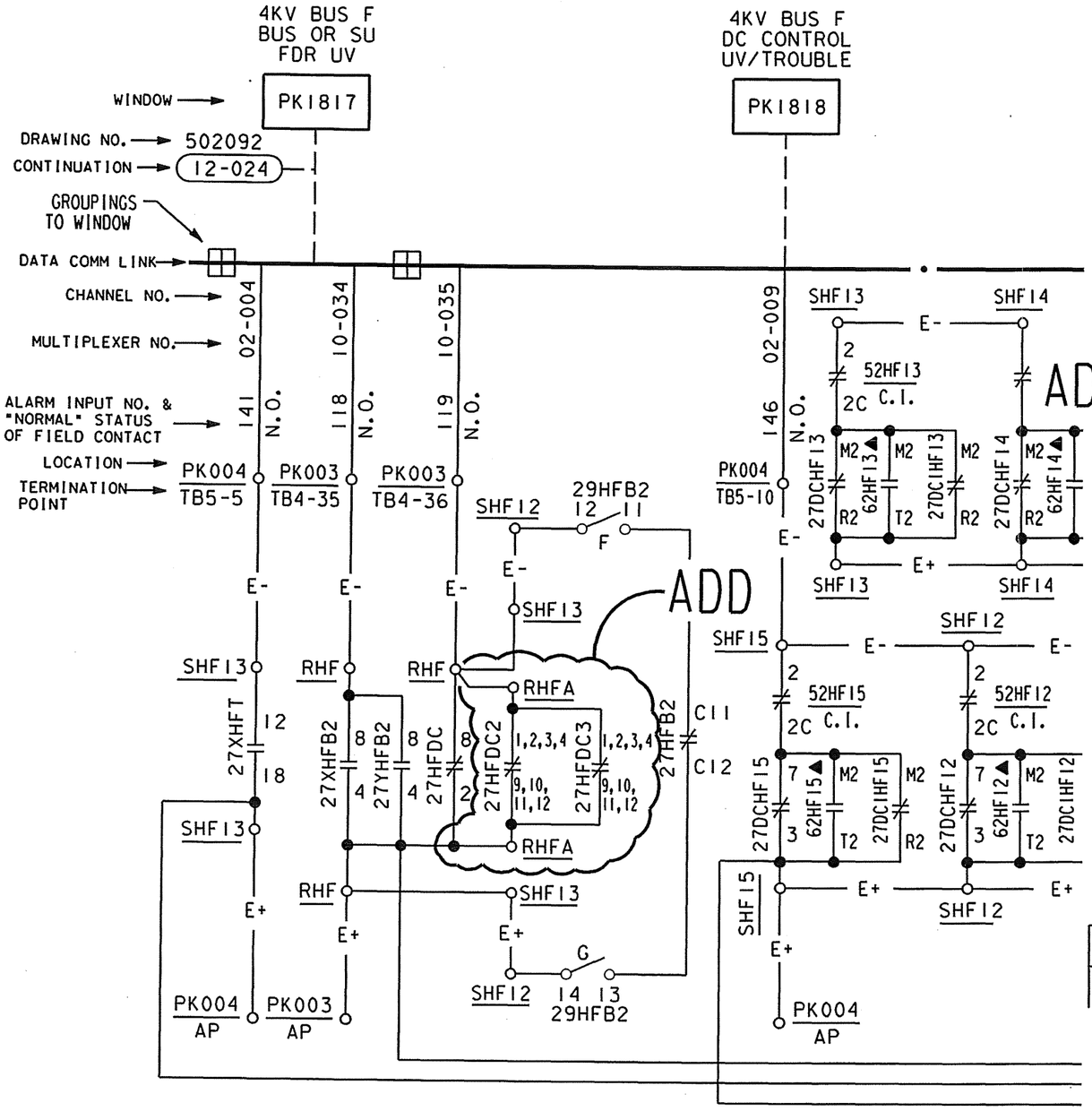
FOR INFO ONLY

"BEFORE"

