GULF STATES UTILITIES COMPANY
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AREA CODE 713 838-6631

March 29, 1984
RBG-17,456
File No. G9.5, G9.8.6.1

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Denton:

River Bend Station Unit 1
Docket No. 50-458

Enclosed for your review are Gulf States Utilities Company (GSU) responses to Request for Additional Information identified by the Nuclear Regulatory Commission's Power Systems Branch (PSB). This letter supplements information contained in docketed correspondence from J. E. Booker to H. R. Denton dated December 30, 1983, February 10, 1984, March 5, 1984, and March 7, 1984. Attachment 1 of this letter summarizes the Staffs request identified in a meeting between GSU and PSB dated February 15, 1984. These changes will be incorporated into the FSAR in a future amendment.

Sincerely,

Eddie R Grant

for J. E. Booker
Manager-Engineering,
Nuclear Fuels & Licensing
River Bend Nuclear Group

JEB/WJR/ERG/JEP/je

Attachments

B001
1/1

Attachment 1

A. I^2T Curves

1. Contactor penetration protection capability and reliability above the "locked-rotor" ranges should be discussed, and should be similar to that of a circuit breaker.(Figure 8.3-13c)

Response

Contactors used in circuits running through containment electrical penetrations are procured QA Category 2 and qualified to RG 1.89 and IEEE-323 standards. Contactors utilized for this application on RBS are specified to be in complete conformance to NEMA ICS standards. This standard requires a design test to be performed to demonstrate the ability of the contactor to make-and-break current of 10 times contactor rated current for 10 operations. Thus, contactors chosen for use on RBS are qualified and can reliably open on currents well in excess of rated current. Any currents in excess of 10 times contactor rated current will be interrupted by the penetration circuit breaker.

2. Provide background on the motor-generator curve on Figure 8.3-13d.

Response

The "Short Circuit Decrement Data" furnished for the reactor recirculation motor generator set is provided in Enclosure 1.

B. BTP-1PSB

1. Expand your discussion to address under voltage protection for lower voltage level requirements (i.e. down to 120 volts).

Response

With the GSU grid at 95% voltage, the worst case (fully loaded) voltage on the Class 1E 4.16 kV bus is 93.9%. This 93.9% voltage at the 4.16 kV level results in 92.67% voltage on the Class 1E 480V bus and 90.4% voltage at the Class 1E 120V panels. Final load study calculations will provide more accurate infomration for voltage profile calculations, and will result in final relay setpoints. Using these loading conditions, voltage on the Class 1E 120V will be calculated assuming 90% on the 4.16 kV bus. Should the voltage at the 120V bus be insufficient to furnish rated voltage to low

voltage Class 1E loads, the transformer trip setting will be revised or undervoltage relays will be added on the 120 volt buses. Additional one line sketches are provided in Enclosure 2.

C. Battery Discharge Alarm

1. The undervoltage alarm setpoint is too low at 120 volts. Revise setpoint to 123-125 volts or show that during normal discharging at 120 volts the batteries can still supply one minute loads above the equipment operating voltage.

Response

The setpoint for the undervoltage alarm provided in the March 5, 1984 letter from J. E. Booker to H. R. Denton wil be revised to 124 volts.

D. Backup Battery Charger Interlock

1. A backup battery charger interlock must be provided.

Response

In addition to the response provided in the March 5, 1984 letter from J. E. Booker to H. R. Denton, revised FSAR figures are provided in Enclosure 3. In addition, pad locking the backup battery charger circuit breaker in the OPEN position will ensure electrical isolation between the Division III 125 VDC panel board and other electrical systems.

