CRWMS/M&O

Design Analysis Cover Sheet

Complete only applicable items.

1.

QA: N/A

Page: 1 Of: 5

2. DESIGN ANALYSIS TITLE			
SHORT CIRCUIT CALCULATION (TEMPORARY POWER) (SCPP: N/A)			
3. DOCUMENT IDENTIFIER (Including Rev. No.)		4. REV. NO.	5. TOTAL PAGES
BABBDA000-01717-0200-00089 REV 01		01	5
6. TOTAL ATTACHMENTS	7. ATTACHMENT NUMBERS - NO. OF PAGES IN EACH		8. SYSTEM ELEMENT
2	I-1, II-15		ESF
	Print Name	Signature	Date
9. Originator	YURI SHANE	<i>Yuri D Shane</i>	7/21/95
10. Checker	LESLIE FERNANDEZ	<i>Leslie Fernandez</i>	7/24/95
11. Lead Design Engineer	Robert E. Howell	<i>Robert S. Howell</i>	7/24/95
12. QA Manager	Daniel M. Jenkins	<i>DM Jenkins</i>	07.24.95
13. Department Manager	GENE N. KIMURA	<i>Gene N. Kimura</i>	7/24/95
14. REMARKS			

Design Analysis Revision Record

CRWMS/M&O

Complete only applicable items.

1.

QA: N/A

Page: 2 Of: 5

2. DESIGN ANALYSIS TITLE

SHORT CIRCUIT CALCULATION (TEMPORARY POWER)

3. DOCUMENT IDENTIFIER (Including Rev. No.)

BABBDA000-01717-0200-00089 REV 01

4. REVISION NO.

01

5. Revision No.

6. Total Pages

7. Description of Revision

00

4

Initial issue

01

5

Removed TBV-127

Reformatted entire Design Analysis to conform with Procedure QAP-3-9 Rev. 5

1. PURPOSE

The purpose and objective of this calculation is to determine the momentary and interrupting duty on the breakers, for 69kV temporary power only.

2. QUALITY ASSURANCE

- 2.1 No quality assurance (QA) controls apply to the items and activities as they are discussed within this analysis and it is therefore QA classified as "NONE" per [Quality Administrative Procedure] QAP-2-0 Rev. 2, QAP-2-3 Rev. 7, and [Implementing Line Procedure] NLP-3-18 Rev. 2.
- 2.2 No applicable Determination of Importance Evaluations (DIEs) (Reference 5.1) have resulted in controls that would affect the structures, systems, or components/configuration items described within this analysis. If a subsequent DIE indicates that the information provided in this analysis is required for use as a design input, this design analysis will require revision.
- 2.3 This study was prepared in accordance with QAP-3-9 Rev. 5.

3. METHOD

The computer program Electrical Transient Analyzer Program (ETAP) developed by Operation Technology Inc. was used for this analysis.

4. DESIGN INPUTS

4.1 DESIGN PARAMETERS

- 4.1.1 Available Short Circuit = 167.11 MVA (from Raytheon Services Nevada (RSN) Study)
- 4.1.2 Main Transformer Z = 7.5 percent
- 4.1.3 Pad Mtd. Transformer Z = 5.5 percent

4.2 CRITERIA

Exploratory Studies Facility Basis for Design 7.2 IV.1

| **4.3 ASSUMPTIONS**| **4.3.1** Typical values for cable resistance and reactances were assumed.| **4.3.2** Transformer percentage impedances were assumed.| **4.4 CODES AND STANDARDS**| **4.4.1** ANSI/IEEE C37.010-1979, IEEE Application Guide for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis| **4.4.2** ANSI/IEEE C37.5-1979, IEEE Guide for Calculation of Fault Currents for Application of AC High-Voltage Circuit Breakers Rated on a Total Current Basis| **4.4.3** ANSI/IEEE C37.13-1981, IEEE Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures| **5. REFERENCES**| **5.1** BABB00000-01717-2200-00001 REV. 05, DIE for ESF North Portal Pad| **5.2** RSN Short Circuit Computer Printout, 10 June 1993| **6. USE OF COMPUTER SOFTWARE**

| The Electrical Transient Analysis Program (ETAP) by Operation Technology, Inc. (OTI) Version 6.52 was used for short circuit calculations. The software used was appropriate for the nonquality-affecting application.

| **7. DESIGN ANALYSIS**

| Short circuit analysis program was run to determine interrupting duty at the secondary of the pad mounted transformer. At this time only three pad mounted transformers (shop building, switchgear building, and change house) were included in the study. Momentary and interrupting duty for each mode (bus) shown on the sketch were calculated.

| **8. CONCLUSION**

| It was determined that the available fault duty at the transformer secondary is satisfactory.