UNIT 2

DRAWING No. 500788 SHEET No. 1 REV. No. 24	DDN No. 2000000991 PART 000 VERSION 00 SHEET No. ____ of ____
PREPARED BY: AJL2 DATE: 3/5/12 REVIEWED BY: Doug Bowman DATE: 3/5/12 VERIFIED BY: G Ramirez DATE: 3/5/12	SKETCH No. DSK-5000032113 PART 000 VERSION 00 SHEET No. 1 of 2 SKETCH TYPE [1] WALKDOWN PERFORMED: YES [X] NO [ ]

S....Drawings/NCFE/AJL2/U2 BUS F



AV4403DF 4KV BUS-F UV

AV4404DF 4KV BUS-F BUS OR STUP FDR UV

AV4406DF 4KV BUS-F AUTO XFR CONT UV OR UV RELAY FAILURE

AV4407DF 4KV BUS-F PPS DC CONT UV TROUBLE

TABLE OF DEVICES

DEVICE NUMBER	FUNCTION	CATALOG NO. OR REF DWG	REMARKS
3HF1	DIESEL AUTO TRANSFER INTERLOCKING RELAY	441352	
5HF13	STARTUP AUTO TRANSFER TRIP RELAY	441352	
5VD2	12KV BUS D AUTO TRANSFER TRIP RELAY	441350	
5VE8	12KV BUS E AUTO TRANSFER TRIP RELAY	441350	
27DC1HF7,27DCHF7	DC CONTROL BUS UV RELAY	441356	
27DC1HF8,27DCHF8	DC CONTROL BUS UV RELAY	441287	
27DC1HF9,27DCHF9	DC CONTROL BUS UV RELAY	441307	
27DC1HF11,27DCHF11	DC CONTROL BUS UV RELAY	441309	
27DC1HF12,27DCHF12	DC CONTROL BUS UV RELAY	441311	
27DC1HF13,27DCHF13	DC CONTROL BUS UV RELAY	441349	
27DC1HF14,27DCHF14	DC CONTROL BUS UV RELAY	441345	
27DC1HF15,27DCHF15	DC CONTROL BUS UV RELAY	441315	
27HFDC	DC CONTROL BUS F UV RELAY	441352	
27HFDC2	DC CONTROL BUS F UV RELAY (PSS)	441352	RLY PWR SUPPLY BUS
27HFDC3	DC CONTROL BUS F UV RELAY (PSS)	441352	RLY PWR SUPPLY BUS
27VDDC	DC CONTROL BUS D UV RELAY	441350	
27VEDC	DC CONTROL BUS E UV RELAY	441350	
27XHDT	4KV BUS D UV TRIP AUX RELAY	441351	
27XHFB2	4KV BUS F START DIESEL UV AUX RELAY	441352	
27XHFT	4KV BUS F UV TRIP AUX RELAY	441352	
27XVDT	12KV BUS D UV TRIP RELAY	441350	
27XVET	12KV BUS E UV TRIP		
27XVUB2			

PRELIM

FOR INFO ONLY

"AFTER"

UNIT 2

DRAWING No. 500788 SHEET No. 1 REV. No. 24	DDN No. 2000000991 PART 000 VERSION 00 SHEET No. ____ of ____
PREPARED BY: AJL2 DATE: 3/5/12 REVIEWED BY: Don L Dourson DATE: 3/5/12 VERIFIED BY: G Reames DATE: 3/5/12	SKETCH No. DSK-5000032113 PART 000 VERSION 00 SHEET No. 2 of 2 SKETCH TYPE [1] WALKDOWN PERFORMED: YES [X] NO [ ]