ENCLOSURE 1

SHORT CIRCUIT DECREMENT DATA

RIVERBEND
NL SATI83D956C1

SO **HON14 **
REQN 205-83E043

GENERATOR RATING -

160. KW- 200. KVA- 325. V- 450. RPM

CASE 1

3-PH SYMMETRICAL SHORT CIRCUIT

INITIAL CONDITIONS - GENERATOR WDG TEMP. 130.
EXCITER FIELD TEM. 70.
REGULATION - MANUAL
PRE-LOAD NO-LOAD

Calculated results +/- 15%

Time	I-ac	I-dc	I-t	I-eff
0.001	6.350	0.	6.350	6.402
0.003	6.152	0.	6.152	6.301
0.010	5.561	0.	5.561	5.986
0.030	4.482	0.	4.482	5.302
0.100	3.192	0.	3.192	4.259
0.300	1.888	0.	1.888	3.193
1.000	0.362	0.	0.362	1.940
3.000	0.008	0.	0.008	1.125
10.000	0.000	0.	0.000	0.616
30.000	0.	0.	0.	0.356
100.000	0.	0.	0.	0.195

1.0 CURRENT = 355.AMPERES RMS

Definitions -

Time - Time in seconds after application of short
I-ac - AC component of short circuit current, p.u.
I-dc - DC component of short circuit current, p.u.
I-t - Total short circuit current, p.u.
I-eff - Effective value - A constant current having same I-sqr-dt integral as the calcul. value

5 Pages

SHORT CIRCUIT DECREMENT DATA

RIVERBEND
NL SAT1830956C1

SO **HON14 **
REON 205-83E043

GENERATOR RATING -

160. KW- 200. KVA- 325. V- 450. RPM

CASE 2

3-PH SYMMETRICAL SHORT CIRCUIT

INITIAL CONDITIONS - GENERATOR RDO TEMP, 130.
EXCITER FIELD TEM, 70.
REGULATION AUTOMATIC
PRE-LOAD NO-LOAD

Calculated results +/- 15%

Time	I-ac	I-dc	I-t	I-eff
0.001	6.350	0.	6.350	6.402
0.003	6.152	0.	6.152	6.301
0.010	5.561	0.	5.561	5.986
0.030	4.482	0.	4.482	5.332
0.100	3.192	0.	3.192	4.259
0.300	1.888	0.	1.888	3.194
1.000	0.362	0.	0.362	1.940
3.000	0.009	0.	0.009	1.125
10.000	0.001	0.	0.001	0.616
30.000	0.001	0.	0.001	0.356
100.000	0.001	0.	0.001	0.195

1.0 CURRENT = 355. AMPERES RMS

Definitions -

Time - Time in seconds after application of short
I-ac - AC component of short circuit current, p.u.
I-dc - DC component of short circuit current, p.u.
I-t - Total short circuit current, p.u.
I-eff - Effective value - A constant current having same I-sqr-dt integral as the calcul. value

SHORT CIRCUIT DECREMENT DATA

RIVERBEND
ML 5AT1830956C1

SO **HOW14 **
RECN 205-83E043

GENERATOR RATING -

160. KW- 200. KVA- . 325. V- . 450. RPM

CASE 3

3-PH ASYMETRICAL SHORT CIRCUIT

INITIAL CONDITIONS - GENERATOR WDG TEMP. 25.
EXCITER FIELD TEM. 25.
REGULATION AUTOMATIC
PRE-LOAD FULL LOAD

Calculated results +/- 15%

Plotted on I²t curve.

Time	I-ac	I-dc	I-t	I-eff
0.001	6.953	9.811	12.025	12.121
0.003	6.762	9.492	11.654	11.934
0.010	6.124	8.454	10.480	11.321
0.030	5.177	6.072	7.980	9.939
0.100	4.051	1.907	4.478	7.331
0.300	2.915	0.070	2.916	5.122
1.000	0.934	0.000	0.934	3.198
3.000	0.034	0.	0.034	1.870
10.000	0.001	0.	0.001	1.024
30.000	0.001	0.	0.001	0.591
100.000	0.001	0.	0.001	0.324