9. ATTACHMENTS**ATTACHMENT****TITLE**

I	Temporary Power-Single Line
II	Computer Printout

TEMPORARY POWER SINGLE LINE

YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT

Civilian Radioactive Waste Management System
Management & Operating Contractor

CONTRACT NO. DE-AC01-91RW00134

SUBJECT: TEMPORARY POWER - SINGLE LINE

WBS NO: 1.2.6.

DATE: 9-17-93 REV NO: _____

CALC NO: _____

ORIGINATOR: B. MAJUMDAR BA

CHECKED BY: _____

CHECKED DATE: _____

COMPUTER PRINTOUT

SYSTEM ANALYSIS

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BMA*

ETAP 6.52

Study Case: 1

Page: 1/15
 Date: 09-24-1993
 SN: 88FD130132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

Electrical Transient Analyzer Program

SHORT CIRCUIT ANALYSIS

3-Phase Fault Currents

	SWING	GEN.	LOAD	TOTAL
Number of Buses:	1	0	8	9

	XFRM	REACT.	LINE	IMP.	C.B.	TOTAL
Number of Branches:	4	0	4	0	0	8

	Synch. Gen.	Synch. Motor	Ind. Motor	Uti- lity	Total
Number of Machines:	0	0	2	1	3

System Frequency: 60.0 Hz

Unit System: English

Data File Name: TEMPPWR1

Output File Name: TEMPPWR1

COMPUTER PRINTOUT (CONTINUED)

BUS INPUT DATA

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BAM*

ETAP 6.52

Study Case: 1

Page: 2/15
 Date: 09-24-1993
 SN: 88FD130132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

Bus				Voltage		Generation		Motor Load		Static Load		Mvar Limits	
No.	Name	Type	kV	XMag.	Ang.	MW	Mvar	MW	Mvar	MW	Mvar	Max.	Min.
1	PRIM.	SWNG	69.00	100.0	.0			.000	.000	.000	.000		
2	SEC.XFMR	Load	12.47	100.0	.0			7.200	.000	.000	.000		
3	PADSWGR	Load	12.47	100.0	.0			.000	.000	.000	.000		
4	PRIMSHOP	Load	12.47	100.0	.0			.000	.000	.000	.000		
5	PRISWGR	Load	12.47	100.0	.0			.000	.000	.000	.000		
6	PRICHNGH	Load	12.47	100.0	.0			.000	.000	.000	.000		
7	SECSHOP	Load	.48	100.0	.0			.250	.000	.000	.000		
8	SECXWGR	Load	.48	100.0	.0			.500	.000	.000	.000		
9	SECCHNGH	Load	.48	100.0	.0			.100	.000	.000	.000		
Total						.000		8.050	.000	.000	.000		

COMPUTER PRINTOUT (CONTINUED)

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BAM*

LINE / CABLE DATA

ETAP 6.52
 Study Case: 1

Page: 3/15
 Date: 09-24-1993
 SN: 88FD130132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

CKT #	CKT / Branch			Line / Cable (ohms/1000 ft per phase)								Impedance			
	From	To	Name	Library	Size	L (ft)	#/Y	T (°C)	R	X	Y	MVA _b	% R	% X	% Y
2	2	3	FDR	15NCUS1	500	175.	1	75	.02840	.04210	.000000	100.0	.32	.47	.000
3	3	4	FDR	15NCUS1	500	200.	1	75	.02840	.04210	.000000	100.0	.37	.54	.000
4	3	5	FDR	15NCUS1	500	160.	1	75	.02840	.04210	.000000	100.0	.29	.43	.000
5	5	6	FDR	15NCUS1	500	600.	1	75	.02840	.04210	.000000	100.0	1.10	1.62	.000