S....Drawings/NCFE/AJL2/U2 BUS F

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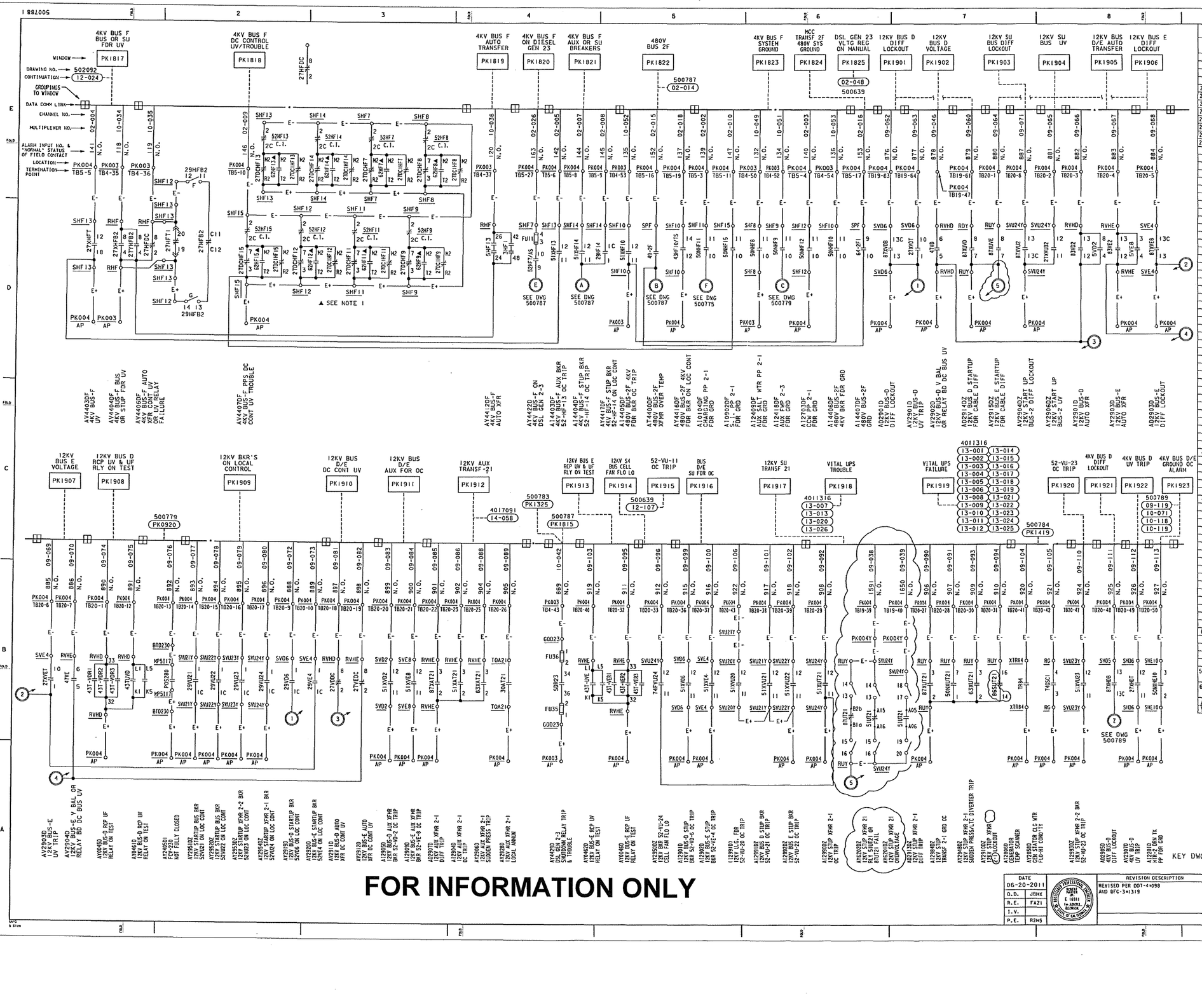