1.0 CURRENT = 355. AMPERES RMS

Definitions -

Time - Time in seconds after application of short
I-ac - AC component of short circuit current, p.u.
I-dc - DC component of short circuit current, p.u.
I-t - Total short circuit current, p.u.
I-eff - Effective value - A constant current having same I-sqr-dt integral as the calcul. value

SHORT CIRCUIT DECREMENT DATA

HIVERBEND SO **HOM14 **
#L 5AT1830956C1 REGN 205-83E043

GENERATOR RATING -

160. KW- 200. KVA- 325. V- 450. RPM

CASE 4

L-L SYMETRICAL SHORT CIRCUIT

INITIAL CONDITIONS - GENERATOR RDC TEMP, 130.
EXCITER FIELD TEM, 25.
REGULATION MANUAL
PRE-LOAD NO-LOAD

Calculated results +/- 15%

Time	I-ac	I-dc	I-t	I-eff
0.001	4.905	0.	4.905	4.924
0.003	4.833	0.	4.833	4.888
0.010	4.609	0.	4.609	4.770
0.030	4.153	0.	4.153	4.503
0.100	3.446	0.	3.446	3.986
0.300	2.538	0.	2.538	3.343
1.000	0.881	0.	0.881	2.289
3.000	0.037	0.	0.037	1.352
10.000	0.000	0.	0.000	0.741
30.000	0.	0.	0.	0.428
100.000	0.	0.	0.	0.234

1.0 CURRENT = 355.AMPERES RMS

Definitions -

Time - Time in seconds after application of short
I-ac - AC component of short circuit current, p.u.
I-dc - DC component of short circuit current, p.u.
I-t - Total short circuit current, p.u.
I-eff - Effective value - A constant current having same I-sqr-dt integral as the calcul. value