COMPUTER PRINTOUT (CONTINUED)

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BMA*

XFMR / REACTOR DATA

ETAP 6.52

Study Case: 1

Page: 4/15
 Date: 09-24-1993
 SN: 88FDI30132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

CKT #	CKT / Branch			Transformer				Reactor		Impedance (100 MVA Base)		
	From	To	Name	MVA	% Z	X/R	% Tap	X (ohm)	X/R	%Tolerance	% R	% X
1	1	2	XFMR	10.000	7.500	15.5	.000			-7.50	4.5	69.2
6	4	7	XFMR	.750	5.500	5.8	.000			-7.50	115.4	668.4
7	5	8	XFMR	.500	5.500	5.8	.000			-7.50	173.2	1002.7
8	6	9	XFMR	.500	5.500	5.8	.000			-7.50	173.2	1002.7

COMPUTER PRINTOUT (CONTINUED)

MTR & GEN INPUT DATA

Project: ESF DESIGN - YUCCA MOUNTAIN

Location: LAS VEGAS, NV.

Contract: 4580823

Engineer: B.MAJMUDAR *BMA*

ETAP 6.52

Study Case: 1

Page: 5/15

Date: 09-24-1993

SN: 88FD130132

File: TEMPPWR1

TEMPORARY POWER

Short Circuit Analysis

Bus No.	Machine Information			Rating			X/R Ratio		% Impedance(Machine Base)			% Impedance(100 MVA Base)		
	No.	Name	Type	MVA	kV	RPM	X"/R	X'/R	R	X"	X'	R	X"	X'
1	101	UTILITY	Utility	167.100	69.00	1800.	10.00	10.00	9.950	99.50	99.50	6.0	59.5	59.5
2	201	TBM	Ind MTR	3.403	12.00	1800.	49.30	73.97	.312	15.38	23.08	8.5	418.5	628.1
2	202	LUMPED	Ind MTR	2.560	12.00	1800.	42.66	63.98	.361	15.38	23.08	13.0	556.5	834.8

Total Connected Generators (= 0): .000 MVA

Total Connected Motors (= 2): 5.963 MVA

COMPUTER PRINTOUT (CONTINUED)

SHORT-CIRCUIT REPORT

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BAM*

ETAP 6.52

Study Case: 1

Page: 6/15
 Date: 09-24-1993
 SN: 88FDI30132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

Three-phase fault at bus number: 1 PRIM. , 69.00 kV bus (Prefault Voltage = 100.00 %)

Contribution From Bus		To Bus	1/2 Cycle (% voltage & symm. rms current)					1.5 to 4 Cycle (% voltage & symm. rms current)				
No.	Name	No.	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
2	SEC.XFMR	1	22.51	.008	-.271	32.0	.271	16.22	.004	-.196	44.4	.196
101	UTILITY	1	100.00	.139	-1.391	10.0	1.398	100.00	.139	-1.391	10.0	1.398

Momentary Duty: Symmetrical = 1.669 kA rms
 Asymmetrical = 2.509 kA rms (MF = 1.503, X/R = 13.6 from separate R & X networks)
 Asymmetrical = 2.671 kA rms (MF = 1.60 at X/R = 25.0)

Interrupting Duty: Symmetrical = 1.593 kA rms (NACD ratio = 1.00)
 Adjusted Symm. = 1.593 kA rms (MF = 1.000, X/R = 14.2 from separate R & X networks)

(5 cycle CB, symmetrical current rating basis)

COMPUTER PRINTOUT (CONTINUED)

SHORT-CIRCUIT REPORT

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR

ETAP 6.52

Study Case: 1

Page: 7/5
 Date: 09-24-1993
 SN: 88FD130132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

Three-phase fault at bus number: 2 SEC.XFMR, 12.47 kV bus (Prefault Voltage = 100.00 %)

Contribution From Bus		To Bus	1/2 Cycle (% voltage & symm. rms current)					1.5 to 4 Cycle (% voltage & symm. rms current)				
No.	Name	No.	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
3	PADSWGR	2	.00	.000	.000	5.2	.000	.00	.000	.000	3.7	.000
1	PRIM.	2	53.70	.289	-3.572	12.4	3.584	53.70	.289	-3.572	12.4	3.584
201	TBM	2	100.00	.022	-1.106	49.3	1.106	100.00	.010	-.737	74.0	.737
202	LUMPED	2	100.00	.019	-.831	42.7	.832	100.00	.009	-.554	64.0	.555