TABLE OF DEVICES

DEVICE NUMBER	FUNCTION	CATALOG NO. OR REF DWG	REMARKS
3HF1	DIESEL AUTO TRANSFER INTERLOCKING RELAY	441352	
5HF13	STARTUP AUTO TRANSFER TRIP RELAY	441352	
5VD2	12KV BUS D AUTO TRANSFER TRIP RELAY	441350	
5VE8	12KV BUS E AUTO TRANSFER TRIP RELAY	441350	
27DCHF7,27DCHF7	DC CONTROL BUS UV RELAY	441356	
27DCHF8, 27DCHF8	DC CONTROL BUS UV RELAY	441287	
27DCHF9, 27DCHF9	DC CONTROL BUS UV RELAY	441307	
27DCHF11, 27DCHF11	DC CONTROL BUS UV RELAY	441309	
27DCHF12, 27DCHF12	DC CONTROL BUS UV RELAY	441311	
27DCHF13, 27DCHF13	DC CONTROL BUS UV RELAY	441349	
27DCHF14, 27DCHF14	DC CONTROL BUS UV RELAY	441345	
27DCHF15, 27DCHF15	DC CONTROL BUS UV RELAY	441315	
27HFDC	DC CONTROL BUS F UV RELAY	441352	
27VDDC	DC CONTROL BUS D UV RELAY	441350	
27VEDC	DC CONTROL BUS E UV RELAY	441350	
27XHDT	4KV BUS D UV TRIP AUX RELAY	441351	
27XHFB2	4KV BUS F START DIESEL UV AUX RELAY	441352	
27XHFT	4KV BUS F UV TRIP AUX RELAY	441352	
27XVDT	12KV BUS D UV TRIP AUX RELAY	441350	
27XVET	12KV BUS E UV TRIP AUX RELAY	441350	
27XYUB2	12KV STUP BUS-2 UV AUX RELAY	437611	UNIT 1 DEVICE
27YHFB2	4KV BUS F START DIESEL UV AUX RELAY	441352	
29HF14	4KV BUS F (STUP) ISOLATION SWITCH	441345	
29VD6	12KV BUS D (STUP) ISOLATION SWITCH	441336	
29VE4	12KV BUS E (STUP) ISOLATION SWITCH	441336	
43HF10/TS	MCC TRANSF 2F FDR BKR TRANSFER SW	441364	
74GSC1	LOSS OF STTR CLR WTR FLO-HI CNDCT	441247	
29VU21	ST UP TRANSF 21 ISOLATION SWITCH	437660	
29VU22	ST UP TRANSF 21 ISOLATION SWITCH	437660	
29VU23	ST UP TRANSF 21 ISOLATION SWITCH	437660	
29VU24	ST UP TRANSF 21 ISOLATION SWITCH	437660	
47VD	12KV BUS D AC VOLTAGE BALANCE RELAY	441338	
47VE	12KV BUS E AC VOLTAGE BALANCE RELAY	441338	
49-2F	MCC TRANSF 2F OVERTEMP RELAY	441364	
50NXHE10	HTR #2 DRAIN PP21 GRD OC AUX RELAY	441276	
50NHF8	GROUND OC SENSOR RELAY	441312	
50NHF9	GROUND OC SENSOR RELAY	441302	
50NHF10	GROUND OC SENSOR RELAY	441364	
50NHF11	GROUND OC SENSOR RELAY	441312	
50NHF12	GROUND OC SENSOR RELAY	441311	
50NHF15	GROUND OC SENSOR RELAY	441315	
50NXAT21	AUX TRANSF 21 GRD OC AUX RLY	441347	
50NXUT21	ST UP TRANSF 21 GRD OC AUX RLY	437660	
51XAT21	AUX TRANSF 21 OC AUX RELAY	441347	
51XHF10	MCC TRANSF 2F OC AUX RELAY	441364	
51XHF13	4KV BUS F FDR OC AUX RELAY	441349	
51XHF14	START UP TRANSF 22 OC AUX RELAY	441345	
51XVD6	12KV BUS D OC AUX RELAY	441345	