SHORT CIRCUIT DECREMENT DATA

RIVERBEND
ML 5AT1830956C1

SO **HOM14 **
REQN 205-83E043

GENERATOR RATING -

160. KW- 200. KVA- 325. V- 450. RPM

CASE 5

L-L ASYMETRICAL SHORT CIRCUIT

INITIAL CONDITIONS - GENERATOR HOT TEMP, 25.
EXCITER FIELD TEM, 25.
REGULATION AUTOMATIC
PRE-LOAD FULL-LOAD

Calculated results +/- 15%

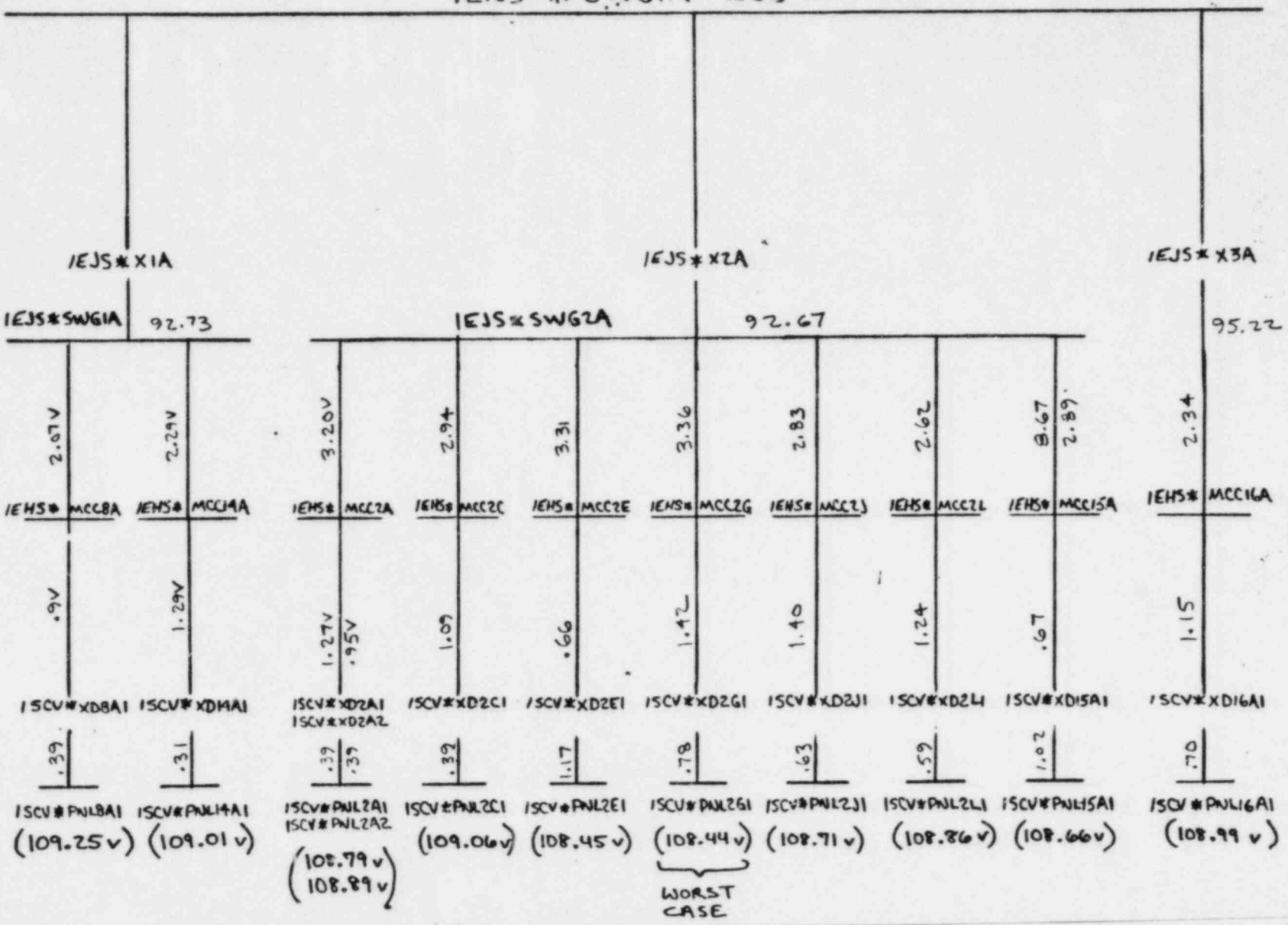
Time	I-ac	I-dc	I-t	I-eff
0.001	5.371	7.514	9.236	9.296
0.003	5.311	7.269	9.003	9.179
0.010	5.127	6.474	8.258	8.794
0.030	4.759	4.650	6.654	7.900
0.100	4.237	1.461	4.482	6.202
0.300	3.573	0.053	3.573	4.812
1.000	1.794	0.000	1.794	3.452
3.000	0.163	0.	0.163	2.107
10.000	0.002	0.	0.002	1.166
30.000	0.002	0.	0.002	0.667
100.000	0.002	0.	0.002	0.365

1.0 CURRENT = 355. AMPERES RMS

Definitions -

Time - Time in seconds after application of short
I-ac - AC component of short circuit current, p.u.
I-dc - DC component of short circuit current, p.u.
I-t - Total short circuit current, p.u.
I-eff - Effective value - A constant current having same I-sqr-dt integral as the calcul. value