Momentary Duty: Symmetrical = 5.519 kA rms
 Asymmetrical = 8.803 kA rms (MF = 1.595, X/R = 24.3 from separate R & X networks)
 Asymmetrical = 8.830 kA rms (MF = 1.60 at X/R = 25.0)

Interrupting Duty: Symmetrical = 4.873 kA rms (NACD ratio = 1.00)
 Adjusted Symm. = 5.440 kA rms (MF = 1.116, X/R = 27.5 from separate R & X networks)

CB Capability = 23.000 kA rms (5 cycle CB, symmetrical current rating basis)

COMPUTER PRINTOUT (CONTINUED)

SHORT-CIRCUIT REPORT

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BMA*

ETAP 6.52

Study Case: 1

Page: 8/15
 Date: 09-24-1993
 SN: 88FD130132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

Three-phase fault at bus number: 3 PADSAGR, 12.47 kV bus (Prefault Voltage = 100.00 %)

Contribution From Bus		To Bus	1/2 Cycle (% voltage & symm. rms current)					1.5 to 4 Cycle (% voltage & symm. rms current)				
No.	Name	No.	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
2	SEC.XFMR	3	.68	.348	-5.476	15.7	5.487	.60	.321	-4.837	15.1	4.848
4	PRIMSHOP	3	.00	.000	.000	999.9	.000	.00	.000	.000	999.9	.000
5	PRISWGR	3	.00	.000	.000	999.9	.000	.00	.000	.000	.8	.000

Momentary Duty: Symmetrical = 5.487 kA rms
 Asymmetrical = 8.693 kA rms (MF = 1.584, X/R = 22.4 from separate R & X networks)
 Asymmetrical = 8.779 kA rms (MF = 1.60 at X/R = 25.0)

SW Capability = 22.400 kA rms

1.5 to 4 Cycle SC: Symmetrical = 4.848 kA rms (Device: SW)

COMPUTER PRINTOUT (CONTINUED)

SHORT-CIRCUIT REPORT

Project: ESF DESIGN - YUCCA MOUNTAIN

Location: LAS VEGAS, NV.

Contract: 4580823

Engineer: B.MAJMUDAR *BMA*

ETAP 6.52

Study Case: 1

Page: 9/15

Date: 09-24-1993

SN: 88FD130132

File: TEMPPWR1

TEMPORARY POWER

Short Circuit Analysis

Three-phase fault at bus number: 4 PRIMSHOP, 12.47 kV bus (Prefault Voltage = 100.00 %)

Contribution From Bus		To Bus	1/2 Cycle (% voltage & symm. rms current)					1.5 to 4 Cycle (% voltage & symm. rms current)				
No.	Name	No.	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
3	PADSWGR	4	.77	.367	-5.438	14.8	5.450	.68	.335	-4.808	14.3	4.820
7	SECSHOP	4	.00	.000	.000	999.9	.000	.00	.000	.000	999.9	.000

Momentary Duty:

Symmetrical = 5.450 kA rms

Asymmetrical = 8.570 kA rms (MF = 1.572, X/R = 20.5 from separate R & X networks)

Asymmetrical = 8.721 kA rms (MF = 1.60 at X/R = 25.0)

SW Capability = 12.000 kA rms

1.5 to 4 Cycle SC: Symmetrical = 4.820 kA rms (Device: SW)

COMPUTER PRINTOUT (CONTINUED)

SHORT-CIRCUIT REPORT

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BMA*

ETAP 6.52

Study Case: 1

Page: 10/15
 Date: 09-24-1993
 SN: 88FDI30132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

Three-phase fault at bus number: 5 PRISWGR, 12.47 kV bus (Prefault Voltage = 100.00 %)