51XVD2	12KV BUS D AUX TRANSF 21 OC AUX RELAY	441347	
51XVE8	12KV BUS E AUX TRANSF 21 OC AUX RELAY	441347	
51XVE4	12KV BUS E OC AUX RELAY	441336	
431-VDR1,2,3	RCP UNDERFREQUENCY RLY TEST SW, BUS D	441338	
43T-UVD	RCP UNDERVOLTAGE RLY TEST SW, BUS D	441338	
51XVU21	AIR BREAKER OC AUX RELAY	437660	
51XVU22	AIR BREAKER OC AUX RELAY	437660	
51XVU23	AIR BREAKER OC AUX RELAY	437660	
51XUT21	STUP TRANSF 21 OC AUX RELAY	437660	
431-VER1,2,3	RCP UNDERFREQUENCY RLY TEST SW, BUS E	441338	
52HF7/AS	DIESEL GEN 4KV CKT BREAKER	496276	
43T-UVE	RCP UNDERVOLTAGE RLY TEST SW, BUS E	441338	
63XAT21	AUX TRANSF 21 SUDDEN PRESS AUX RELAY	441347	
63XUT21	ST-UP XFMR 2-1 SUDDEN PRESS/LTC DIVERTER AUX RLY	441347	
51XVU20	AIR BREAKER O.C. AUX RELAY	441338	
64-2F1	GROUND SENSOR	451792	
30AT21	AUX TRANSF 21 LOCAL ANN RELAY	498121	
TR84	TEMP.RECORDER		
74FVU24	COOLING FAN ALARM RELAY	437659	
87XUVD	12KV STUP BUS D FDR CA DIFF LOCKOUT RELAY	441336	
87XUVE	12KV STUP BUS E FDR CA DIFF LOCKOUT RELAY	441336	
83VD2	12KV BUS D AUTO TRANSFER RELAY	441350	
83VE2	12KV BUS E AUTO TRANSFER RELAY	441350	
87XA121	AUX TRANSF 21 DIFF TRIP AUX RELAY	441347	
87XHDB	4KV BUS D DIFF LOCKOUT RELAY	441342	
87XUT21	STUP TRANSF 21 DIFF AUX RELAY	437660	
(86SUT21)	STUP TRANSF(21) LOCKOUT RELAY	(437660)	
87XVDB	12KV BUS D DIFF LOCKOUT RELAY	441341	
87XVEB	12KV BUS E DIFF LOCKOUT RELAY	441341	
87XVU	STUP BUS 2 DIFF LOCKOUT RELAY	441341	
SDR23	DIESEL GEN 23 SHUTDN RELAY	496281	
52HF7,8,9,11,12, 13,14,15/C.1.	4KV BUS F CIRCUIT BREAKER		
62HF7,8,9,11, 12,13,14,15	BKR CLOSING SPRING TIME DELAY RELAY		
51UT21	STUP TRANSF 21 OC RELAY	437660	
87UT21	STUP TRANSF 21 DIFF RELAY	437660	

NOTE:

1. DEVICE 62 IS INITIATED BY THE LOSS OF BREAKER SPRING CHARGE (52/LS) OR LOW INTERRUPTER BOTTLE PRESSURE (52/PS)

REFERENCES

SEE DWG # 500771

KEY DWG. SECTION 8

UNIT 2

P.G.&E. SYSTEM PHASE SEQUENCE A-C-B

DATE	REVISION DESCRIPTION
06-20-2011	REVISED PER DOT-4-4098 AND DFC-3-1319
D.D. JBHK	
R.E. FAZI	
I.V.	
P.E. R2H5	

ELECTRICAL
SCHEMATIC DIAGRAM
MAIN ANNUNCIATOR
WINDOWS PK1817 - PK1923

DIABLO CANYON POWER PLANT
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

DWG SCALE:	
BILL OF MATL:	
SUPSDS1	
SUPSD BY:	

DRAWING	SHEET	PAGE	REV
500788	1	0	24

UI-501138

500788 1

RASTER-500788.dgn
DGN-500788.dgn
CAD User:JBHK Date: 06-20-2011

FOR INFORMATION ONLY