ENCLOSURE 2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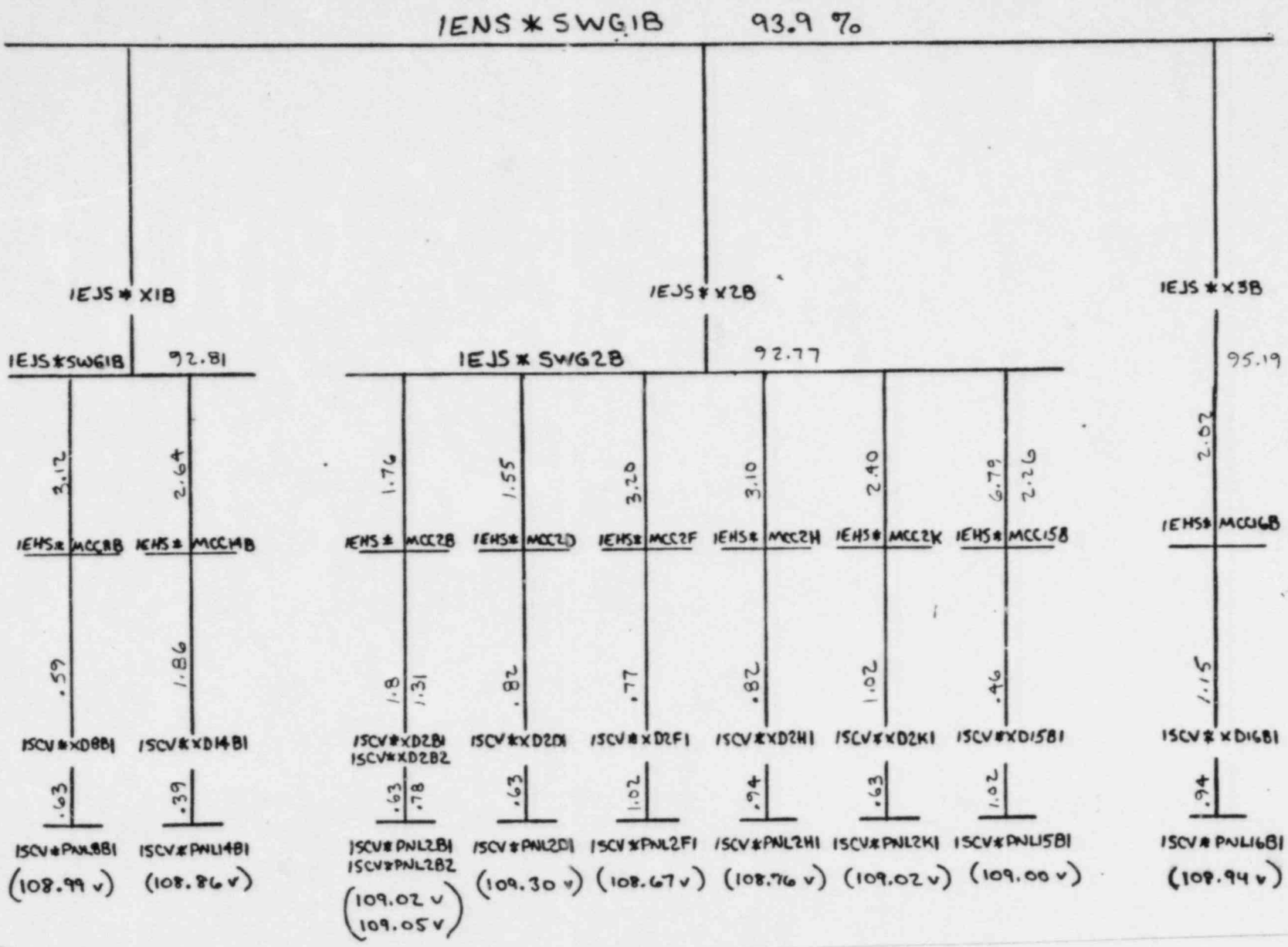
1EJS * X1A
1EJS * X2A
1EJS * X3A
1EJS * SWG1A 92.73
1EJS * SWG2A 92.67
95.22
2.07V
2.29V
3.20V
2.94
3.31
3.36
2.83
2.62
3.67
2.89
2.34
1EHS * MCC8A
1EHS * MCC14A
1EHS * MCC2A
1EHS * MCC2C
1EHS * MCC2E
1EHS * MCC2G
1EHS * MCC2J
1EHS * MCC2L
1EHS * MCC15A
1EHS * MCC16A
.9V
1.29V
1.27V
.95V
1.09
.66
1.42
1.40
1.24
.67
1.15
1SCV * XD8A1
1SCV * XD14A1
1SCV * XD2A1
1SCV * XD2A2
1SCV * XD2C1
1SCV * XD2E1
1SCV * XD2G1
1SCV * XD2J1
1SCV * XD2L1
1SCV * XD15A1
1SCV * XD16A1
.39
.31
.39
.39
.32
1.17
.78
.63
.59
1.02
.70
1SCV * PNL8A1
1SCV * PNL14A1
1SCV * PNL2A1
1SCV * PNL2A2
1SCV * PNL2C1
1SCV * PNL2E1
1SCV * PNL2G1
1SCV * PNL2J1
1SCV * PNL2L1
1SCV * PNL15A1
1SCV * PNL16A1
(109.25 v)
(109.01 v)
(108.79 v
108.89 v)
(109.06 v)
(108.45 v)
(108.44 v)
(108.71 v)
(108.86 v)
(108.66 v)
(108.99 v)
WORST CASE