Contribution From Bus		To Bus	1/2 Cycle (% voltage & symm. rms current)					1.5 to 4 Cycle (% voltage & symm. rms current)				
No.	Name	No.	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
3	PADSWGR	5	.62	.363	-5.446	15.0	5.458	.54	.332	-4.814	14.5	4.825
6	PRICHNGH	5	.00	.000	.000	1.0	.000	.00	.000	.000	1.0	.000
8	SECSWGR	5	.00	.000	.000	999.9	.000	.00	.000	.000	999.9	.000

Momentary Duty: Symmetrical = 5.458 kA rms
 Asymmetrical = 8.594 kA rms (MF = 1.575, X/R = 20.9 from separate R & X networks)
 Asymmetrical = 8.732 kA rms (MF = 1.60 at X/R = 25.0)

SW Capability = 12.000 kA rms

1.5 to 4 Cycle SC: Symmetrical = 4.825 kA rms (Device: SW)

COMPUTER PRINTOUT (CONTINUED)

SHORT-CIRCUIT REPORT

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BMA*

ETAP 6.52

Study Case: 1

Page: 11/15
 Date: 09-24-1993
 SN: 88FDI30132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

Three-phase fault at bus number: 6 PRICHNGH, 12.47 kV bus (Prefault Voltage = 100.00 %)

Contribution From Bus		To Bus	1/2 Cycle (% voltage & symm. rms current)					1.5 to 4 Cycle (% voltage & symm. rms current)				
No.	Name	No.	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
5	PRISWGR	6	2.26	.417	-5.334	12.8	5.350	2.01	.374	-4.726	12.6	4.741
9	SECCHNGH	6	.00	.000	.000	999.9	.000	.00	.000	.000	999.9	.000

Momentary Duty: Symmetrical = 5.350 kA rms
 Asymmetrical = 8.244 kA rms (MF = 1.541, X/R = 16.7 from separate R & X networks)
 Asymmetrical = 8.561 kA rms (MF = 1.60 at X/R = 25.0)

SW Capability = 12.000 kA rms

1.5 to 4 Cycle SC: Symmetrical = 4.741 kA rms (Device: SW)

COMPUTER PRINTOUT (CONTINUED)

SHORT-CIRCUIT REPORT

Project: ESF DESIGN - YUCCA MOUNTAIN

Location: LAS VEGAS, NV.

Contract: 4580823

Engineer: B.MAJMUDAR

ETAP 6.52

Study Case: 1

Page: 12/15

Date: 09-24-1993

SN: 88FD130132

File: TEMPPWR1

TEMPORARY POWER

Short Circuit Analysis

Three-phase fault at bus number: 7 SECSHOP, .48 kV bus (Prefault Voltage = 100.00 %)

Contribution From Bus		To Bus	1/2 Cycle (% voltage & symm. rms current)				
No.	Name	No.	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
4	PRIMSHOP	7	88.92	2.504	-15.567	6.2	15.767

Momentary Duty:

Symmetrical = 15.767 kA rms

Asymmetrical = 20.783 kA rms (MF = 1.318, X/R = 6.3 from separate R & X networks)

Interrupting Duty:

Symmetrical = 15.767 kA rms (X/R = 6.30, from separate R & X networks)

Adjusted = 15.767 kA rms (MF = 1.000, L. V. power CB - tested at 15% PF)

= 16.668 kA rms (MF = 1.057, molded case CB - rated over 20 kA)

= 18.389 kA rms (MF = 1.166, molded case CB - rated 10 to 20 kA)

= 20.253 kA rms (MF = 1.285, molded case CB - rated 10 kA or less)

CB Capability = 42.000 kA rms (molded case circuit breaker)

COMPUTER PRINTOUT (CONTINUED)

SHORT-CIRCUIT REPORT

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BMA*

ETAP 6.52

Study Case: 1

Page: 13/15
 Date: 09-24-1993
 SN: 88FD130132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

Three-phase fault at bus number: 8 SECSWGR, .48 kV bus (Prefault Voltage = 100.00 %)

Contribution From Bus		To Bus	1/2 Cycle (% voltage & symm. rms current)				
No.	Name	No.	% V From Bus	KA Real	KA Imaginary	X/R Ratio	KA Magnitude
5	PRISWGR	8	92.34	1.771	-10.771	6.1	10.916