1ENS*SWG1B 93.9 %
1EJS*X1B
1EJS*X2B
1EJS*X3B
1EJS*SWG1B
92.81
1EJS*SWG2B
92.77
95.19
3.12
2.64
1.76
1.55
3.20
3.10
2.40
6.79
2.26
2.07
1EHS* MCC1B
1EHS* MCC4B
1EHS* MCC2B
1EHS* MCC2D
1EHS* MCC2F
1EHS* MCC2H
1EHS* MCC2K
1EHS* MCC15B
1EHS* MCC16B
.59
1.86
1.8
1.31
.82
.77
.82
1.02
.46
1.15
1SCV*XD8B1
1SCV*XD14B1
1SCV*XD2B1
1SCV*XD2B2
1SCV*XD2D1
1SCV*XD2F1
1SCV*XD2H1
1SCV*XD2K1
1SCV*XD15B1
1SCV*XD16B1
.63
.39
.63
.78
.63
1.02
.94
.63
1.02
.94
1SCV*PNL8B1
(108.99 v)
1SCV*PNL14B1
(108.86 v)
1SCV*PNL2B1
1SCV*PNL2B2
(109.02 v
109.05 v)
1SCV*PNL2D1
(109.30 v)
1SCV*PNL2F1
(108.67 v)
1SCV*PNL2H1
(108.76 v)
1SCV*PNL2K1
(109.02 v)
1SCV*PNL15B1
(109.00 v)
1SCV*PNL16B1
(108.94 v)

Notes

1. Voltages on the 4.16 kV buses are based on a fully loaded condition of the transformer feeding that respective bus

2. Voltages on the 480 volt buses are based on load center transformers being fully loaded

3. Voltage drops from load center to MCC are based on 1) actual installed cable impedance 2) MCC full load AMP of 317.25 AMPS*