Momentary Duty: Symmetrical = 10.916 kA rms
 Asymmetrical = 14.308 kA rms (MF = 1.311, X/R = 6.1 from separate R & X networks)

Interrupting Duty: Symmetrical = 10.916 kA rms (X/R = 6.13, from separate R & X networks)
 Adjusted = 10.916 kA rms (MF = 1.000, L. V. power CB - tested at 15% PF)
 = 11.475 kA rms (MF = 1.051, molded case CB - rated over 20 kA)
 = 12.660 kA rms (MF = 1.160, molded case CB - rated 10 to 20 kA)
 = 13.943 kA rms (MF = 1.277, molded case CB - rated 10 kA or less)

CB Capability = 42:000 kA rms (molded case circuit breaker)

COMPUTER PRINTOUT (CONTINUED)

SHORT-CIRCUIT REPORT

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BMA*

ETAP 6.52

Study Case: 1

Page: 14/15
 Date: 09-24-1993
 SN: 88FDI30132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

Three-phase fault at bus number: 9 SECCHNGH, .48 kV bus (Prefault Voltage = 100.00 %)

Contribution From Bus		To Bus	1/2 Cycle (% voltage & symm. rms current)				
No.	Name	No.	% V From Bus	-kA Real	kA Imaginary	X/R Ratio	kA Magnitude
6	PRICHNGH	9	92.19	1.776	-10.752	6.1	10.898

Momentary Duty: Symmetrical = 10.898 kA rms
 Asymmetrical = 14.271 kA rms (MF = 1.309, X/R = 6.1 from separate R & X networks)

Interrupting Duty: Symmetrical = 10.898 kA rms (X/R = 6.11, from separate R & X networks)
 Adjusted = 10.898 kA rms (MF = 1.000, L. V. power CB - tested at 15% PF)
 = 11.445 kA rms (MF = 1.050, molded case CB - rated over 20 kA)
 = 12.627 kA rms (MF = 1.159, molded case CB - rated 10 to 20 kA)
 = 13.907 kA rms (MF = 1.276, molded case CB - rated 10 kA or less)

CB Capability = 42.000 kA rms (molded case circuit breaker)

COMPUTER PRINTOUT (CONTINUED)

S. C. SUMMARY REPORT

Project: ESF DESIGN - YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BMA*

ETAP 6.52

Study Case: 1

Page: 15/15
 Date: 09-24-1993
 SN: 88FD130132
 File: TEMPPWR1

TEMPORARY POWER
 Short Circuit Analysis

Three-Phase Fault Currents: (Prefault Voltage = 100.00 %)

Bus Information				Momentary					Interrupting				
No.	Name	kV	Device	Symm. kA rms	X/R Ratio	M.F.#	Asymm. kA rms	Capability kA rms	Symm. kA rms	X/R Ratio	M.F.	Adj. Sym. kA rms	Capability kA rms
1	PRIM.	69.00	5 cy Sym CB	1.669	13.6	1.600	2.671		1.593	14.2	1.000	1.593	
2	SEC.XFMR	12.47	5 cy Sym CB	5.519	24.3	1.600	8.830		4.873	27.5	1.116	5.440	23.000
3	PADSWGR	12.47	Switch	5.487	22.4	1.600	8.779		4.848	25.3			
4	PRIMSHOP	12.47	Switch	5.450	20.5	1.600	8.721		4.820	23.2			
5	PRISWGR	12.47	Switch	5.458	20.9	1.600	8.732		4.825	23.6			
6	PRICHNGH	12.47	Switch	5.350	16.7	1.600	8.561		4.741	18.9			
7	SECSHOP	.48	Molded Case	15.767	6.3	1.318	20.783		15.767	6.3	1.057	16.668	42.000
8	SECWGR	.48	Molded Case	10.916	6.1	1.311	14.308		10.916	6.1	1.051	11.475	42.000
9	SECCHNGH	.48	Molded Case	10.898	6.1	1.309	14.271		10.898	6.1	1.050	11.445	42.000

Notes: * Indicates buses with short-circuit values exceeding the device duties.
 # Multiplying Factors (M.F.) for MV momentary fault currents are set to a minimum of 1.60 in this table.

Method: IEEE - X/R is calculated from separate R & X networks.