* Except

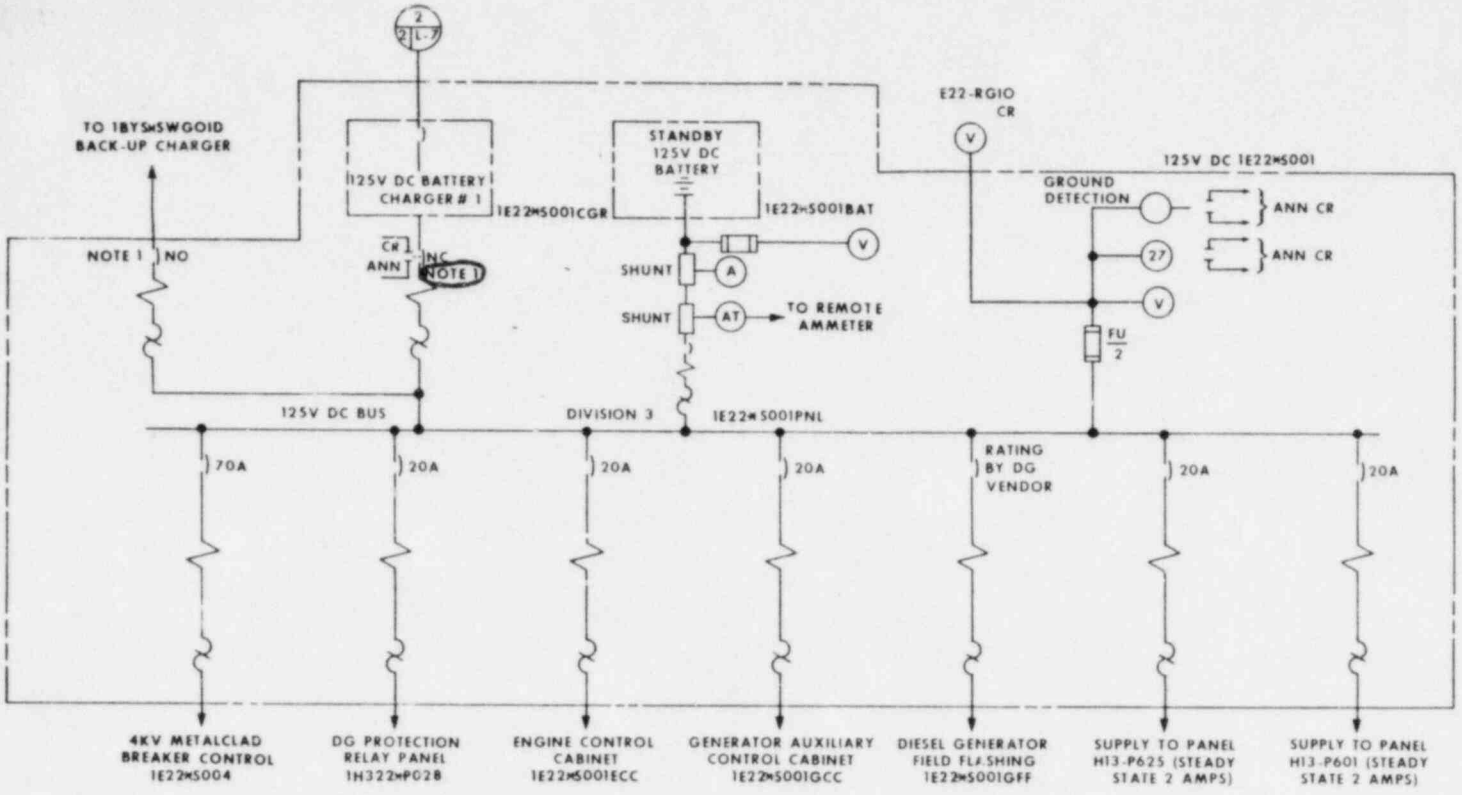
1EHS*MCC15A & 15B - Assumed full load AMP of 100 AMPS (actual approximately 25 AMPS)

1EHS*MCC16A & 16B - Assumed full load AMP of 635.5 AMPS (feed directly from XFMR)

4. Voltage drops from MCC to XFMR are based on 1) full load XFMR rating (15KVA) (31.25A) 2) actual installed cable impedance

5. Voltage drops from XFMR to panel are based on 1) actual installed cable impedance 2) full load XFMR rating (15KVA) (62.5A)

ENCLOSURE 3



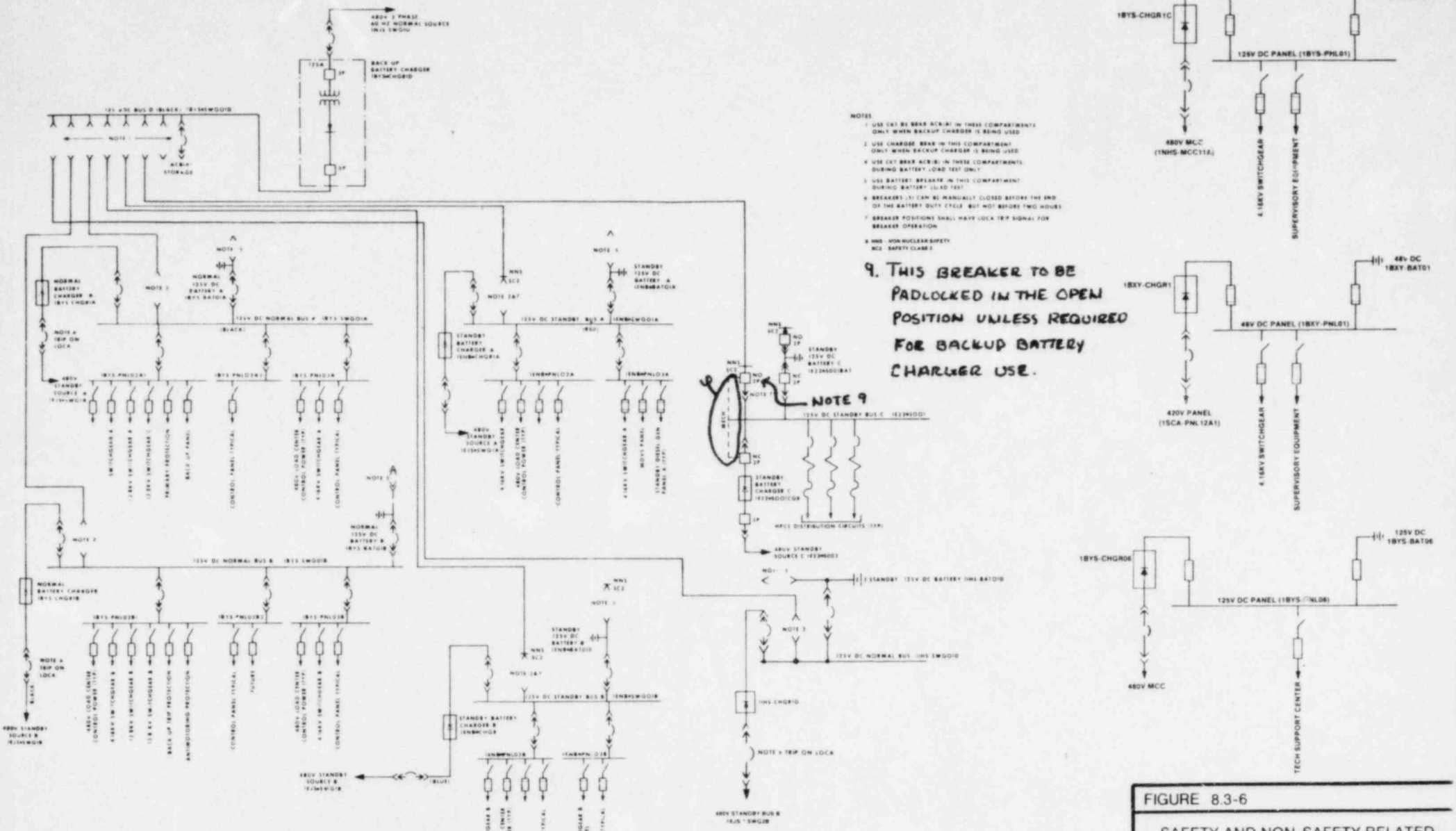
1. THIS BREAKER TO BE PADLOCKED IN THE OPEN POSITION EXCEPT FOR WHEN REQUIRED TO USE BACKUP BATTERY CHARGER.

NOTES: 1. ONE BREAKER INTERCHANGEABLE FOR EITHER POSITION.
2. DOUBLE POLE DOUBLE THROW TRANSFER DEVICE WITH ANNUNCIATION TO INDICATE POSITION.

FIGURE 8.3-3

ONE LINE DIAGRAM
HIGH PRESSURE CORE SPRAY
SHT. 3 OF 3

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT



SOURCE 12210-EE-1ZJ

FIGURE 8.3-6

SAFETY AND NON-SAFETY RELATED
125V DC DISTRIBUTION SYSTEM

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT