INNOVX

POWER SYSTEM CALCULATION:

LOAD FLOW & SHORT CIRCUIT

PHOSPHORIC ACID TREATMENT_TRACE ELEMENT

FEED PHASE

Project No. : Q3126031

Sub Project N° : Common

Project Phase : DEFINE

JESA Doc. No. : Q3126031-00-EL-CAL-00009

Revision : A

Client N° Q3126031

Rev.	Issue Date	Revision Description	Prepared by	Checked by	Discipline Approved by	Project Approved by
A	3/30/2024	Issued For Review	FMBARKI	TMULLA	AOUMGH	FELRHAZA

JESA SHORE 27 CASABLANCA NEARSHORE PARK 1100 BD AL QODS CASABLANCA, MOROCCO

Tel +212.5.22.87.7000 / +212.5.22.87.7150

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Hold Record

Specify any Holds within the document.

Hold No.	Section	Description of Hold
1		UPS rating and consumer details
2		Admin Building & other building loads not yet finalized
3		Street lighting loads not yet finalized

Revision Tracking

Specify significant change from previous revisions of the document. (From First Revision onwards)

Rev.	Section	Description of Change

1 Introduction

The Project customer for the present project is INNOV'X. INNOV'X plans to build an Element trace production plant with a capacity of (220T/Year) at Jorf Lasfar, Morocco.

Uranium (U) will be extracted from phosphoric acid at OCP's Jorf Lasfar ODI-4 site. The plant will be based on an Ion Exchange (IX) process and the Main process stages of this plant (actual project SOW) are as follow:

- **Phosphoric acid pretreatment unit** serves to remove the solid content in PA by cooling and adding clay and flocculent this unit will be located into ODI 2 with a capacity of 0.5 MT P2O5.
- **Yellow Cake plant**: with a production of 204 TU3O8/ year.
- **Extraction cycle**:
  - primary extraction (P CIX)
  - secondary extraction (4 P CIX capacity)
- **Refinery wet side** (8 P CIX capacity) and **refinery Dry Side** (8 P CIX capacity).

Train 1 is engineered now and trains 2 to 4 are future ones:

- Present Area 20 is for 1 train and 3 future Area 20 loads for 3 trains are considered.
- Present Area 30 is for 4 train except NF spend solution package. 3 future NF spend solution package for 3 trains are considered.
- Present Area 40 is for 1 train and 3 future Area 40 loads for 3 trains are considered.
- Present Area 50 is for 4 trains.
- Present Area 60 is for 4 trains.

2 Abbreviations

A	: Ampere
AC	: Alternating Current
AVR	: Automatic Voltage Regulator
CB	: Circuit Breaker
c factor	: IEC voltage correction factor for short circuit calculation
Cu	: Copper Conductor
c_{min}, c_{max}	: Minimum and maximum c factor
°C	: Celsius temperature measurement
DAP Unit	: Diammonia Phosphate Unit
Dyn11	: Transformer vector group
ETAP	: Electrical Transient and Analysis Program
FLC	: Full Load Current
HV	: High Voltage

HVCB	: High Voltage Circuit Breaker
Hz	: Hertz
Ib	: Symmetrical breaking short circuit current (RMS)
I''k	: Initial symmetrical short circuit current
Ik	: Steady-state symmetrical short circuit current
In	: Rated current
Ip	: Peak short circuit current
IEC	: International Electro-technical Commission
IEEE	: Institute of Electrical & Electronics Engineers
ISBL	: Inside Battery Limit
kW	: kilo Watt
kVA	: kilo Volt-Ampere
LQ	: Living Quarters
LV	: Low Voltage
LVCB	: Low Voltage Circuit Breaker
MV	: Medium Voltage
MW	: Mega Watt
NA	: Not Applicable
NER	: Neutral Earthing Resistor
OCP	: Office chérifien des phosphates
OCTC	: Off Circuit Tap Changer
OLD	: One Line Diagram
OLTC	: On Load Tap Changer
OSBL	: Outside Battery Limit
OTI	: Operation Technology Inc.
PF	: Power Factor
RMS	: Root Mean Square
TSP	: Trisodium Phosphate Plant
SSD	: Soft Starting Device
TG	: Turbine Generator
UPS	: Uninterruptible Power Supply
V	: Volt
VCB	: Vacuum Circuit Breaker

VFD / VSD : Variable Frequency Drive / Variable Speed Drive

XLPE : Cross Linked Poly Ethylene

3 Scope of Study

This report is prepared to carry out the following electrical system studies for PAT_TE plant load:

a) Load flow study
b) Short circuit study

Initially, all above studies have been carried out using ETAP version 21.0.2 power system analysis Software.

The packages bellow is considered in vendor scope:

- Spent Solution filtration & Secondary Regen filtration Package in Area 30
- Refinery Wet side Package in Area 40
- Refinery Dry side Package in Area 50

4 Presumptions and Exclusions

For Power System Studies, appropriate assumptions and exclusions are followed as follows:

Presumptions:

a) 10kV grid data (Maximum fault levels and X/R ratios) are considered from “PJ-DAP Project” which feed the PAT_TE substation. The 3-phase fault levels for the PJ-DAP substation provided via mail dt.2.9.2024 & dt3.18.2024 are as follows:
-Current max & min: 24.19 kA & 13.92 kA.
-X/R max & min: 15.36 & 22.21**.**
b) EDG details as per ETAP data
c) For Packages Refinery Wet Side package of Area 40 (MCC-40EB41, MCC-40EB42 & MCC-40EB43), spent solution NF package of Area 30 (MCC-30EB40, MCC-30EB41 & MCC-30EB42), and Refinery Dry Side Package of Area 50. It is presumed that each will be fed from a single feeder.
d) For FUTURE MLDB for Trains 2, 3 & 4, it has been considered that one feeder will supply power. In ETAP, this feeder is included in load lumps with other present MLDBs.
e) All LV 660V motors with a rating less than 55 kW are modeled as load lumps in ETAP. Continuous and intermittent loads are included within these load lumps with required factors (0.35 for intermittent loads).
f) VFDs are not modeled as all motors have low ratings.

Exclusions:

a) Cables for lump loads.
b) Cable loading data / cable ampacity/voltage drop check.

5 Reference Documents

5.1 Project Specific Documents

Sl.No	Document Title	Document Number / Reference
1	LOAD CALCULATION AND TRANSFORMERS	Q3126031-00-EL-CAL-00001
2	MV CABLE SIZING CALCULATION	Q3126031-00-EL-CAL-00002
3	NOTE DE CALCUL DES CABLES DE PUISSANCE BT 660V - PAT-TE	Q3126031-00-EL-CAL-00003
4	EMERGENCY LOAD LIST & DG SIZING	Q3126031-00-EL-CAL-00005
5	NOTE DE CALCUL DES CABLES DE PUISSANCE BT 380V - PAT-TE	Q3126031-00-EL-CAL-00006
6	MV power and control Cables schedule	Q3126031-00-EL-DCS-00001
7	LV Power and control cables schedule	Q3126031-00-EL-DCS-00002
8	ELECTRICAL LOAD LIST	Q3126031-00-EL-LST-00001
9	ELECTRICAL KEY SINGLE LINE DIAGRAM PAT_TE SUBSTATION	Q3126031-01-EL-DSL-00001
10	MV SWITCHGEAR 00EM01 PAT-TE SUBSTATION	Q3126031-00-EL-DSL-00001
11	ELECTRICAL SINGLE LINE DIAGRAM 660V PCC-00EB01	Q3126031-00-EL-DSL-00002
12	ELECTRICAL SINGLE LINE DIAGRAM 380V MLDB AND MPDB_00EG01	Q3126031-00-EL-DSL-00003
13	ELECTRICAL SINGLE LINE DIAGRAM 660V BREAKER PANEL 00EB03 PAT_TE	Q3126031-00-EL-DSL-00004
14	ELECTRICAL SINGLE LINE DIAGRAM 660/380V MCC 00EB40 PAT_TE SUBSTATION	Q3126031-00-EL-DSL-00005
15	ELECTRICAL SINGLE LINE DIAGRAM 660/380V MCC 00EB41 PAT_TE SUBSTATION	Q3126031-00-EL-DSL-00006
16	ELECTRICAL SINGLE LINE DIAGRAM 660/380V MCC 00EB42 PAT_TE SUBSTATION	Q3126031-00-EL-DSL-00007

5.2 Standard Specifications

This study report shall be used in conjunction with the latest edition of applicable sections & standards listed below:

Standards Number	Description
IEC 60034	Rotating electrical machines
IEC 62271-100	High-voltage switchgear and control gear - Part 100: Alternating current circuit-breakers
IEC 61439-1	Low-voltage switchgear and control gear assemblies - Part 1: General rules
IEC 60947	Low-voltage switchgear and control gear
IEC 60071-1	Insulation coordination – Part 1: Definitions, principles and rules
IEC 60076	Power Transformers
IEC 60298	AC metal-enclosed switchgear and control gear for rated voltages above 1 kV and up to and including 52kV
IEC 60909-0	Short-circuit currents in three-phase A.C. Systems Part 0: Calculation of currents.
IEC 60909-1	Short-circuit currents in three-phase A.C. systems-Part 1: Factors for the calculation of short-circuit currents according to IEC 60909-0
IEC 60909-2	IEEE recommended practice for Industrial and Commercial Power System Analysis with IEC 60909
IEC 60909-3	Short-circuit current calculation in three-phase a. c. systems– Part 3 Currents during two separate simultaneous single-phase line-to-earth short circuits and partial short-circuit currents flowing through earth
IEC TR 60909-4	Short-circuit current calculation in three-phase a. c. systems – Part 4: Examples for the calculation of short-circuit currents1)
IEEE 399-1997	IEEE recommended practice for Industrial and Commercial Power System Analysis
IEEE 141-1993	IEEE Recommended Practice for Electric Power Distribution for Industrial Plants

6 Overall Electrical System and Load Details

6.1 Electrical System Details

PAT_TE substation shall receive power from PJ DAP from two feeders 10kV (I/C-1 and I/C-2) into 10 kV switchgear located in in electrical substation. This 10 kV switchgear with 2 incomers and 6 feeders through 10/0.695 kV 3 (1 for present loads, 1 for future loads and 1 standby) transformers, 10/0.4 2 lighting transformers, plus 2 spare transformer feeders.

00EC01 transformer 10/0.695 kV with 2500KVA will feed LV PCC 00EB01 feeding 14 feeders:

1) 5 LV MCC 660V:
   - LV MCC-00EB40: located in PAT_TE substation, feeding loads in Area 20.
   - LV MCC-00EB41: located in PAT_TE substation, feeding loads in Area 30.
   - LV MCC-00EB42: located in PAT_TE substation, feeding loads in Area 60.
   - LV MCC-40EB40: located in Area 40, feeding loads in Refinery Wet Side package. This package is in vendor scope.
   - LV MCC-50EB40: located in Area 50, feeding loads in Refinery Dry Side package. This package is in vendor scope.

2) UPS & Batteries:
   - PAT-TE 220 UPS (I/C-1, I/C-2)
   - PAT-TE 220 UPS BYPASS
   - 220 V DC BATTERY CHARGER (I/C-1, I/C-2)
   - 24 V DC BATTERY CHARGER (I/C-1, I/C-2)

3) 00EC06 Emergency lighting transformer which feeding emergency lighting in 00EG01 MLDB&MPDB LDB.

4) Emergency futures loads in LV PCC 00EB02 FUTURE.

00EC03 transformer 10/0.695 kV with 2500KVA will feed LV PCC 00EB02 FUTURE feeding 9 LV MCC 660V:

- LV MCC-00EB43: located in PAT_TE substation, feeding Future loads (train 2) in Area 20.
- LV MCC-00EB44: located in PAT_TE substation, feeding Future loads (train 3) in Area 20.
- LV MCC-00EB45: located in PAT_TE substation, feeding Future loads (train 4) in Area 20.
- LV MCC-40EB41: located in Area 40, feeding future loads in Refinery Wet Side package (train2).
- LV MCC-40EB42: located in Area 40, feeding future loads in Refinery Wet Side package (train3).
- LV MCC-40EB43: located in Area 40, feeding future loads in Refinery Wet Side package (train4).
- LV MCC-30EB40: located in Area 30, feeding loads in Spent Solution NF package. This package is in vendor scope.
- LV MCC-30EB41: located in Area 30, feeding loads in Spent Solution NF package. This package is in vendor scope.
- LV MCC-30EB42: located in Area 30, feeding loads in Spent Solution NF package. This package is in vendor scope.

The standby transformer 00EC02, rated at 2500KVA 10/0.695 kV, is connected to the LV Breaker panel 00EB03. This breaker panel is connected to the LV PCC-00EB01 and LV PCC-00EB02 Future. In the event of a transformer failure for transformers 00EC01 and 00EC03, this transformer provides power to the loads.

00EC043 lighting transformer 10/0.4 kV with 1500KVA will feed 00EG01 MLDB&MPDB including future ones. 00EC05 is the standby transformer.

A 700kVA diesel generator (DG) is supplying power to emergency loads, both present and future ones.

6.2 Electrical Load Details

The details of PAT_TE plant loads are as follows:

Description	Active Power in kW	Reactive Power in KVAR	Apparent Power in kVA	Power factor in %
00EM01	3432	1961	3953	86.82
LV PCC-00EB01	1287	767.5	1498	85.88
LV PCC-00EB02 FUTURE	1428	845.8	1660	86.04

Table 1: Load Details –Before connecting Capacitor Bank.

Description	Active Power in kW	Reactive Power in KVAR	Apparent Power in kVA	Power factor in %
00EM01	3429	1992	3630	94.46
LV PCC-00EB01	1289	423.2	1357	95
LV PCC-00EB02 FUTURE	1428	450.1	1497	95.3

Table 2: Load Details –After connecting Capacitor Bank.

7 Electrical System Model Details In ETAP

This section briefly describes about the PAT_TE electrical system modeling in ETAP.

7.1 Electrical System Model SLD

The PAT_TE loads have been modelled in ETAP as per key one-line diagram, 10kV SLD & 660V/380V SLDs.

The ETAP SLD model shows the overall power distribution system consisting of 10 kV, 0.660 kV and 0.380 kV voltage level system.

The complete ETAP SLD model for PAT_TE SLD are attached in Appendix-1.

7.2 10kV Grid Data

10kV grid data (Maximum fault levels and X/R ratios) are considered from “PJ-DAP Project” which feed the PAT_TE substation.

The 10 kV Grid data are summarized as follows:

Maximum Actual Fault Level:		
	Phase-Phase(3Ph)	
	Ik''(P-P)	**X/R**
MV bus designated to supply PAT-TE project	**24.119**	**15.36**
Min Actual Fault Level:		
	Phase-Phase(3Ph)	
	Ik''(P-P)	**X/R**
MV bus designated to supply PAT-TE project	**13.929**	**22.21459227**

Table 3: 10kV Grid Data.

7.3 Electrical Motors & Load Modelling

All LV (660V) motors rating 55kW and above are modelled in ETAP. All LV (660V) motors rating less than 55kW are modalized as load lump. Standby motors and emergency loads are also modelled separately as load lump.

For LV motors, ABB LV motor IE3 catalogue typical values are used for ETAP modelling.

All Lighting and static loads are modeled as lumped static constant impedance loads.

7.4 Transformer Data

Transformers are modelled as indicated in below tables.

Tag No.	Rating in KVA & Voltage Ratio (kV)	Vector Group	Z in %, Tol	X/R Ratio
00EC01	2500 & 10 / 0.695	Dyn11	7.5%	6
00EC02	2500 & 10 / 0.695	Dyn11	7.5%	6
00EC03	2500 & 10 / 0.695	Dyn11	7.5%	6
00EC04	1500 & 0.66 / 0.4	Dyn11	7%	3.5
00EC05	1500 & 0.66 / 0.4	Dyn11	7%	6
00EC06	160 & 0.66 / 0.4	Dyn11	4%	1.5

Table 4: Transformer Data used for ETAP Modelling.

- X/R ratio is considered from ETAP's standard library.

- According to standard IEC60076, the impedance for a transformer rated at 2500KVA is 6.25%. To reduce short circuit current values in various switchgears, the transformer impedance for 00EC01, 00EC02, and 00EC03 has been increased to 7.5% in the ETAP model.

Power Transformers and other distribution transformers are provided with load tap changers, their details are indicated in below table:

Tag No.	Tap Changer Type	Tap Setting range (step)	Voltage Control - 100% and bands	
			Upper	Lower
00EC01	OFTC	+/-5%	2.5	2.5
00EC02	OFTC	+/-5%	2.5	2.5
00EC03	OFTC	+/-5%	2.5	2.5
00EC04	OFTC	+/-5%	2.5	2.5
00EC05	OFTC	+/-5%	2.5	2.5
00EC06	OFTC	-	-	-

Table 5: Transformer On load / Off Load Tap Changer Details.

7.5 Cable Data

As per Electrical Design Criteria document, cable insulation voltage shall be as follows:

10kV Cables – 12/20(24kV)

Refer below tables for the data used to create cable library for this project, (No. of Cable Cores, Cable Size) based on MV Cable sizing Doc NO Q3126031-00-EL-CAL-00002.

Voltage Grade	12/20(24kV)	12/20(24kV)
No. of Cable Cores	1C	3C
Cable Size (Sq.mm)	300	300

Table 6: 12/20(24kV) MV Cable Data.

7.6 Switchgear Data

The details of Switchgear modeled in ETAP are as per below table:

Switchgear Tag Number & Voltage	Incomer & Busbars Cont. Current Rating (A)	Short Circuit Current Ratings (kA) – Circuit Breaker	
		Sym.	T (s)
00EM01 10kV Switchgear	630	40	3
LV PCC-00EB01 660V	2500	50	1
LV PCC-00EB02 FUTURE 660V	2500	50	1
LV MCC-00EB40	630	50	1
LV MCC-00EB41	630	50	1
LV MCC-00EB42	400	50	1
LV MCC-40EB40	100	50	1
LV MCC-50EB40	630	50	1
LV MCC-00EB43	630	50	1
LV MCC-00EB44	630	50	1
LV MCC-00EB45	630	50	1
LV MCC-40EB41	100	50	1
LV MCC-40EB42	100	50	1
LV MCC-40EB43	100	50	1
LV MCC-30EB40:	200	50	1
LV MCC-30EB41	200	50	1
LV MCC-30EB42	200	50	1

Table 7: Switchgear Details.

7.7 Capacitor Data

The details of Power factor correction capacitor bank cum switchgear modeled in ETAP are as per below table. The capacitor ratings are as per Transformer sizing & Load Balance calcs. Doc NO. Q3126031-00-EL-CAL-00001.

Switchgear Tag No	Rating & Voltage (As Per SLD)
LV PCC-00EB01	350kVAR, 660V
LV PCC-00EB02 FUTURE	400kVAR, 660kV

Table 8: Capacitor Data.

7.8 Emergency Diesel Generator (EDG) Data

EDG is required to supply electrical power to emergency loads, lighting which are critical for safe plant operation and safety of operating personnel in plant, when normal power supply is not available or in case of plant start up.

At present, typical values from ETAP are used as preliminary data for system studies.

8 Study Criteria

8.1 Load Flow Study Criteria

- **System Voltage Variation Criteria**: - Under plant normal steady state operating conditions, the voltages at all the buses should be within ± 5.0 % of the nominal system voltage.

  Under NO LOAD condition for different plant operating conditions, the voltages at all the buses should be within ± 10 % of the nominal system voltage.

- **Transformer Tap Criteria:** - All Transformer tap ranges should be adequate to ensure that voltages on their secondary side are maintained within limits even under the worst-case condition.

- **Power Factor Correction Equipment:** - Recommend Capacitor bank ratings to improve power factor to 0.95 at 10 kV Switchgear bus.

- **Equipment Adequacy:** - All equipment in system such as generators, transformers, switchgear, cables, capacitors etc should operate within their designed ratings and capacity.

The study was carried out using the Adaptive Newton-Raphson version of ETAP Load Flow Analysis module.

8.2 Short Circuit Study Criteria

The purpose of this study is to check the system short circuit performance based on the criteria given below. These criteria will be adopted for comparison with study results to check the effectiveness of the system to perform satisfactorily under the maximum short circuit conditions considered for the study.

ETAP Maximum Short Circuit Calculation Settings

For calculating maximum peak and asymmetrical short circuit current in ETAP following settings have been considered for short circuit study cases: -

- Short Circuit Calculation Standard IEC 60909 based on maximum loads
- All Transformer taps set at Recommended or Nominal tap value as applicable
- Standard X/R ratio as per ETAP library for all transformers within the plant.

- C max factor of 1.1 is considered as defined in Table 1 of IEC 60909.

Nominal Voltage, U_n	Voltage factor *c* for the calculation of	
	maximum short circuit current, c_{max} 1)	minimum short circuit current, c_{min}
Low voltage 100V to 1000V	1.05 3) 1.10 4)	0.95
Medium voltage, > 1kV to 35kV	1.10	1.00
High voltage, > 35kV		1.00

1. C_{max} U_n should not exceed the highest voltage U_m for equipment of power systems.
2. If no nominal voltage is defined $C_{max}U_n = U_m$ or $C_{min}U_n = 0.90 \times U_m$ should be applied.
3. For low voltage systems with a tolerance of +6%, for example systems renamed from 380 V to 400 V.
4. For low voltage systems with a tolerance of +10%.

Table 9: Table 1 of IEC 60909

- Method C for peak fault calculation as per IEC 60909.
- All HV CB opening time considered for study is 80 milli-sec.
- All LV CB opening time considered for study is 25 milli-sec.

Criteria used for checking Adequacy of the Switchgear:
The ½ cycle peak (make) and asymmetrical break short circuit current ratings of MV switchgear and its associated circuit breaker is considered to be adequate provided its short circuit rated values exceed the corresponding switchgear peak (make) and asymmetrical break short circuit currents evaluated using ETAP IEC 60909 calculation standard.

Short circuit studies are performed for Maximum and Minimum fault levels under different operating conditions.

9 Load Flow Study

9.1 Load Flow Study Cases

Load Flow Analysis is carried out for possible plant operating configurations / conditions. The plant operating configurations/ conditions are listed as below.

1. Total loading (Present & Future) Condition without Capacitor Bank
2. Total loading (Present & Future) Condition with Capacitor Bank
3. Only present Loading Condition with Capacitor Bank
4. Loading with EDG-Only EMG Loads-With Cap Bank
5. No Load Condition without Capacitor Bank

Sr. No.	Study Case No.	Plant Operating Configurations / Conditions
1	PAT_TE TOTAL LOADING (PRESENT & FUTURE) COND.WITHOUT CAP. BANK	- Incomer breaker (I/C-1) 10Kv from PJ DAP substation in “CLOSED” position, Incomer breaker (I/C-2 from PJ DAP substation in “OPEN” position. - Transformers 00EC01, 00EC03 and 00EC04 in operation. - EDG (700kVA), emergency lighting transformer 00EC06 and the Breaker panel 00EB03 are not in operation. - At 10kV Switchgear 00EM01, circuit breakers connected for transformers 00EC02 and 00EC05 are in “CLOSED” position. - Lump Loads and motor loads as modelled in ETAP are in operation. - All Transformer taps set at Recommended values. - Capacitor bank in “OPEN” position.
2	PAT_TE TOTAL LOADING (PRESENT & FUTURE) COND.WITH CAP. BANK	- Incomer breaker (I/C-1) 10Kv from PJ DAP substation in “CLOSED” position, Incomer breaker (I/C-2 from PJ DAP substation in “OPEN” position. - Transformers 00EC01, 00EC03 and 00EC04 in operation. - EDG (700kVA), emergency lighting transformer 00EC06 and the Breaker panel 00EB03 are not in operation. - At 10kV Switchgear 00EM01, circuit breakers connected for transformers 00EC02 and 00EC05 are in “CLOSED” position. - Lump Loads and motor loads as modelled in ETAP are in operation. - All Transformer taps set at Recommended values. - Capacitor bank in “CLOSED” position.
3	Only PRESENT Loads-With CAP BANK	- Incomer breaker (I/C-1) 10Kv from PJ DAP substation in “CLOSED” position, Incomer breaker (I/C-2 from PJ DAP substation in “OPEN” position. - Transformers 00EC01 and 00EC04 in operation. - EDG (700kVA), emergency lighting transformer 00EC06, 00EC03 and the Breaker panel 00EB03 are not in operation. - At 10kV Switchgear 00EM01, circuit breakers connected for transformers 00EC02 and 00EC05 are in “CLOSED” position. - Only present Lump Loads and present motor loads as modelled in ETAP are in operation. - All Transformer taps set at Recommended values. - Capacitor bank in “CLOSED” position.
4	EDG-Only EMG Loads-Without Cap Bank	- Incomer breaker (I/C-1) 10Kv from PJ DAP substation in “OPEN” position, Incomer breaker (I/C-2 from PJ DAP substation in “OPEN” position. - Transformers 00EC01, 00EC03, 00EC02, 00EC05 and 00EC04 are not in operation.

		- EDG (700kVA), emergency lighting transformer 00EC06 and the Breaker panel 00EB03 are in operation. - At 10kV Switchgear 00EM01, circuit breakers connected for transformers 00EC02 and 00EC05 are in “OPEN” position. - Only emergency loads modelled in ETAP are in operation. - Transformer tapings are kept at recommended setting as applicable. - Capacitor bank in “OPEN” position.
5	NO LOAD COND.WITHOUT Cap Bank	- Incomer breaker (I/C-1) 10Kv from PJ DAP substation in “CLOSED” position, Incomer breaker (I/C-2 from PJ DAP substation in “OPEN” position. - Transformers 00EC01, 00EC03 and 00EC04 in operation. - EDG (700kVA), emergency lighting transformer 00EC06 and the Breaker panel 00EB03 are not in operation. - All LV Switchboards and Breaker Panel – Only one incomer breaker is in “CLOSED” position. - No load condition – Loads on MV and LV switchgears are not in operation. - Capacitor bank in “OPEN” position.

Table 10 : Load Flow Case Studies.

9.2 Load Flow Study Results

The ETAP results for the Load flow cases as described in Section 9.1 have been included in the Appendix-2.

Sr. No.	Study Case	ETAP Load Flow Output Reports
1	PAT_TE TOTAL LOADING (PRESENT & FUTURE) COND.WITHOUT CAP. BANK	Appendix-2.1: ETAP Case 1 Complete Report
2	PAT_TE TOTAL LOADING (PRESENT & FUTURE) COND.WITH CAP. BANK	Appendix-2.2: ETAP Case 2 Complete Report
3	ONLY PRESENT LOADS-WITH CAP BANK	Appendix-2.3: ETAP Case 3 Complete Report
4	EDG-ONLY EMG LOADS-WITHOUT CAP BANK	Appendix-2.4: ETAP Case 4 Complete Report
5	NO LOAD COND.WITHOUT CAP BANK	Appendix-2.5: ETAP Case 5 Complete Report

Table 11: Load Flow Study output reports.

9.3 Analysis of Load Flow Case Study Results

Analysis of load flow study for different operating conditions / configurations are tabulated in section as indicated below –

- Voltage Profile at load condition and No-Load condition
- Recommended transformer tap changer settings

- Transformer Ratings Vs Loading
- Switchboards Busbars, Incomers and Bus couplers Ratings vs Loading
- KVA and PF at all switchgear levels
- Overall losses

9.3.1 Voltage profile

Below table gives the % voltage drop on each bus for various case studies with recommended transformer tap changer settings.

Bus Tag No.	Nominal Voltage (kV)	Voltage in % (of nominal voltage)			
		Plant Operating Condition(s)/Configuration(s)			
		PAT_TE TOTAL LOADING (PRESENT & FUTURE) COND.WITHOUT CAP. BANK	PAT_TE TOTAL LOADING (PRESENT & FUTURE) COND.WITH CAP. BANK	EDG-ONLY EMG LOADS-WITHOUT CAP BANK	ONLY PRESENT LOADS-WITH CAP BANK
00EM01	10	99.16	99.31	-	99.60
LV PCC-00EB01	0.66	98.66	99.87	100	100.19
LV PCC-00EB02 FUTURE	0.66	98.33	99.7	100	-
LV MCC-00EB40	0.66	98.66	99.87	100	100.19
LV MCC-00EB41	0.66	98.66	99.87	100	100.19
LV MCC-00EB42	0.66	98.66	99.87	100	100.19
LV MCC-40EB40	0.66	98.66	99.87	100	100.19
LV MCC-50EB40	0.66	98.66	99.87	100	100.19
LV MCC-00EB43	0.66	98.33	99.7	100	-
LV MCC-00EB44	0.66	98.33	99.7	100	-
LV MCC-00EB45	0.66	98.33	99.7	100	-
LV MCC-40EB41	0.66	-	-	-	-
LV MCC-40EB42	0.66	-	-	-	-
LV MCC-40EB43	0.66	-	-	-	-
LV MCC-30EB40	0.66	-	-	-	-
LV MCC-30EB41	0.66	-	-	-	-
LV MCC-30EB42	0.66	-	-	-	-
00EG01	0.38	99.67	99.82	104.7	100.12

Table 12: Voltage Profile for Plant Operating Configurations / Conditions.

9.3.2 Switchboards Rating Vs Loadings

The below table indicates maximum current carried by MV (10kV) Switchboards and LV Switchboards (0.660kV & 0.380kV) and %loading for various case study.

Bus Tag No.	KV	Rated Amps	Switchboard Ratings Vs Loading							
			Plant Operating Condition(s)/Configuration(s)							
			PAT_TE LOADING COND.WITHOUT CAP. BANK		PAT_TE LOADING COND.WITH CAP. BANK		EDG-ONLY EMG LOADS-WITHOUT CAP BANK		ONLY PRESENT LOADS-WITH CAP BANK	
			Amp	%	Amp	%	Amp	%	Amp	%
00EM01	10	630	230.1	36.52	216.4	34.34	-	-	121.8	19.33
LV PCC-00EB01	0.66	2500	1328	53.12	1188.4	47.53	322.1	12.88	1185	47.4
LV PCC-00EB02 FUTURE	0.66	2500	1476	59.04	1314.2	52.56	86	3.44	-	-
LV MCC-00EB40	0.66	630	316	50.15	310.7	49.31	28.7	4.55	309.8	49.17
LV MCC-00EB41	0.66	630	429.7	68.20	380.5	60.39	-	-	379.4	60.22
LV MCC-00EB42	0.66	400	207.8	51.95	184	46	38.5	9.62	183.4	45.85
LV MCC-40EB40	0.66	100	48.4	48.4	43	43	9.2	9.2	42.9	42.9
LV MCC-50EB40	0.66	630	304	48.25	292.3	46.39	26.9	4.269	291.4	46.25
LV MCC-00EB43	0.66	630	315.6	50.09	311.3	49.41	28.7	4.55	-	-
LV MCC-00EB44	0.66	630	315.6	50.09	311.3	49.41	28.7	4.55	-	-
LV MCC-00EB45	0.66	630	315.6	50.09	311.3	49.41	28.7	4.55	-	-
LV MCC-40EB41	0.66	100	43.7	43.7	43.1	43.1	-	-	-	-
LV MCC-40EB42	0.66	100	43.7	43.7	43.1	43.1	-	-	-	-
LV MCC-40EB43	0.66	100	43.7	43.7	43.1	43.1	-	-	-	-
LV MCC-30EB40	0.66	200	132.9	66.45	131.1	65.55	-	-	-	-
LV MCC-30EB41	0.66	200	132.9	66.45	131.1	65.55	-	-	-	-
LV MCC-30EB42	0.66	200	132.9	66.45	131.1	65.55	-	-	-	-
00EG01	0.38	2000	1073	53.65	1071	53.55	54.3	2.71	1069	53.45

Table 13: Switchboard Busbars Rating Vs Loading for different Plant Operating Configurations / Conditions at Recommended Tap Settings.

9.3.3 Transformers Ratings Vs Loading

The below table indicates the maximum loading on the transformers for various case study. This table also indicates the balance loading in MVA available against transformer ratings considering maximum 90% loading for each transformer during different plant operating conditions / configurations.

TAG NO.	RATING (KVA)	PAT_TE TOTAL LOADING (PRESENT & FUTURE) COND.WITHOUT CAP. BANK			PAT_TE TOTAL LOADING (PRESENT & FUTURE) COND.WITH CAP. BANK			ONLY PRESENT LOADS-WITH CAP BANK		
		KVA	%	AC	KVA	%	AC	KVA	%	AC
00EC01	2500	1544	61.76	*	1384	55.36	*	1384	55.36	-
00EC02	2500	-	-	*	-	-	*	-	-	-
00EC03	2500	1717	68.68	*	1530	61.2	*	-	-	-
00EC04	1250	718	57.44	*	718.2	57.456	*	718.6	57.488	-
00EC05	1250	-	-	*	-	-	*	-	-	-
00EC06	1250	-	-	*	-	-	*	-	-	*

Table 14: Transformer Ratings Vs Loading for different Plant Operating Configurations / Conditions at Recommended Tap Settings and Available Capacity (AC) in KVA.

All transformers are loaded below the rated capacity as indicated in above table.

AC – Available Capacity in MVA.

9.3.4 SDDRecommended transformer tap changer settings.

As per the table indicated in section 9.3.1 bus voltages shall be limited within ±5% tolerance (No Load = +10%) under all Plant Operating Configuration(s) / Condition(s) subject to consideration of transformer taps as recommended below.

Tag No.	Rating & Voltage Ratio (KVA, kV)	Tap Changer Type	Tap Setting range (step)	Recommended Tap Setting
00EC01	2500 & 10 / 0.695	Off Load (OFTC)	+/- 5% with (2.5%)	-2.5
00EC02	2500 & 10 / 0.695	Off Load (OFTC)	+/- 5% with (2.5%)	-2.5
00EC03	2500 & 10 / 0.695	Off Load (OFTC)	+/- 5% with (2.5%)	-2.5
00EC04	1250 & 0.66 / 0.4	Off Load (OFTC)	+/- 5% with (2.5%)	-2.5
00EC05	1250 & 0.66 / 0.4	Off Load (OFTC)	+/- 5% with (2.5%)	-2.5
00EC06	1250 & 0.66 / 0.4	Off Load (OFTC)	+/- 5% with (2.5%)	-

Table 15: Recommended Transformer Off Load Tap Changer Details.

9.3.5 KVA and PF AT DIFFERENT OPERATING CONDITION

Bus Tag No.	KV	KVA and Power factor (in %)					
		Plant Operating Condition(s)/Configuration(s)					
LOAD FLOW STUDY CASES		PAT_TE TOTAL LOADING (PRESENT & FUTURE) COND.WITHOUT CAP. BANK		PAT_TE TOTAL LOADING (PRESENT & FUTURE) COND.WITH CAP. BANK		ONLY PRESENT LOADS-WITH CAP BANK	
		MVA	PF	MVA	PF	MVA	PF
00EM01	10	3.95	86.8	3.63	94.5	2.1	94.8
LV PCC-00EB01	0.66	1.49	85.9	1.53	85.9	1.50	85.9
LV PCC-00EB02 FUTURE	0.66	1.6	86	1.66	86	-	-
LV MCC-00EB40	0.66	0.33	85.8	0.33	85.8	0.33	85.8
LV MCC-00EB41	0.66	0.434	85.8	0.434	85.8	0.434	85.8
LV MCC-00EB42	0.66	0.21	84.8	0.21	84.8	0.21	84.8
LV MCC-40EB40	0.66	0.04	85.3	0.04	85.3	0.04	85.3
LV MCC-50EB40	0.66	0.33	85.3	0.33	85.3	0.33	85.3
LV MCC-00EB43	0.66	0.35	85.8	0.35	85.8	-	-
LV MCC-00EB44	0.66	0.35	85.8	0.35	85.8	-	-
LV MCC-00EB45	0.66	0.35	85.8	0.35	85.8	-	-
00EG01	0.38	0.7	97.2	0.7	97.2	0.7	97.2

Table 16: KVA and Power Factor at different Operating Condition at recommended tap settings.

9.3.6 Overall losses

Overall electrical losses in electrical system for various Plant Operating Configuration(s) / Condition(s) are indicated in below table:

Plant Operating Condition(s)/ Configuration(s)	Losses		Total Power Generated	Losses in % of Total Power Generated
	MW + j MVAR	MVA	MVA	
PAT_TE LOADING COND.WITHOUT CAP. BANK	0.055+0.211j	0.218	3.986	5.47
PAT_TE LOADING COND.WITH CAP. BANK	0.046+0.175j	0.18	3.651	4.95

Only PRESENT Loads-With CAP BANK	0.023+0.09j	0.092	2.109	4.40

Table 17: Overall Losses for different Plant Operating Configurations / Conditions at recommended tap settings.

9.3.7 Conclusion Summary on Load flow Study

The findings of the load flow study results are summarized below:

- The voltages at the 10kV, 0.66Kv and 0.380kV buses under study cases with recommended tap settings are less than 5% of the nominal voltage, which is acceptable.
- The maximum current carried by the MV (10kV) Switchboards and LV Switchboards (0.660kV & 0.380kV) are below the rated bus rating.
- The maximum loading on the transformers is well below 70% of continuous ratings of the respective transformers.
- Emergency loads are well within the rating of Emergency Generator.
- Distribution losses can be noted as per table.

The ETAP load flow study of all load flow cases, based on alert & summary reports & ETAP load flow SLD outputs in Appendix 2, shows the following:

- Voltage profile of switchgear buses at loaded condition and no-load condition under different operating conditions / configurations are found within +/- 5% and +/-10% of nominal bus voltage respectively.
- Selected equipment ratings are found adequate in Normal and Emergency operating conditions at substation.
- Without Capacitor bank, power factor value is approx. 0.86 for total loads. With 350KVAR and 400KVAR capacitor bank on LV PCC-00EB02 and LV PCC-00EB02 FUTURE switchgear respectively, power factor is improved to 0.95.

9.3.8 Recommendation from Load Flow Study

- Transformers 00EC01, 00EC02, 00EC03, 00EC04, 00EC05 in substation shall be set at recommended tap settings as per Table 15.
- For achieving 0.95 power factor in normal operating conditions, 350KVAR and 400KVAR capacitor bank on LV PCC-00EB02 and LV PCC-00EB02 FUTURE switchgear respectively.

10 Short Circuit Study

10.1 Short Circuit Study Cases

10.1.1 Study Cases for Maximum and Minimum Fault Current

Objective of the study is to determine the maximum fault current to check device capacity and the selection of equipment rating such as MV Switchgear, LV Switchgear, Motor Control centre etc. and minimum fault current to be used for protective relay coordination.

Following operating condition / configurations are considered to meet the stated objective.

- Normal Operation – Source Maximum Fault
- Emergency Operation with EDG – Source Maximum Fault
- No Load without CAP – Source Minimum Fault

Sr. No.	Study Case No.	Plant Operating Configurations / Conditions
1	SC1- Maximum fault condition	- Incomer breaker (I/C-1) 10Kv from PJ DAP substation in “CLOSED” position, Incomer breaker (I/C-2 from PJ DAP substation in “OPEN” position. @Maximum fault condition - Transformers 00EC01, 00EC03 and 00EC04 in operation. - EDG (700kVA), emergency lighting transformer 00EC06 and the Breaker panel 00EB03 are not in operation. - At 10kV Switchgear 00EM01, circuit breakers connected for transformers 00EC02 and 00EC05 are in “CLOSED” position. - Lump Loads and motor loads as modelled in ETAP are in operation. - All Transformer taps set at Recommended values. - Capacitor bank in “CLOSED” position.
2	SC2- Maximum fault condition With EDG	- Incomer breaker (I/C-1) 10Kv from PJ DAP substation in “OPEN” position, Incomer breaker (I/C-2 from PJ DAP substation in “OPEN” position. @Maximum fault condition - Transformers 00EC01, 00EC03, 00EC02, 00EC05 and 00EC04 are not in operation. - EDG (700kVA), emergency lighting transformer 00EC06 and the Breaker panel 00EB03 are in operation. - At 10kV Switchgear 00EM01, circuit breakers connected for transformers 00EC02 and 00EC05 are in “OPEN” position. - Only emergency loads modelled in ETAP are in operation. - Transformer tapings are kept at recommended setting as applicable. - Capacitor bank in “OPEN” position.

3	SC3- Minimum fault condition with no load	- Incomer breaker (I/C-1) 10Kv from PJ DAP substation in “CLOSED” position, Incomer breaker (I/C-2 from PJ DAP substation in “OPEN” position. @Minimum fault condition - Transformers 00EC01, 00EC03 and 00EC04 in operation. - EDG (700kVA), emergency lighting transformer 00EC06 and the Breaker panel 00EB03 are not in operation. - All LV Switchboards and Breaker Panel – Only one incomer breaker is in “CLOSED” position. - No load condition – Loads on MV and LV switchgears are not in operation. - Capacitor bank in “OPEN” position.

Table 18: Short Circuit Study Cases.

10.1.2 Study Results for Maximum Fault Current

The results of ETAP short circuit runs for above short circuit cases have been included in the following Appendix-3 of the report.

Sr. No.	Study Case	ETAP Short Circuit Output Reports
1	SC1- Maximum fault condition- Normal operation	Appendix-3.1: ETAP SC1 Complete short circuit report
2	SC2- Maximum fault condition With EDG	Appendix-3.2: ETAP SC2 Complete short circuit report
3	SC3- Minimum fault condition with no load	Appendix-3.3: ETAP SC3 Complete short circuit report

Table 19: Short Circuit Study Output Reports for Maximum fault current.

Short circuit calculations are summarized in the below tables.

Remarks:

The short circuit values provided for each switchgear in the table below are preliminary and based on data from previous projects. Final values will be determined once receipt of data from the vendor.

For Ib sym, Ib asym and Idc calculated based on Time Delay TD(s) = 0.01s.

Switchboard	Voltage Grade	Current	Switchgear Rating				Calculated Values From ETAP IEC 60909				
ID	KV	Amp	Peak	Ib sym	Ib asym	Idc	Peak	Ib sym	Ib asym	Idc	Ik"
00EM01	10	630	100	40	60.4	45.29	28.93	14.589	16.323	7.322	14.85
LV PCC-00EB01	0.66	2500	105	50	50.89	-	79.98	34.69	43.81	26.76	37.040
LV PCC-00EB02 FUTURE	0.66	2500	105	50	50.89	-	86.58	36.73	46.43	28.4	40.55
LV MCC-00EB40	0.66	630	105	50	50.89	-	79.98	34.69	43.81	26.76	37.04
LV MCC-00EB41	0.66	630	105	50	50.89	-	79.98	34.69	43.81	26.76	37.04
LV MCC-00EB42	0.66	400	105	50	50.89	-	79.98	34.69	43.81	26.76	37.04
LV MCC-40EB40	0.66	100	105	50	50.89	-	79.98	34.69	43.81	26.76	37.04
LV MCC-50EB40	0.66	630	105	50	50.89	-	79.98	34.69	43.81	26.76	37.04
LV MCC-00EB43	0.66	630	105	50	50.89	-	86.58	36.73	46.43	28.4	40.55
LV MCC-00EB44	0.66	630	105	50	50.89	-	86.58	36.73	46.43	28.4	40.55
LV MCC-00EB45	0.66	630	105	50	50.89	-	86.58	36.73	46.43	28.4	40.55
00EG01	0.38	2000	84	40	40.68	-	68.73	33.77	38.53	18.55	34.57

Table 20: Case SC1- Maximum fault condition- Normal Operation.

Switchboard	Voltage Grade	Current	Switchgear Rating				Calculated Values From ETAP IEC 60909				
ID	KV	Amp	Peak	Ib sym	Ib asym	Idc	Peak	Ib sym	Ib asym	Idc	Ik"
00EM01	10	630	100	40	60.4	45.29	-	-	-	-	-
LV PCC-00EB01	0.66	2500	105	50	50.89	-	12.18	4.19	6.71	5.24	5.07
LV PCC-00EB02 FUTURE	0.66	2500	105	50	50.89	-	12.18	4.19	6.71	5.24	5.07
LV MCC-00EB40	0.66	630	105	50	50.89	-	12.18	4.19	6.71	5.24	5.07
LV MCC-00EB41	0.66	630	105	50	50.89	-	12.18	4.19	6.71	5.24	5.07
LV MCC-00EB42	0.66	400	105	50	50.89	-	12.18	4.19	6.71	5.24	5.07
LV MCC-40EB40	0.66	100	105	50	50.89	-	12.18	4.19	6.71	5.24	5.07
LV MCC-50EB40	0.66	630	105	50	50.89	-	12.18	4.19	6.71	5.24	5.07
LV MCC-00EB43	0.66	630	105	50	50.89	-	12.18	4.19	6.71	5.24	5.07
LV MCC-00EB44	0.66	630	105	50	50.89	-	12.18	4.19	6.71	5.24	5.07
LV MCC-00EB45	0.66	630	105	50	50.89	-	12.18	4.19	6.71	5.24	5.07
00EG01	0.38	2000	84	40	40.68	-	7.13	3.532	3.9	1.653	3.81

Table 21: SC2- Maximum fault condition - With EDG.

10.1.3 Study Results for Minimum Fault Current

The results of ETAP short circuit runs for above short circuit cases have been included in the following Appendix-3 of the report.

Remarks:

The short circuit values provided for each switchgear in the table below are preliminary and based on data from previous projects. Final values will be determined once receipt of data from the vendor.

For Ib sym, Ib asym and Idc calculated based on Time Delay TD(s) = 0.01s.

Sr. No.	Study Case	ETAP Short Circuit Output Reports
1	SC3- Minimum fault condition with no load	Appendix-3.4: ETAP SC3 Complete short circuit report

Table 22: Short Circuit Study Output Reports for Minimum fault current.

Switchboard	Voltage Grade	Current	Switchgear Rating				Calculated Values From ETAP IEC 60909				
ID	KV	Amp	Peak	Ib sym	Ib asym	Idc	Peak	Ib sym	Ib asym	Idc	Ik"
00EM01	10	630	100	40	60.4	45.29	21.11	10.08	11.98	6.46	10.08
LV PCC-00EB01	0.66	2500	105	50	50.89	-	58.87	26.25	33.54	20.88	26.25
LV PCC-00EB02 FUTURE	0.66	2500	105	50	50.89	-	58.87	26.25	33.54	20.88	26.25
LV MCC-00EB40	0.66	630	105	50	50.89	-	58.87	26.25	33.54	20.88	26.25
LV MCC-00EB41	0.66	630	105	50	50.89	-	58.87	26.25	33.54	20.88	26.25
LV MCC-00EB42	0.66	400	105	50	50.89	-	58.87	26.25	33.54	20.88	26.25
LV MCC-40EB40	0.66	100	105	50	50.89	-	58.87	26.25	33.54	20.88	26.25
LV MCC-50EB40	0.66	630	105	50	50.89	-	58.87	26.25	33.54	20.88	26.25
LV MCC-00EB43	0.66	630	105	50	50.89	-	58.87	26.25	33.54	20.88	26.25
LV MCC-00EB44	0.66	630	105	50	50.89	-	58.87	26.25	33.54	20.88	26.25
LV MCC-00EB45	0.66	630	105	50	50.89	-	58.87	26.25	33.54	20.88	26.25
00EG01	0.38	2000	84	40	40.68	-	54.36	26.68	30.88	15.55	26.68

Table 23: SC3- Minimum fault condition with no load.

10.2 Conclusion Summary from Short Circuit Study

Conclusion based on Plant Scenarios are as follows:

- For operating conditions SC-2 and SC-3 and SC-4, ETAP calculated short circuit breaking, making and Idc currents at all 10kV, 0.660kV and 380V switchgear are well within the switchgear rating under Maximum fault operating conditions.
- For operating condition SC-1, ETAP calculated short circuit breaking, making currents at LV switchgears are close to their rated values under Maximum fault operating conditions.
- For faults Currents (LG, LLG, LLL, L-L) in different operating conditions refer Appendix-3.

11 List of Appendices

Appendix-1: ETAP Single Line Diagrams

Appendix-2: ETAP Load Flow Output Results

Appendix-2.1: ETAP Case 1 Complete Report

Appendix-2.2: ETAP Case 2 Complete Report

Appendix-2.3: ETAP Case 3 Complete Report

Appendix-2.4: ETAP Case 4 Complete Report

Appendix-2.5: ETAP Case 5 Complete Report

Appendix-3: ETAP Short Circuit Output Results

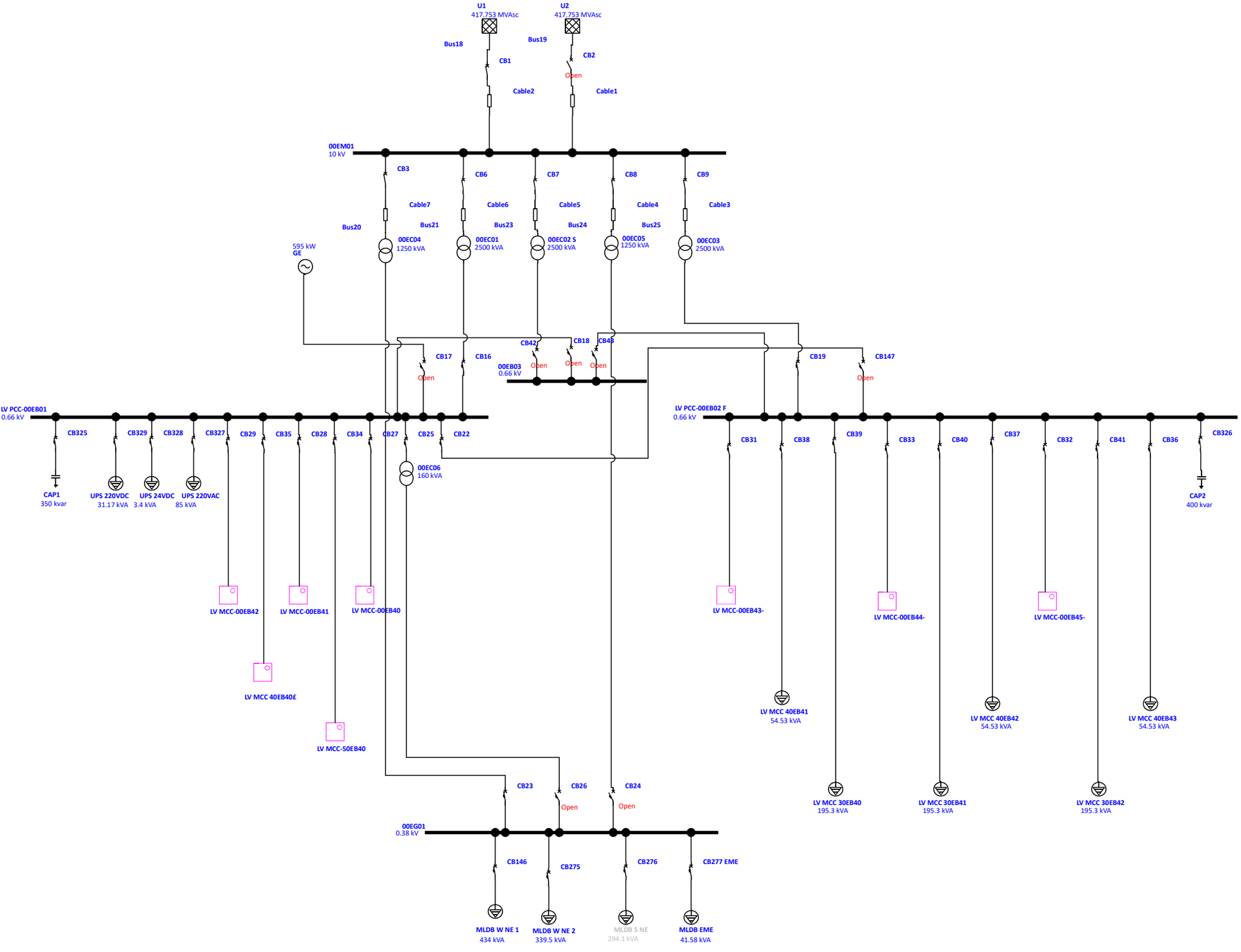
Appendix-3.1 ETAP SC1 Complete short circuit report

Appendix-3.2: ETAP SC2 Complete short circuit report

Appendix-3.3: ETAP SC3 Complete short circuit report

Appendix-3.4: ETAP SC3 Complete short circuit report

One-Line Diagram - OLV1 (Edit Mode)



Electrical Transient Analyzer Program

Load Flow Analysis

Loading Category (1): Design

Generation Category (1): Design

Load Diversity Factor: None

	Swing	V-Control	Load	Total
Number of Buses:	2	0	26	28

	XFMR2	XFMR3	Reactor	Line/Cable/ Busway	Impedance	Tie PD	Total
Number of Branches:	7	0	0	6	0	13	26

Method of Solution:	Adaptive Newton-Raphson Method
Maximum No. of Iteration:	99
Precision of Solution:	0.0001000
System Frequency:	50.00 Hz
Unit System:	Metric
Project Filename:	PAT_TE
Output Filename:	C:\ETAP2102\PAT_TE\Untitled.lfr

Adjustments

Tolerance	Apply Adjustments	Individual /Global	Percent
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable / Busway Length:	No		

Temperature Correction	Apply Adjustments	Individual /Global	Degree C
Transmission Line Resistance:	Yes	Individual	
Cable / Busway Resistance:	Yes	Individual	

Bus Input Data

Bus			Initial Voltage		Load							
					Constant kVA		Constant Z		Constant I		Generic	
ID	kV	Sub-sys	% Mag.	Ang.	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar
00EG01	0.380	1	100.0	0.0	0.606	0.167	0.078	0.000				
00EG51	0.380	1	100.0	0.0	0.002	0.001						
00EG52	0.380	1	100.0	0.0								
00EM01	10.000	1	100.0	0.0								
Bus AREA 40	0.380	1	100.0	0.0	0.001	0.001						
Bus AREA 50	0.380	1	100.0	0.0								
Bus13	0.660	1	100.0	0.0	0.082	0.049						
Bus14	0.660	1	100.0	0.0								
Bus15	0.660	1	100.0	0.0	0.001	0.001						
Bus16	0.660	1	100.0	0.0								
Bus17	0.660	1	100.0	0.0	0.004	0.003						
Bus18	10.000	1	100.0	0.0								
Bus19	10.000	2	100.0	0.0								
Bus20	10.000	1	100.0	0.0								
Bus21	10.000	1	100.0	0.0								
Bus23	10.000	1	100.0	0.0								
Bus24	10.000	1	100.0	0.0								
Bus25	10.000	1	100.0	0.0								
LV PCC-00EB01	0.660	1	100.0	0.0			0.108	0.052				
LV PCC-00EB02 F	0.660	1	100.0	0.0	0.515	0.299						
MCC 00EB40	0.660	1	110.0	0.0	0.217	0.130						
MCC 00EB41	0.660	1	100.0	0.0	0.371	0.222						
MCC 00EB42	0.660	1	100.0	0.0	0.177	0.111						
MCC 00EB43-	0.660	1	110.0	0.0	0.304	0.182						
MCC 00EB44-	0.660	1	110.0	0.0	0.304	0.182						
MCC 00EB45-	0.660	1	110.0	0.0	0.304	0.182						
MCC 40EB40£	0.660	1	100.0	0.0	0.040	0.024						
MCC 50EB40	0.660	1	100.0	0.0	0.284	0.174						
Total Number of Buses: 28					3.215	1.729	0.186	0.052	0.000	0.000	0.000	0.000

Generation Bus				Voltage		Generation			Mvar Limits	
ID	kV	Type	Sub-sys	% Mag.	Angle	MW	Mvar	% PF	Max	Min

Generation Bus				Voltage		Generation			Mvar Limits	
ID	kV	Type	Sub-sys	% Mag.	Angle	MW	Mvar	% PF	Max	Min
Bus18	10.000	Swing	1	100.0	0.0					
Bus19	10.000	Swing	2	100.0	0.0					
						0.000	0.000			

Line/Cable/Busway Input Data

ohms or siemens/1000 m per Conductor (Cable) or per Phase (Line/Busway)

Line/Cable/Busway ID	Library	Size	Length Adj. (m)	% Tol.	#/Phase	T (°C)	R	X	Y
Cable2	11NCUS1	300	1766.0	0.0	1	75	0.076302	0.105000	
Cable3	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable4	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable5	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable6	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable7	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	

Line / Cable / Busway resistances are listed at the specified temperatures.

2-Winding Transformer Input Data

Transformer		Rating					Z Variation			% Tap Setting		Adjusted	Phase Shift	
ID	Phase	MVA	Prim. kV	Sec. kV	% Z1	X1/R1	+ 5%	- 5%	% Tol.	Prim.	Sec.	% Z	Type	Angle
00EC01	3-Phase	2.500	10.000	0.660	7.50	6.00	0	0	1.1	-2.500	0	7.5825	Dyn	0.000
00EC03	3-Phase	2.500	10.000	0.660	7.50	6.00	0	0	1.1	-2.500	0	7.5825	Dyn	0.000
00EC04	3-Phase	1.250	10.000	0.380	7.00	3.50	0	0	1.1	-2.500	0	7.0770	Dyn	0.000
00EC51	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
00EC52	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
T1 AREA 40	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
T2 AREA 50	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000

Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVA Base			
ID	Type	From Bus	To Bus	R	X	Z	Y
00EC01	2W XFMR	Bus21	LV PCC-00EB01	48.62	291.69	295.72	
00EC03	2W XFMR	Bus25	LV PCC-00EB02 F	48.62	291.69	295.72	
00EC04	2W XFMR	Bus20	00EG01	151.65	530.77	552.01	
00EC51	2W XFMR	MCC 00EB41	00EG51	22188.01	33282.01	40000.00	
00EC52	2W XFMR	MCC 00EB42	00EG52	22188.01	33282.01	40000.00	
T1 AREA 40	2W XFMR	MCC 40EB40£	Bus AREA 40	22188.01	33282.01	40000.00	
T2 AREA 50	2W XFMR	MCC 50EB40	Bus AREA 50	22188.01	33282.01	40000.00	
Cable2	Cable	Bus18	00EM01	13.47	18.54	22.92	
Cable3	Cable	00EM01	Bus25	0.23	0.25	0.34	
Cable4	Cable	00EM01	Bus24	0.23	0.25	0.34	
Cable5	Cable	00EM01	Bus23	0.23	0.25	0.34	
Cable6	Cable	00EM01	Bus21	0.23	0.25	0.34	
Cable7	Cable	00EM01	Bus20	0.23	0.25	0.34	
CB27	Tie Breakr	LV PCC-00EB01	MCC 00EB40				
CB28	Tie Breakr	LV PCC-00EB01	MCC 00EB41				
CB29	Tie Breakr	LV PCC-00EB01	MCC 00EB42				
CB31	Tie Breakr	LV PCC-00EB02 F	MCC 00EB43-				
CB32	Tie Breakr	LV PCC-00EB02 F	MCC 00EB45-				
CB33	Tie Breakr	LV PCC-00EB02 F	MCC 00EB44-				
CB34	Tie Breakr	LV PCC-00EB01	MCC 50EB40				
CB35	Tie Breakr	LV PCC-00EB01	MCC 40EB40£				
CB44	Tie Breakr	MCC 00EB40	Bus13				
CB47	Tie Breakr	MCC 00EB40	Bus15				
CB54	Tie Breakr	MCC 00EB40	Bus17				
CB166	Tie Breakr	MCC 00EB40	Bus14				
CB172	Tie Breakr	MCC 00EB40	Bus16				

LOAD_FLOW_REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
00EG01	0.380	99.670	-2.2	0.000	0.000	0.684	0.167	Bus20	-0.684	-0.167	1072.5	97.2	
00EG51	0.380	97.838	-2.4	0.000	0.000	0.002	0.001	MCC 00EB41	-0.002	-0.001	3.3	79.5	
00EG52	0.380	98.338	-2.3	0.000	0.000	0.001	0.001	MCC 00EB42	-0.001	-0.001	1.3	79.7	
00EM01	10.000	99.166	-0.2	0.000	0.000	0.000	0.000	Bus18	-3.432	-1.961	230.1	86.8	
								Bus25	1.442	0.931	99.9	84.0	
								Bus24	0.000	0.000	0.0	0.0	
								Bus23	0.000	0.000	0.0	0.0	
								Bus21	1.298	0.837	89.9	84.1	
								Bus20	0.691	0.194	41.8	96.3	
Bus AREA 40	0.380	97.961	-2.3	0.000	0.000	0.001	0.001	MCC 40EB40£	-0.001	-0.001	2.9	81.0	
Bus AREA 50	0.380	98.402	-2.3	0.000	0.000	0.001	0.000	MCC 50EB40	-0.001	0.000	1.1	81.6	
Bus13	0.660	98.666	-2.2	0.000	0.000	0.082	0.049	MCC 00EB40	-0.082	-0.049	84.7	86.0	
Bus14	0.660	98.666	-2.2	0.000	0.000	0.000	0.000	MCC 00EB40	0.000	0.000	0.0	0.0	
Bus15	0.660	98.666	-2.2	0.000	0.000	0.001	0.001	MCC 00EB40	-0.001	-0.001	1.4	86.8	
Bus16	0.660	98.666	-2.2	0.000	0.000	0.000	0.000	MCC 00EB40	0.000	0.000	0.0	0.0	
Bus17	0.660	98.666	-2.2	0.000	0.000	0.004	0.003	MCC 00EB40	-0.004	-0.003	4.1	82.0	
* Bus18	10.000	100.000	0.0	3.453	1.991	0.000	0.000	00EM01	3.453	1.991	230.1	86.6	
Bus20	10.000	99.164	-0.2	0.000	0.000	0.000	0.000	00EM01	-0.691	-0.194	41.8	96.3	
								00EG01	0.691	0.194	41.8	96.3	-2.500
Bus21	10.000	99.161	-0.2	0.000	0.000	0.000	0.000	00EM01	-1.298	-0.836	89.9	84.1	
								LV PCC-00EB01	1.298	0.836	89.9	84.1	-2.500
Bus23	10.000	99.166	-0.2	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
Bus24	10.000	99.166	-0.2	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
Bus25	10.000	99.161	-0.2	0.000	0.000	0.000	0.000	00EM01	-1.442	-0.931	99.9	84.0	
								LV PCC-00EB02 F	1.442	0.931	99.9	84.0	-2.500
LV PCC-00EB01	0.660	98.666	-2.2	0.000	0.000	0.105	0.051	Bus21	-1.287	-0.768	1328.2	85.9	
								MCC 00EB40	0.304	0.182	314.5	85.8	
								MCC 00EB41	0.373	0.223	385.2	85.8	
								MCC 00EB42	0.178	0.111	186.3	84.8	
								MCC 50EB40	0.285	0.174	295.9	85.3	
								MCC 40EB40£	0.042	0.026	43.5	85.3	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
LV PCC-00EB02 F	0.660	98.330	-2.4	0.000	0.000	0.515	0.299	Bus25	-1.428	-0.846	1476.4	86.0	
								MCC 00EB43-	0.304	0.182	315.6	85.8	
								MCC 00EB45-	0.304	0.182	315.6	85.8	
								MCC 00EB44-	0.304	0.182	315.6	85.8	
MCC 00EB40	0.660	98.666	-2.2	0.000	0.000	0.217	0.130	LV PCC-00EB01	-0.304	-0.182	314.5	85.8	
								Bus13	0.082	0.049	84.7	86.0	
								Bus15	0.001	0.001	1.4	86.8	
								Bus17	0.004	0.003	4.1	82.0	
								Bus14	0.000	0.000	0.0	0.0	
								Bus16	0.000	0.000	0.0	0.0	
MCC 00EB41	0.660	98.666	-2.2	0.000	0.000	0.371	0.222	00EG51	0.002	0.001	1.9	79.3	
								LV PCC-00EB01	-0.373	-0.223	385.2	85.8	
MCC 00EB42	0.660	98.666	-2.2	0.000	0.000	0.177	0.111	00EG52	0.001	0.001	0.8	79.6	
								LV PCC-00EB01	-0.178	-0.111	186.3	84.8	
MCC 00EB43-	0.660	98.330	-2.4	0.000	0.000	0.304	0.182	LV PCC-00EB02 F	-0.304	-0.182	315.6	85.8	
MCC 00EB44-	0.660	98.330	-2.4	0.000	0.000	0.304	0.182	LV PCC-00EB02 F	-0.304	-0.182	315.6	85.8	
MCC 00EB45-	0.660	98.330	-2.4	0.000	0.000	0.304	0.182	LV PCC-00EB02 F	-0.304	-0.182	315.6	85.8	
MCC 40EB40£	0.660	98.666	-2.2	0.000	0.000	0.040	0.025	Bus AREA 40	0.001	0.001	1.6	80.8	
								LV PCC-00EB01	-0.042	-0.026	43.5	85.3	
MCC 50EB40	0.660	98.666	-2.2	0.000	0.000	0.284	0.174	Bus AREA 50	0.001	0.000	0.6	81.5	
								LV PCC-00EB01	-0.285	-0.174	295.9	85.3	

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

# Indicates a bus with a load mismatch of more than 0.1 MVA

Bus Loading Summary Report

Bus			Directly Connected Load								Total Bus Load			
			Constant kVA		Constant Z		Constant I		Generic					Percent
ID	kV	Rated Amp	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar	MVA	% PF	Amp	Loading
Bus19	10.000													
00EG01	0.380		0.606	0.167	0.078						0.704	97.2	1072.5	
00EG51	0.380		0.002	0.001							0.002	79.5	3.3	
00EG52	0.380		0.001	0.001							0.001	79.7	1.3	
00EM01	10.000										3.953	86.8	230.1	
Bus AREA 40	0.380		0.001	0.001							0.002	81.0	2.9	
Bus AREA 50	0.380		0.001	0.000							0.001	81.6	1.1	
Bus13	0.660		0.082	0.049							0.095	86.0	84.7	
Bus14	0.660													
Bus15	0.660		0.001	0.001							0.002	86.8	1.4	
Bus16	0.660													
Bus17	0.660		0.004	0.003							0.005	82.0	4.1	
Bus18	10.000										3.986	86.6	230.1	
Bus20	10.000										0.718	96.3	41.8	
Bus21	10.000										1.544	84.1	89.9	
Bus23	10.000												-	
Bus24	10.000												-	
Bus25	10.000										1.717	84.0	99.9	
LV PCC-00EB01	0.660				0.105	0.051					1.498	85.9	1328.2	
LV PCC-00EB02 F	0.660		0.515	0.299							1.660	86.0	1476.4	
MCC 00EB40	0.660		0.217	0.130							0.355	85.8	314.5	
MCC 00EB41	0.660		0.371	0.222							0.434	85.8	385.2	
MCC 00EB42	0.660		0.177	0.111							0.210	84.8	186.3	
MCC 00EB43-	0.660		0.304	0.182							0.355	85.8	315.6	
MCC 00EB44-	0.660		0.304	0.182							0.355	85.8	315.6	
MCC 00EB45-	0.660		0.304	0.182							0.355	85.8	315.6	
MCC 40EB40£	0.660		0.040	0.024	0.000	-					0.049	85.3	43.5	
MCC 50EB40	0.660		0.284	0.174							0.334	85.3	295.9	

* Indicates operating load of a bus exceeds the bus critical limit (100.0% of the Continuous Ampere rating).
# Indicates operating load of a bus exceeds the bus marginal limit (95.0% of the Continuous Ampere rating).

Branch Loading Summary Report

CKT / Branch		Busway / Cable & Reactor			Transformer				
		Ampacity (Amp)	Loading Amp		Capability (MVA)	Loading (input)		Loading (output)	
ID	Type			%		MVA	%	MVA	%
Cable2	Cable	414.11	230.12	55.57					
00EC01	Transformer				2.500	1.544	61.8	1.498	59.9
00EC03	Transformer				2.500	1.717	68.7	1.660	66.4
00EC04	Transformer				1.250	0.718	57.4	0.704	56.3
00EC51	Transformer				0.010	0.002	21.6	0.002	21.4
00EC52	Transformer				0.010	0.001	8.6	0.001	8.5
T1 AREA 40	Transformer				0.010	0.002	18.5	0.002	18.4
T2 AREA 50	Transformer				0.010	0.001	7.0	0.001	6.9

* Indicates a branch with operating load exceeding the branch capability.

Branch Losses Summary Report

Branch ID	From-To Bus Flow		To-From Bus Flow		Losses		% Bus Voltage		Vd % Drop
	MW	Mvar	MW	Mvar	kW	kvar	From	To	in Vmag
00EC01	1.298	0.836	-1.287	-0.768	11.5	69.0	99.2	98.7	0.50
00EC03	1.442	0.931	-1.428	-0.846	14.2	85.2	99.2	98.3	0.83
00EC04	-0.684	-0.167	0.691	0.194	7.8	27.1	99.7	99.2	0.51
00EC51	-0.002	-0.001	0.002	0.001	0.0	0.0	97.8	98.7	0.83
00EC52	-0.001	-0.001	0.001	0.001	0.0	0.0	98.3	98.7	0.33
Cable2	-3.432	-1.961	3.453	1.991	21.4	29.5	99.2	100.0	0.83
Cable3	1.442	0.931	-1.442	-0.931	0.1	0.1	99.2	99.2	0.01
Cable4	0.000	0.000	0.000	0.000			99.2	99.2	
Cable5	0.000	0.000	0.000	0.000			99.2	99.2	
Cable6	1.298	0.837	-1.298	-0.836	0.1	0.1	99.2	99.2	0.01
Cable7	0.691	0.194	-0.691	-0.194	0.0	0.0	99.2	99.2	0.00
T1 AREA 40	-0.001	-0.001	0.001	0.001	0.0	0.0	98.0	98.7	0.70
T2 AREA 50	-0.001	0.000	0.001	0.000	0.0	0.0	98.4	98.7	0.26
					55.0	211.0			

* This Transmission Line includes Series Capacitor.

Alert Summary Report

	% Alert Settings	
	Critical	Marginal
Loading		
Bus	100.0	95.0
Cable / Busway	100.0	95.0
Reactor	100.0	95.0
Line	100.0	95.0
Transformer	100.0	95.0
Panel	100.0	95.0
Protective Device	100.0	95.0
Generator	100.0	95.0
Inverter/Charger	100.0	95.0
Bus Voltage		
OverVoltage	105.0	102.0
UnderVoltage	95.0	98.0
Generator Excitation		
OverExcited (Q Max.)	100.0	95.0
UnderExcited (Q Min.)	100.0	

Marginal Report

Device ID	Type	Condition	Rating/Limit	Unit	Operating	% Operating	Phase Type
00EG51	Bus	Under Voltage	0.380	kV	0.372	97.8	3-Phase
Bus AREA 40	Bus	Under Voltage	0.380	kV	0.372	98.0	3-Phase

SUMMARY OF TOTAL GENERATION , LOADING & DEMAND

	MW	Mvar	MVA	% PF
Source (Swing Buses):	3.453	1.991	3.986	86.63 Lagging
Source (Non-Swing Buses):	0.000	0.000	0.000	
Total Demand:	3.453	1.991	3.986	86.63 Lagging
Total Motor Load:	3.215	1.729	3.651	88.07 Lagging
Total Static Load:	0.183	0.051	0.190	96.33 Lagging
Total Constant I Load:	0.000	0.000	0.000	
Total Generic Load:	0.000	0.000	0.000	
Apparent Losses:	0.055	0.211		
System Mismatch:	0.000	0.000		

Number of Iterations: 3

Electrical Transient Analyzer Program

Load Flow Analysis

Loading Category (1): Design

Generation Category (1): Design

Load Diversity Factor: None

	Swing	V-Control	Load	Total
Number of Buses:	2	0	26	28

	XFMR2	XFMR3	Reactor	Line/Cable/ Busway	Impedance	Tie PD	Total
Number of Branches:	7	0	0	6	0	13	26

Method of Solution:	Adaptive Newton-Raphson Method
Maximum No. of Iteration:	99
Precision of Solution:	0.0001000
System Frequency:	50.00 Hz
Unit System:	Metric
Project Filename:	PAT_TE
Output Filename:	C:\ETAP2102\PAT_TE\Untitled.lfr

Adjustments

Tolerance	Apply Adjustments	Individual /Global	Percent
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable / Busway Length:	No		

Temperature Correction	Apply Adjustments	Individual /Global	Degree C
Transmission Line Resistance:	Yes	Individual	
Cable / Busway Resistance:	Yes	Individual	

Bus Input Data

Bus			Initial Voltage		Load							
					Constant kVA		Constant Z		Constant I		Generic	
ID	kV	Sub-sys	% Mag.	Ang.	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar
00EG01	0.380	1	100.0	0.0	0.606	0.167	0.078	0.000				
00EG51	0.380	1	100.0	0.0	0.002	0.001						
00EG52	0.380	1	100.0	0.0								
00EM01	10.000	1	100.0	0.0								
Bus AREA 40	0.380	1	100.0	0.0	0.001	0.001						
Bus AREA 50	0.380	1	100.0	0.0								
Bus13	0.660	1	100.0	0.0	0.082	0.049						
Bus14	0.660	1	100.0	0.0								
Bus15	0.660	1	100.0	0.0	0.001	0.001						
Bus16	0.660	1	100.0	0.0								
Bus17	0.660	1	100.0	0.0	0.004	0.003						
Bus18	10.000	1	100.0	0.0								
Bus19	10.000	2	100.0	0.0								
Bus20	10.000	1	100.0	0.0								
Bus21	10.000	1	100.0	0.0								
Bus23	10.000	1	100.0	0.0								
Bus24	10.000	1	100.0	0.0								
Bus25	10.000	1	100.0	0.0								
LV PCC-00EB01	0.660	1	100.0	0.0			0.108	-0.294				
LV PCC-00EB02 F	0.660	1	100.0	0.0	0.515	0.299	0.000	-0.396				
MCC 00EB40	0.660	1	110.0	0.0	0.217	0.130						
MCC 00EB41	0.660	1	100.0	0.0	0.371	0.222						
MCC 00EB42	0.660	1	100.0	0.0	0.177	0.111						
MCC 00EB43-	0.660	1	110.0	0.0	0.304	0.182						
MCC 00EB44-	0.660	1	110.0	0.0	0.304	0.182						
MCC 00EB45-	0.660	1	110.0	0.0	0.304	0.182						
MCC 40EB40£	0.660	1	100.0	0.0	0.040	0.024						
MCC 50EB40	0.660	1	100.0	0.0	0.284	0.174						
Total Number of Buses: 28					3.215	1.729	0.186	-0.690	0.000	0.000	0.000	0.000

Generation Bus				Voltage		Generation			Mvar Limits	
ID	kV	Type	Sub-sys	% Mag.	Angle	MW	Mvar	% PF	Max	Min

Generation Bus				Voltage		Generation			Mvar Limits	
ID	kV	Type	Sub-sys	% Mag.	Angle	MW	Mvar	% PF	Max	Min
Bus18	10.000	Swing	1	100.0	0.0					
Bus19	10.000	Swing	2	100.0	0.0					
						0.000	0.000			

Line/Cable/Busway Input Data

ohms or siemens/1000 m per Conductor (Cable) or per Phase (Line/Busway)

Line/Cable/Busway ID	Library	Size	Length Adj. (m)	% Tol.	#/Phase	T (°C)	R	X	Y
Cable2	11NCUS1	300	1766.0	0.0	1	75	0.076302	0.105000	
Cable3	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable4	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable5	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable6	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable7	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	

Line / Cable / Busway resistances are listed at the specified temperatures.

2-Winding Transformer Input Data

Transformer		Rating					Z Variation			% Tap Setting		Adjusted	Phase Shift	
ID	Phase	MVA	Prim. kV	Sec. kV	% Z1	X1/R1	+ 5%	- 5%	% Tol.	Prim.	Sec.	% Z	Type	Angle
00EC01	3-Phase	2.500	10.000	0.660	7.50	6.00	0	0	1.1	-2.500	0	7.5825	Dyn	0.000
00EC03	3-Phase	2.500	10.000	0.660	7.50	6.00	0	0	1.1	-2.500	0	7.5825	Dyn	0.000
00EC04	3-Phase	1.250	10.000	0.380	7.00	3.50	0	0	1.1	-2.500	0	7.0770	Dyn	0.000
00EC51	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
00EC52	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
T1 AREA 40	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
T2 AREA 50	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000

Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVA Base			
ID	Type	From Bus	To Bus	R	X	Z	Y
00EC01	2W XFMR	Bus21	LV PCC-00EB01	48.62	291.69	295.72	
00EC03	2W XFMR	Bus25	LV PCC-00EB02 F	48.62	291.69	295.72	
00EC04	2W XFMR	Bus20	00EG01	151.65	530.77	552.01	
00EC51	2W XFMR	MCC 00EB41	00EG51	22188.01	33282.01	40000.00	
00EC52	2W XFMR	MCC 00EB42	00EG52	22188.01	33282.01	40000.00	
T1 AREA 40	2W XFMR	MCC 40EB40£	Bus AREA 40	22188.01	33282.01	40000.00	
T2 AREA 50	2W XFMR	MCC 50EB40	Bus AREA 50	22188.01	33282.01	40000.00	
Cable2	Cable	Bus18	00EM01	13.47	18.54	22.92	
Cable3	Cable	00EM01	Bus25	0.23	0.25	0.34	
Cable4	Cable	00EM01	Bus24	0.23	0.25	0.34	
Cable5	Cable	00EM01	Bus23	0.23	0.25	0.34	
Cable6	Cable	00EM01	Bus21	0.23	0.25	0.34	
Cable7	Cable	00EM01	Bus20	0.23	0.25	0.34	
CB27	Tie Breakr	LV PCC-00EB01	MCC 00EB40				
CB28	Tie Breakr	LV PCC-00EB01	MCC 00EB41				
CB29	Tie Breakr	LV PCC-00EB01	MCC 00EB42				
CB31	Tie Breakr	LV PCC-00EB02 F	MCC 00EB43-				
CB32	Tie Breakr	LV PCC-00EB02 F	MCC 00EB45-				
CB33	Tie Breakr	LV PCC-00EB02 F	MCC 00EB44-				
CB34	Tie Breakr	LV PCC-00EB01	MCC 50EB40				
CB35	Tie Breakr	LV PCC-00EB01	MCC 40EB40£				
CB44	Tie Breakr	MCC 00EB40	Bus13				
CB47	Tie Breakr	MCC 00EB40	Bus15				
CB54	Tie Breakr	MCC 00EB40	Bus17				
CB166	Tie Breakr	MCC 00EB40	Bus14				
CB172	Tie Breakr	MCC 00EB40	Bus16				

LOAD_FLOW_REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
00EG01	0.380	99.822	-2.2	0.000	0.000	0.684	0.167	Bus20	-0.684	-0.167	1071.3	97.2	
00EG51	0.380	99.059	-2.5	0.000	0.000	0.002	0.001	MCC 00EB41	-0.002	-0.001	3.3	79.5	
00EG52	0.380	99.553	-2.4	0.000	0.000	0.001	0.001	MCC 00EB42	-0.001	-0.001	1.3	79.7	
00EM01	10.000	99.311	-0.3	0.000	0.000	0.000	0.000	Bus18	-3.429	-1.192	211.1	94.5	
								Bus25	1.439	0.520	89.0	94.1	
								Bus24	0.000	0.000	0.0	0.0	
								Bus23	0.000	0.000	0.0	0.0	
								Bus21	1.298	0.478	80.4	93.8	
								Bus20	0.692	0.194	41.8	96.3	
Bus AREA 40	0.380	99.181	-2.5	0.000	0.000	0.001	0.001	MCC 40EB40£	-0.001	-0.001	2.8	81.0	
Bus AREA 50	0.380	99.617	-2.4	0.000	0.000	0.001	0.000	MCC 50EB40	-0.001	0.000	1.1	81.6	
Bus13	0.660	99.877	-2.3	0.000	0.000	0.082	0.049	MCC 00EB40	-0.082	-0.049	83.6	86.0	
Bus14	0.660	99.877	-2.3	0.000	0.000	0.000	0.000	MCC 00EB40	0.000	0.000	0.0	0.0	
Bus15	0.660	99.877	-2.3	0.000	0.000	0.001	0.001	MCC 00EB40	-0.001	-0.001	1.3	86.8	
Bus16	0.660	99.877	-2.3	0.000	0.000	0.000	0.000	MCC 00EB40	0.000	0.000	0.0	0.0	
Bus17	0.660	99.877	-2.3	0.000	0.000	0.004	0.003	MCC 00EB40	-0.004	-0.003	4.1	82.0	
* Bus18	10.000	100.000	0.0	3.447	1.217	0.000	0.000	00EM01	3.447	1.217	211.1	94.3	
Bus20	10.000	99.309	-0.3	0.000	0.000	0.000	0.000	00EM01	-0.692	-0.194	41.8	96.3	
								00EG01	0.692	0.194	41.8	96.3	-2.500
Bus21	10.000	99.307	-0.3	0.000	0.000	0.000	0.000	00EM01	-1.298	-0.478	80.4	93.8	
								LV PCC-00EB01	1.298	0.478	80.4	93.8	-2.500
Bus23	10.000	99.311	-0.3	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
Bus24	10.000	99.311	-0.3	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
Bus25	10.000	99.306	-0.3	0.000	0.000	0.000	0.000	00EM01	-1.439	-0.520	89.0	94.1	
								LV PCC-00EB02 F	1.439	0.520	89.0	94.1	-2.500
LV PCC-00EB01	0.660	99.877	-2.3	0.000	0.000	0.107	-0.294	Bus21	-1.289	-0.423	1188.4	95.0	
								MCC 00EB40	0.304	0.182	310.7	85.8	
								MCC 00EB41	0.373	0.223	380.5	85.8	
								MCC 00EB42	0.178	0.111	184.0	84.8	
								MCC 50EB40	0.285	0.174	292.3	85.3	
								MCC 40EB40£	0.042	0.026	43.0	85.3	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
LV PCC-00EB02 F	0.660	99.701	-2.6	0.000	0.000	0.515	-0.095	Bus25	-1.428	-0.452	1314.2	95.3	
								MCC 00EB43-	0.304	0.182	311.3	85.8	
								MCC 00EB45-	0.304	0.182	311.3	85.8	
								MCC 00EB44-	0.304	0.182	311.3	85.8	
MCC 00EB40	0.660	99.877	-2.3	0.000	0.000	0.217	0.130	LV PCC-00EB01	-0.304	-0.182	310.7	85.8	
								Bus13	0.082	0.049	83.6	86.0	
								Bus15	0.001	0.001	1.3	86.8	
								Bus17	0.004	0.003	4.1	82.0	
								Bus14	0.000	0.000	0.0	0.0	
								Bus16	0.000	0.000	0.0	0.0	
MCC 00EB41	0.660	99.877	-2.3	0.000	0.000	0.371	0.222	00EG51	0.002	0.001	1.9	79.3	
								LV PCC-00EB01	-0.373	-0.223	380.5	85.8	
MCC 00EB42	0.660	99.877	-2.3	0.000	0.000	0.177	0.111	00EG52	0.001	0.001	0.7	79.6	
								LV PCC-00EB01	-0.178	-0.111	184.0	84.8	
MCC 00EB43-	0.660	99.701	-2.6	0.000	0.000	0.304	0.182	LV PCC-00EB02 F	-0.304	-0.182	311.3	85.8	
MCC 00EB44-	0.660	99.701	-2.6	0.000	0.000	0.304	0.182	LV PCC-00EB02 F	-0.304	-0.182	311.3	85.8	
MCC 00EB45-	0.660	99.701	-2.6	0.000	0.000	0.304	0.182	LV PCC-00EB02 F	-0.304	-0.182	311.3	85.8	
MCC 40EB40£	0.660	99.877	-2.3	0.000	0.000	0.040	0.025	Bus AREA 40	0.001	0.001	1.6	80.8	
								LV PCC-00EB01	-0.042	-0.026	43.0	85.3	
MCC 50EB40	0.660	99.877	-2.3	0.000	0.000	0.284	0.174	Bus AREA 50	0.001	0.000	0.6	81.5	
								LV PCC-00EB01	-0.285	-0.174	292.3	85.3	

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

# Indicates a bus with a load mismatch of more than 0.1 MVA

Bus Loading Summary Report

Bus			Directly Connected Load								Total Bus Load			
			Constant kVA		Constant Z		Constant I		Generic					Percent
ID	kV	Rated Amp	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar	MVA	% PF	Amp	Loading
Bus19	10.000													
00EG01	0.380		0.606	0.167	0.078						0.704	97.2	1071.3	
00EG51	0.380		0.002	0.001							0.002	79.5	3.3	
00EG52	0.380		0.001	0.001							0.001	79.7	1.3	
00EM01	10.000										3.630	94.5	211.1	
Bus AREA 40	0.380		0.001	0.001							0.002	81.0	2.8	
Bus AREA 50	0.380		0.001	0.000							0.001	81.6	1.1	
Bus13	0.660		0.082	0.049							0.095	86.0	83.6	
Bus14	0.660													
Bus15	0.660		0.001	0.001							0.002	86.8	1.3	
Bus16	0.660													
Bus17	0.660		0.004	0.003							0.005	82.0	4.1	
Bus18	10.000										3.656	94.3	211.1	
Bus20	10.000										0.718	96.3	41.8	
Bus21	10.000										1.384	93.8	80.4	
Bus23	10.000													
Bus24	10.000													
Bus25	10.000										1.530	94.1	89.0	
LV PCC-00EB01	0.660				0.107	-0.294					1.501	85.9	1314.6	
LV PCC-00EB02 F	0.660		0.515	0.299		-0.394					1.660	86.0	1456.1	
MCC 00EB40	0.660		0.217	0.130							0.355	85.8	310.7	
MCC 00EB41	0.660		0.371	0.222							0.434	85.8	380.5	
MCC 00EB42	0.660		0.177	0.111							0.210	84.8	184.0	
MCC 00EB43-	0.660		0.304	0.182							0.355	85.8	311.3	
MCC 00EB44-	0.660		0.304	0.182							0.355	85.8	311.3	
MCC 00EB45-	0.660		0.304	0.182							0.355	85.8	311.3	
MCC 40EB40£	0.660		0.040	0.024	0.000	-					0.049	85.3	43.0	
MCC 50EB40	0.660		0.284	0.174							0.334	85.3	292.3	

* Indicates operating load of a bus exceeds the bus critical limit (100.0% of the Continuous Ampere rating).
\# Indicates operating load of a bus exceeds the bus marginal limit (95.0% of the Continuous Ampere rating).

Branch Loading Summary Report

CKT / Branch		Busway / Cable & Reactor			Transformer				
		Ampacity (Amp)	Loading Amp		Capability (MVA)	Loading (input)		Loading (output)	
ID	Type			%		MVA	%	MVA	%
Cable2	Cable	414.11	211.05	50.97					
00EC01	Transformer				2.500	1.384	55.3	1.357	54.3
00EC03	Transformer				2.500	1.530	61.2	1.498	59.9
00EC04	Transformer				1.250	0.718	57.5	0.704	56.3
00EC51	Transformer				0.010	0.002	21.6	0.002	21.4
00EC52	Transformer				0.010	0.001	8.6	0.001	8.5
T1 AREA 40	Transformer				0.010	0.002	18.5	0.002	18.4
T2 AREA 50	Transformer				0.010	0.001	7.0	0.001	6.9

* Indicates a branch with operating load exceeding the branch capability.

Branch Losses Summary Report

Branch ID	From-To Bus Flow		To-From Bus Flow		Losses		% Bus Voltage		Vd % Drop
	MW	Mvar	MW	Mvar	kW	kvar	From	To	in Vmag
00EC01	1.298	0.478	-1.289	-0.423	9.2	55.2	99.3	99.9	0.57
00EC03	1.439	0.520	-1.428	-0.452	11.3	67.5	99.3	99.7	0.39
00EC04	-0.684	-0.167	0.692	0.194	7.7	27.1	99.8	99.3	0.51
00EC51	-0.002	-0.001	0.002	0.001	0.0	0.0	99.1	99.9	0.82
00EC52	-0.001	-0.001	0.001	0.001	0.0	0.0	99.6	99.9	0.32
Cable2	-3.429	-1.192	3.447	1.217	18.0	24.8	99.3	100.0	0.69
Cable3	1.439	0.520	-1.439	-0.520	0.1	0.1	99.3	99.3	0.00
Cable4	0.000	0.000	0.000	0.000			99.3	99.3	
Cable5	0.000	0.000	0.000	0.000			99.3	99.3	
Cable6	1.298	0.478	-1.298	-0.478	0.0	0.0	99.3	99.3	0.00
Cable7	0.692	0.194	-0.692	-0.194	0.0	0.0	99.3	99.3	0.00
T1 AREA 40	-0.001	-0.001	0.001	0.001	0.0	0.0	99.2	99.9	0.70
T2 AREA 50	-0.001	0.000	0.001	0.000	0.0	0.0	99.6	99.9	0.26
					46.3	174.7			

* This Transmission Line includes Series Capacitor.

Alert Summary Report

	% Alert Settings	
	Critical	Marginal
Loading		
Bus	100.0	95.0
Cable / Busway	100.0	95.0
Reactor	100.0	95.0
Line	100.0	95.0
Transformer	100.0	95.0
Panel	100.0	95.0
Protective Device	100.0	95.0
Generator	100.0	95.0
Inverter/Charger	100.0	95.0
Bus Voltage		
OverVoltage	105.0	102.0
UnderVoltage	95.0	98.0
Generator Excitation		
OverExcited (Q Max.)	100.0	95.0
UnderExcited (Q Min.)	100.0	

SUMMARY OF TOTAL GENERATION , LOADING & DEMAND

	MW	Mvar	MVA	% PF
Source (Swing Buses):	3.447	1.217	3.656	94.30 Lagging
Source (Non-Swing Buses):	0.000	0.000	0.000	
Total Demand:	3.447	1.217	3.656	94.30 Lagging
Total Motor Load:	3.215	1.729	3.651	88.07 Lagging
Total Static Load:	0.186	-0.687	0.712	26.07 Leading
Total Constant I Load:	0.000	0.000	0.000	
Total Generic Load:	0.000	0.000	0.000	
Apparent Losses:	0.046	0.175		
System Mismatch:	0.000	0.000		

Number of Iterations: 3

Electrical Transient Analyzer Program

Load Flow Analysis

Loading Category (1): Design

Generation Category (1): Design

Load Diversity Factor: None

	Swing	V-Control	Load	Total
Number of Buses:	2	0	21	23

	XFMR2	XFMR3	Reactor	Line/Cable/ Busway	Impedance	Tie PD	Total
Number of Branches:	6	0	0	5	0	10	21

Method of Solution:	Adaptive Newton-Raphson Method
Maximum No. of Iteration:	99
Precision of Solution:	0.0001000
System Frequency:	50.00 Hz
Unit System:	Metric
Project Filename:	PAT_TE
Output Filename:	C:\ETAP2102\PAT_TE\Untitled.lfr

Adjustments

Tolerance	Apply Adjustments	Individual /Global	Percent
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable / Busway Length:	No		

Temperature Correction	Apply Adjustments	Individual /Global	Degree C
Transmission Line Resistance:	Yes	Individual	
Cable / Busway Resistance:	Yes	Individual	

Bus Input Data

Bus			Initial Voltage		Load							
					Constant kVA		Constant Z		Constant I		Generic	
ID	kV	Sub-sys	% Mag.	Ang.	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar
00EG01	0.380	1	100.0	0.0	0.606	0.167	0.078	0.000				
00EG51	0.380	1	100.0	0.0	0.002	0.001						
00EG52	0.380	1	100.0	0.0								
00EM01	10.000	1	100.0	0.0								
Bus AREA 40	0.380	1	100.0	0.0	0.001	0.001						
Bus AREA 50	0.380	1	100.0	0.0								
Bus13	0.660	1	100.0	0.0	0.082	0.049						
Bus14	0.660	1	100.0	0.0								
Bus15	0.660	1	100.0	0.0	0.001	0.001						
Bus16	0.660	1	100.0	0.0								
Bus17	0.660	1	100.0	0.0	0.004	0.003						
Bus18	10.000	1	100.0	0.0								
Bus19	10.000	2	100.0	0.0								
Bus20	10.000	1	100.0	0.0								
Bus21	10.000	1	100.0	0.0								
Bus23	10.000	1	100.0	0.0								
Bus24	10.000	1	100.0	0.0								
LV PCC-00EB01	0.660	1	100.0	0.0			0.108	-0.294				
MCC 00EB40	0.660	1	110.0	0.0	0.217	0.130						
MCC 00EB41	0.660	1	100.0	0.0	0.371	0.222						
MCC 00EB42	0.660	1	100.0	0.0	0.177	0.111						
MCC 40EB40£	0.660	1	100.0	0.0	0.040	0.024						
MCC 50EB40	0.660	1	100.0	0.0	0.284	0.174						
Total Number of Buses: 23					1.787	0.883	0.186	-0.294	0.000	0.000	0.000	0.000

Generation Bus				Voltage		Generation			Mvar Limits	
ID	kV	Type	Sub-sys	% Mag.	Angle	MW	Mvar	% PF	Max	Min
Bus18	10.000	Swing	1	100.0	0.0					
Bus19	10.000	Swing	2	100.0	0.0					
						0.000	0.000			

Line/Cable/Busway Input Data

ohms or siemens/1000 m per Conductor (Cable) or per Phase (Line/Busway)

Line/Cable/Busway ID	Library	Size	Length Adj. (m)	Length % Tol.	#/Phase	T (°C)	R	X	Y
Cable2	11NCUS1	300	1766.0	0.0	1	75	0.076302	0.105000	
Cable4	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable5	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable6	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable7	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	

Line / Cable / Busway resistances are listed at the specified temperatures.

2-Winding Transformer Input Data

Transformer		Rating					Z Variation			% Tap Setting		Adjusted	Phase Shift	
ID	Phase	MVA	Prim. kV	Sec. kV	% Z1	X1/R1	+ 5%	- 5%	% Tol.	Prim.	Sec.	% Z	Type	Angle
00EC01	3-Phase	2.500	10.000	0.660	7.50	6.00	0	0	1.1	-2.500	0	7.5825	Dyn	0.000
00EC04	3-Phase	1.250	10.000	0.380	7.00	3.50	0	0	1.1	-2.500	0	7.0770	Dyn	0.000
00EC51	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
00EC52	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
T1 AREA 40	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
T2 AREA 50	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000

Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVA Base			
ID	Type	From Bus	To Bus	R	X	Z	Y
00EC01	2W XFMR	Bus21	LV PCC-00EB01	48.62	291.69	295.72	
00EC04	2W XFMR	Bus20	00EG01	151.65	530.77	552.01	
00EC51	2W XFMR	MCC 00EB41	00EG51	22188.01	33282.01	40000.00	
00EC52	2W XFMR	MCC 00EB42	00EG52	22188.01	33282.01	40000.00	
T1 AREA 40	2W XFMR	MCC 40EB40£	Bus AREA 40	22188.01	33282.01	40000.00	
T2 AREA 50	2W XFMR	MCC 50EB40	Bus AREA 50	22188.01	33282.01	40000.00	
Cable2	Cable	Bus18	00EM01	13.47	18.54	22.92	
Cable4	Cable	00EM01	Bus24	0.23	0.25	0.34	
Cable5	Cable	00EM01	Bus23	0.23	0.25	0.34	
Cable6	Cable	00EM01	Bus21	0.23	0.25	0.34	
Cable7	Cable	00EM01	Bus20	0.23	0.25	0.34	
CB27	Tie Breakr	LV PCC-00EB01	MCC 00EB40				
CB28	Tie Breakr	LV PCC-00EB01	MCC 00EB41				
CB29	Tie Breakr	LV PCC-00EB01	MCC 00EB42				
CB34	Tie Breakr	LV PCC-00EB01	MCC 50EB40				
CB35	Tie Breakr	LV PCC-00EB01	MCC 40EB40£				
CB44	Tie Breakr	MCC 00EB40	Bus13				
CB47	Tie Breakr	MCC 00EB40	Bus15				
CB54	Tie Breakr	MCC 00EB40	Bus17				
CB166	Tie Breakr	MCC 00EB40	Bus14				
CB172	Tie Breakr	MCC 00EB40	Bus16				

LOAD_FLOW_REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
00EG01	0.380	100.129	-2.1	0.000	0.000	0.684	0.167	Bus20	-0.684	-0.167	1068.7	97.2	
00EG51	0.380	99.376	-2.4	0.000	0.000	0.002	0.001	MCC 00EB41	-0.002	-0.001	3.3	79.5	
00EG52	0.380	99.868	-2.3	0.000	0.000	0.001	0.001	MCC 00EB42	-0.001	-0.001	1.3	79.7	
00EM01	10.000	99.606	-0.2	0.000	0.000	0.000	0.000	Bus18	-1.991	-0.670	121.8	94.8	
								Bus24	0.000	0.000	0.0	0.0	
								Bus23	0.000	0.000	0.0	0.0	
								Bus21	1.299	0.476	80.2	93.9	
								Bus20	0.692	0.194	41.7	96.3	
Bus AREA 40	0.380	99.497	-2.4	0.000	0.000	0.001	0.001	MCC 40EB40£	-0.001	-0.001	2.8	81.0	
Bus AREA 50	0.380	99.931	-2.3	0.000	0.000	0.001	0.000	MCC 50EB40	-0.001	0.000	1.1	81.6	
Bus13	0.660	100.191	-2.2	0.000	0.000	0.082	0.049	MCC 00EB40	-0.082	-0.049	83.4	86.0	
Bus14	0.660	100.191	-2.2	0.000	0.000	0.000	0.000	MCC 00EB40	0.000	0.000	0.0	0.0	
Bus15	0.660	100.191	-2.2	0.000	0.000	0.001	0.001	MCC 00EB40	-0.001	-0.001	1.3	86.8	
Bus16	0.660	100.191	-2.2	0.000	0.000	0.000	0.000	MCC 00EB40	0.000	0.000	0.0	0.0	
Bus17	0.660	100.191	-2.2	0.000	0.000	0.004	0.003	MCC 00EB40	-0.004	-0.003	4.1	82.0	
* Bus18	10.000	100.000	0.0	1.997	0.678	0.000	0.000	00EM01	1.997	0.678	121.8	94.7	
Bus20	10.000	99.604	-0.2	0.000	0.000	0.000	0.000	00EM01	-0.692	-0.194	41.7	96.3	
								00EG01	0.692	0.194	41.7	96.3	-2.500
Bus21	10.000	99.601	-0.2	0.000	0.000	0.000	0.000	00EM01	-1.299	-0.476	80.2	93.9	
								LV PCC-00EB01	1.299	0.476	80.2	93.9	-2.500
Bus23	10.000	99.606	-0.2	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
Bus24	10.000	99.606	-0.2	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
LV PCC-00EB01	0.660	100.191	-2.2	0.000	0.000	0.108	-0.296	Bus21	-1.290	-0.421	1184.7	95.1	
								MCC 00EB40	0.304	0.182	309.8	85.8	
								MCC 00EB41	0.373	0.223	379.4	85.8	
								MCC 00EB42	0.178	0.111	183.4	84.8	
								MCC 50EB40	0.285	0.174	291.4	85.3	
								MCC 40EB40£	0.042	0.026	42.9	85.3	
MCC 00EB40	0.660	100.191	-2.2	0.000	0.000	0.217	0.130	LV PCC-00EB01	-0.304	-0.182	309.8	85.8	
								Bus13	0.082	0.049	83.4	86.0	
								Bus15	0.001	0.001	1.3	86.8	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
								Bus17	0.004	0.003	4.1	82.0	
								Bus14	0.000	0.000	0.0	0.0	
								Bus16	0.000	0.000	0.0	0.0	
MCC 00EB41	0.660	100.191	-2.2	0.000	0.000	0.371	0.222	00EG51	0.002	0.001	1.9	79.3	
								LV PCC-00EB01	-0.373	-0.223	379.4	85.8	
MCC 00EB42	0.660	100.191	-2.2	0.000	0.000	0.177	0.111	00EG52	0.001	0.001	0.7	79.6	
								LV PCC-00EB01	-0.178	-0.111	183.4	84.8	
MCC 40EB40£	0.660	100.191	-2.2	0.000	0.000	0.040	0.025	Bus AREA 40	0.001	0.001	1.6	80.8	
								LV PCC-00EB01	-0.042	-0.026	42.9	85.3	
MCC 50EB40	0.660	100.191	-2.2	0.000	0.000	0.284	0.174	Bus AREA 50	0.001	0.000	0.6	81.5	
								LV PCC-00EB01	-0.285	-0.174	291.4	85.3	

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

# Indicates a bus with a load mismatch of more than 0.1 MVA

Bus Loading Summary Report

Bus			Directly Connected Load								Total Bus Load			
			Constant kVA		Constant Z		Constant I		Generic					Percent
ID	kV	Rated Amp	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar	MVA	% PF	Amp	Loading
Bus19	10.000													
00EG01	0.380		0.606	0.167	0.078						0.704	97.2	1068.7	
00EG51	0.380		0.002	0.001							0.002	79.5	3.3	
00EG52	0.380		0.001	0.001							0.001	79.7	1.3	
00EM01	10.000										2.101	94.8	121.8	
Bus AREA 40	0.380		0.001	0.001							0.002	81.0	2.8	
Bus AREA 50	0.380		0.001	0.000							0.001	81.6	1.1	
Bus13	0.660		0.082	0.049							0.095	86.0	83.4	
Bus14	0.660													
Bus15	0.660		0.001	0.001							0.002	86.8	1.3	
Bus16	0.660													
Bus17	0.660		0.004	0.003							0.005	82.0	4.1	
Bus18	10.000										2.109	94.7	121.8	
Bus20	10.000										0.719	96.3	41.7	
Bus21	10.000										1.383	93.9	80.2	
Bus23	10.000													
Bus24	10.000													
LV PCC-00EB01	0.660				0.108	-0.296					1.502	85.9	1311.2	
MCC 00EB40	0.660		0.217	0.130							0.355	85.8	309.8	
MCC 00EB41	0.660		0.371	0.222							0.434	85.8	379.4	
MCC 00EB42	0.660		0.177	0.111							0.210	84.8	183.4	
MCC 40EB40£	0.660		0.040	0.024	0.000	-					0.049	85.3	42.9	
MCC 50EB40	0.660		0.284	0.174							0.334	85.3	291.4	

* Indicates operating load of a bus exceeds the bus critical limit (100.0% of the Continuous Ampere rating).
# Indicates operating load of a bus exceeds the bus marginal limit (95.0% of the Continuous Ampere rating).

Branch Loading Summary Report

CKT / Branch		Busway / Cable & Reactor			Transformer				
		Ampacity (Amp)	Loading Amp		Capability (MVA)	Loading (input)		Loading (output)	
ID	Type			%		MVA	%	MVA	%
Cable2	Cable	414.11	121.76	29.40					
00EC01	Transformer				2.500	1.383	55.3	1.357	54.3
00EC04	Transformer				1.250	0.719	57.5	0.704	56.3
00EC51	Transformer				0.010	0.002	21.6	0.002	21.4
00EC52	Transformer				0.010	0.001	8.6	0.001	8.5
T1 AREA 40	Transformer				0.010	0.002	18.5	0.002	18.4
T2 AREA 50	Transformer				0.010	0.001	7.0	0.001	6.9

* Indicates a branch with operating load exceeding the branch capability.

Branch Losses Summary Report

Branch ID	From-To Bus Flow		To-From Bus Flow		Losses		% Bus Voltage		Vd % Drop
	MW	Mvar	MW	Mvar	kW	kvar	From	To	in Vmag
00EC01	1.299	0.476	-1.290	-0.421	9.1	54.9	99.6	100.2	0.59
00EC04	-0.684	-0.167	0.692	0.194	7.7	26.9	100.1	99.6	0.53
00EC51	-0.002	-0.001	0.002	0.001	0.0	0.0	99.4	100.2	0.81
00EC52	-0.001	-0.001	0.001	0.001	0.0	0.0	99.9	100.2	0.32
Cable2	-1.991	-0.670	1.997	0.678	6.0	8.2	99.6	100.0	0.39
Cable4	0.000	0.000	0.000	0.000			99.6	99.6	
Cable5	0.000	0.000	0.000	0.000			99.6	99.6	
Cable6	1.299	0.476	-1.299	-0.476	0.0	0.0	99.6	99.6	0.00
Cable7	0.692	0.194	-0.692	-0.194	0.0	0.0	99.6	99.6	0.00
T1 AREA 40	-0.001	-0.001	0.001	0.001	0.0	0.0	99.5	100.2	0.69
T2 AREA 50	-0.001	0.000	0.001	0.000	0.0	0.0	99.9	100.2	0.26
					22.9	90.1			

* This Transmission Line includes Series Capacitor.

Alert Summary Report

	% Alert Settings	
	Critical	Marginal
Loading		
Bus	100.0	95.0
Cable / Busway	100.0	95.0
Reactor	100.0	95.0
Line	100.0	95.0
Transformer	100.0	95.0
Panel	100.0	95.0
Protective Device	100.0	95.0
Generator	100.0	95.0
Inverter/Charger	100.0	95.0
Bus Voltage		
OverVoltage	105.0	102.0
UnderVoltage	95.0	98.0
Generator Excitation		
OverExcited (Q Max.)	100.0	95.0
UnderExcited (Q Min.)	100.0	

SUMMARY OF TOTAL GENERATION , LOADING & DEMAND

	MW	Mvar	MVA	% PF
Source (Swing Buses):	1.997	0.678	2.109	94.69 Lagging
Source (Non-Swing Buses):	0.000	0.000	0.000	
Total Demand:	1.997	0.678	2.109	94.69 Lagging
Total Motor Load:	1.787	0.883	1.994	89.65 Lagging
Total Static Load:	0.187	-0.295	0.349	53.44 Leading
Total Constant I Load:	0.000	0.000	0.000	
Total Generic Load:	0.000	0.000	0.000	
Apparent Losses:	0.023	0.090		
System Mismatch:	0.000	0.000		

Number of Iterations: 3

Electrical Transient Analyzer Program

Load Flow Analysis

Loading Category (1): Design

Generation Category (1): Design

Load Diversity Factor: None

	Swing	V-Control	Load	Total
Number of Buses:	3	0	15	18

	XFMR2	XFMR3	Reactor	Line/Cable/ Busway	Impedance	Tie PD	Total
Number of Branches:	6	0	0	0	0	9	15

Method of Solution:	Adaptive Newton-Raphson Method
Maximum No. of Iteration:	99
Precision of Solution:	0.0001000
System Frequency:	50.00 Hz
Unit System:	Metric
Project Filename:	PAT_TE
Output Filename:	C:\ETAP2102\PAT_TE\Untitled.lfr

Adjustments

Tolerance	Apply Adjustments	Individual /Global	Percent
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable / Busway Length:	No		

Temperature Correction	Apply Adjustments	Individual /Global	Degree C
Transmission Line Resistance:	Yes	Individual	
Cable / Busway Resistance:	Yes	Individual	

Bus Input Data

Bus			Initial Voltage		Load							
					Constant kVA		Constant Z		Constant I		Generic	
ID	kV	Sub-sys	% Mag.	Ang.	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar
00EG01	0.380	3	100.0	0.0	0.037	0.000						
00EG51	0.380	3	100.0	0.0								
00EG52	0.380	3	100.0	0.0								
Bus AREA 40	0.380	3	100.0	0.0								
Bus AREA 50	0.380	3	100.0	0.0								
Bus18	10.000	1	100.0	0.0								
Bus19	10.000	2	100.0	0.0								
Bus21	10.000	3	100.0	0.0								
LV PCC-00EB01	0.660	3	100.0	0.0			0.108	0.052				
LV PCC-00EB02 F	0.660	3	100.0	0.0								
MCC 00EB40	0.660	3	110.0	0.0	0.027	0.018						
MCC 00EB41	0.660	3	100.0	0.0								
MCC 00EB42	0.660	3	100.0	0.0	0.037	0.022						
MCC 00EB43-	0.660	3	110.0	0.0	0.027	0.018						
MCC 00EB44-	0.660	3	110.0	0.0	0.027	0.018						
MCC 00EB45-	0.660	3	110.0	0.0	0.027	0.018						
MCC 40EB40£	0.660	3	100.0	0.0	0.008	0.006						
MCC 50EB40	0.660	3	100.0	0.0	0.025	0.018						
Total Number of Buses: 18					0.218	0.119	0.108	0.052	0.000	0.000	0.000	0.000

Generation Bus				Voltage		Generation			Mvar Limits	
ID	kV	Type	Sub-sys	% Mag.	Angle	MW	Mvar	% PF	Max	Min
Bus18	10.000	Swing	1	100.0	0.0					
Bus19	10.000	Swing	2	100.0	0.0					
LV PCC-00EB01	0.660	Swing	3	100.0	0.0					
						0.000	0.000			

2-Winding Transformer Input Data

Transformer		Rating					Z Variation			% Tap Setting		Adjusted	Phase Shift	
ID	Phase	MVA	Prim. kV	Sec. kV	% Z1	X1/R1	+ 5%	- 5%	% Tol.	Prim.	Sec.	% Z	Type	Angle
00EC01	3-Phase	2.500	10.000	0.660	7.50	6.00	0	0	1.1	-2.500	0	7.5825	Dyn	0.000
00EC06	3-Phase	0.160	0.660	0.400	4.00	1.50	0	0	1.1	0	0	4.0440	Dyn	0.000
00EC51	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
00EC52	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
T1 AREA 40	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000
T2 AREA 50	3-Phase	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000	Dyn	0.000

Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVA Base			
ID	Type	From Bus	To Bus	R	X	Z	Y
00EC01	2W XFMR	Bus21	LV PCC-00EB01	48.62	291.69	295.72	
00EC06	2W XFMR	LV PCC-00EB01	00EG01	1402.01	2103.01	2527.50	
00EC51	2W XFMR	MCC 00EB41	00EG51	22188.01	33282.01	40000.00	
00EC52	2W XFMR	MCC 00EB42	00EG52	22188.01	33282.01	40000.00	
T1 AREA 40	2W XFMR	MCC 40EB40£	Bus AREA 40	22188.01	33282.01	40000.00	
T2 AREA 50	2W XFMR	MCC 50EB40	Bus AREA 50	22188.01	33282.01	40000.00	
CB22	Tie Breakr	LV PCC-00EB01	LV PCC-00EB02 F				
CB27	Tie Breakr	LV PCC-00EB01	MCC 00EB40				
CB28	Tie Breakr	LV PCC-00EB01	MCC 00EB41				
CB29	Tie Breakr	LV PCC-00EB01	MCC 00EB42				
CB31	Tie Breakr	LV PCC-00EB02 F	MCC 00EB43-				
CB32	Tie Breakr	LV PCC-00EB02 F	MCC 00EB45-				
CB33	Tie Breakr	LV PCC-00EB02 F	MCC 00EB44-				
CB34	Tie Breakr	LV PCC-00EB01	MCC 50EB40				
CB35	Tie Breakr	LV PCC-00EB01	MCC 40EB40£				

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
00EG01	0.380	104.705	-0.5	0.000	0.000	0.037	0.000	LV PCC-00EB01	-0.037	0.000	54.3	100.0	
00EG51	0.380	100.000	0.0	0.000	0.000	0.000	0.000	MCC 00EB41	0.000	0.000	0.0	0.0	
00EG52	0.380	99.647	-0.1	0.000	0.000	0.001	0.001	MCC 00EB42	-0.001	-0.001	1.4	81.5	
Bus AREA 40	0.380	99.822	0.0	0.000	0.000	0.000	0.000	MCC 40EB40£	0.000	0.000	0.7	81.0	
Bus AREA 50	0.380	100.000	0.0	0.000	0.000	0.000	0.000	MCC 50EB40	0.000	0.000	0.0	0.0	
Bus21	10.000	97.500	0.0	0.000	0.000	0.000	0.000	LV PCC-00EB01	0.000	0.000	0.0	0.0	-2.500
* LV PCC-00EB01	0.660	100.000	0.0	0.326	0.172	0.108	0.052	Bus21	0.000	0.000	0.0	0.0	
								00EG01	0.038	0.000	32.9	100.0	
								LV PCC-00EB02 F	0.082	0.055	86.0	83.0	
								MCC 00EB40	0.027	0.018	28.7	83.0	
								MCC 00EB41	0.000	0.000	0.0	0.0	
								MCC 00EB42	0.038	0.023	38.5	85.9	
								MCC 50EB40	0.025	0.018	26.9	82.0	
								MCC 40EB40£	0.009	0.006	9.2	81.3	
LV PCC-00EB02 F	0.660	100.000	0.0	0.000	0.000	0.000	0.000	LV PCC-00EB01	-0.082	-0.055	86.0	83.0	
								MCC 00EB43-	0.027	0.018	28.7	83.0	
								MCC 00EB45-	0.027	0.018	28.7	83.0	
								MCC 00EB44-	0.027	0.018	28.7	83.0	
MCC 00EB40	0.660	100.000	0.0	0.000	0.000	0.027	0.018	LV PCC-00EB01	-0.027	-0.018	28.7	83.0	
MCC 00EB41	0.660	100.000	0.0	0.000	0.000	0.000	0.000	00EG51	0.000	0.000	0.0	0.0	
								LV PCC-00EB01	0.000	0.000	0.0	0.0	
MCC 00EB42	0.660	100.000	0.0	0.000	0.000	0.037	0.022	00EG52	0.001	0.001	0.8	81.4	
								LV PCC-00EB01	-0.038	-0.023	38.5	85.9	
MCC 00EB43-	0.660	100.000	0.0	0.000	0.000	0.027	0.018	LV PCC-00EB02 F	-0.027	-0.018	28.7	83.0	
MCC 00EB44-	0.660	100.000	0.0	0.000	0.000	0.027	0.018	LV PCC-00EB02 F	-0.027	-0.018	28.7	83.0	
MCC 00EB45-	0.660	100.000	0.0	0.000	0.000	0.027	0.018	LV PCC-00EB02 F	-0.027	-0.018	28.7	83.0	
MCC 40EB40£	0.660	100.000	0.0	0.000	0.000	0.008	0.006	Bus AREA 40	0.000	0.000	0.4	81.0	
								LV PCC-00EB01	-0.009	-0.006	9.2	81.3	
MCC 50EB40	0.660	100.000	0.0	0.000	0.000	0.025	0.018	Bus AREA 50	0.000	0.000	0.0	0.0	
								LV PCC-00EB01	-0.025	-0.018	26.9	82.0	

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

# Indicates a bus with a load mismatch of more than 0.1 MVA

Bus Loading Summary Report

Bus			Directly Connected Load								Total Bus Load			
			Constant kVA		Constant Z		Constant I		Generic					Percent
ID	kV	Rated Amp	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar	MVA	% PF	Amp	Loading
Bus18	10.000													
Bus19	10.000													
00EG01	0.380		0.037								0.037	100.0	54.3	
00EG51	0.380													
00EG52	0.380		0.001	0.001							0.001	81.5	1.4	
Bus AREA 40	0.380		0.000	0.000							0.000	81.0	0.7	
Bus AREA 50	0.380													
Bus21	10.000													
LV PCC-00EB01	0.660				0.108	0.052					0.368	88.4	322.1	
LV PCC-00EB02 F	0.660										0.098	83.0	86.0	
MCC 00EB40	0.660		0.027	0.018							0.033	83.0	28.7	
MCC 00EB41	0.660													
MCC 00EB42	0.660		0.037	0.022							0.044	85.9	38.5	
MCC 00EB43-	0.660		0.027	0.018							0.033	83.0	28.7	
MCC 00EB44-	0.660		0.027	0.018							0.033	83.0	28.7	
MCC 00EB45-	0.660		0.027	0.018							0.033	83.0	28.7	
MCC 40EB40£	0.660		0.008	0.006							0.011	81.3	9.2	
MCC 50EB40	0.660		0.025	0.018							0.031	82.0	26.9	

* Indicates operating load of a bus exceeds the bus critical limit (100.0% of the Continuous Ampere rating).
# Indicates operating load of a bus exceeds the bus marginal limit (95.0% of the Continuous Ampere rating).

Branch Loading Summary Report

CKT / Branch		Busway / Cable & Reactor			Transformer				
						Loading (input)		Loading (output)	
ID	Type	Ampacity (Amp)	Loading Amp	%	Capability (MVA)	MVA	%	MVA	%
00EC01	Transformer				2.500	0.000	0.0	0.000	0.0
00EC06	Transformer				0.160	0.038	23.5	0.037	23.4
00EC51	Transformer				0.010				
00EC52	Transformer				0.010	0.001	9.4	0.001	9.4
T1 AREA 40	Transformer				0.010	0.000	4.7	0.000	4.7
T2 AREA 50	Transformer				0.010				

* Indicates a branch with operating load exceeding the branch capability.

Branch Losses Summary Report

Branch ID	From-To Bus Flow		To-From Bus Flow		Losses		% Bus Voltage		Vd % Drop
	MW	Mvar	MW	Mvar	kW	kvar	From	To	in Vmag
00EC01	0.000	0.000	0.000	0.000	0.0	0.0	97.5	100.0	2.50
00EC06	-0.037	0.000	0.038	0.000	0.2	0.3	104.7	100.0	0.53
00EC51	0.000	0.000	0.000	0.000			100.0	100.0	
00EC52	-0.001	-0.001	0.001	0.001	0.0	0.0	99.6	100.0	0.35
T1 AREA 40	0.000	0.000	0.000	0.000	0.0	0.0	99.8	100.0	0.18
T2 AREA 50	0.000	0.000	0.000	0.000			100.0	100.0	
					0.2	0.3			

* This Transmission Line includes Series Capacitor.

Alert Summary Report

% Alert Settings

	Critical	Marginal
Loading		
Bus	100.0	95.0
Cable / Busway	100.0	95.0
Reactor	100.0	95.0
Line	100.0	95.0
Transformer	100.0	95.0
Panel	100.0	95.0
Protective Device	100.0	95.0
Generator	100.0	95.0
Inverter/Charger	100.0	95.0
Bus Voltage		
OverVoltage	105.0	102.0
UnderVoltage	95.0	98.0
Generator Excitation		
OverExcited (Q Max.)	100.0	95.0
UnderExcited (Q Min.)	100.0	

Marginal Report

Device ID	Type	Condition	Rating/Limit	Unit	Operating	% Operating	Phase Type
00EG01	Bus	Over Voltage	0.380	kV	0.398	104.7	3-Phase
Bus21	Bus	Under Voltage	10.000	kV	9.750	97.5	3-Phase

SUMMARY OF TOTAL GENERATION , LOADING & DEMAND

	MW	Mvar	MVA	% PF
Source (Swing Buses):	0.326	0.172	0.368	88.45 Lagging
Source (Non-Swing Buses):	0.000	0.000	0.000	
Total Demand:	0.326	0.172	0.368	88.45 Lagging
Total Motor Load:	0.218	0.119	0.248	87.69 Lagging
Total Static Load:	0.108	0.052	0.120	90.00 Lagging
Total Constant I Load:	0.000	0.000	0.000	
Total Generic Load:	0.000	0.000	0.000	
Apparent Losses:	0.000	0.000		
System Mismatch:	0.000	0.000		

Number of Iterations: 2

Electrical Transient Analyzer Program

Load Flow Analysis

Loading Category (1): Design

Generation Category (1): Design

Load Diversity Factor: None

	Swing	V-Control	Load	Total
Number of Buses:	2	0	9	11

	XFMR2	XFMR3	Reactor	Line/Cable/ Busway	Impedance	Tie PD	Total
Number of Branches:	3	0	0	6	0	0	9

Method of Solution:	Adaptive Newton-Raphson Method
Maximum No. of Iteration:	99
Precision of Solution:	0.0001000
System Frequency:	50.00 Hz
Unit System:	Metric
Project Filename:	PAT_TE
Output Filename:	C:\ETAP2102\PAT_TE\Untitled.lfr

Adjustments

Tolerance	Apply Adjustments	Individual /Global	Percent
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable / Busway Length:	No		

Temperature Correction	Apply Adjustments	Individual /Global	Degree C
Transmission Line Resistance:	Yes	Individual	
Cable / Busway Resistance:	Yes	Individual	

Bus Input Data

Bus			Initial Voltage		Load							
					Constant kVA		Constant Z		Constant I		Generic	
ID	kV	Sub-sys	% Mag.	Ang.	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar
00EG01	0.380	1	100.0	0.0								
00EM01	10.000	1	100.0	0.0								
Bus18	10.000	1	100.0	0.0								
Bus19	10.000	2	100.0	0.0								
Bus20	10.000	1	100.0	0.0								
Bus21	10.000	1	100.0	0.0								
Bus23	10.000	1	100.0	0.0								
Bus24	10.000	1	100.0	0.0								
Bus25	10.000	1	100.0	0.0								
LV PCC-00EB01	0.660	1	100.0	0.0								
LV PCC-00EB02 F	0.660	1	100.0	0.0								
Total Number of Buses: 11					0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Generation Bus				Voltage		Generation			Mvar Limits	
ID	kV	Type	Sub-sys	% Mag.	Angle	MW	Mvar	% PF	Max	Min
Bus18	10.000	Swing	1	100.0	0.0					
Bus19	10.000	Swing	2	100.0	0.0					
						0.000	0.000			

Line/Cable/Busway Input Data

ohms or siemens/1000 m per Conductor (Cable) or per Phase (Line/Busway)

Line/Cable/Busway ID	Library	Size	Length Adj. (m)	% Tol.	#/Phase	T (°C)	R	X	Y
Cable2	11NCUS1	300	1766.0	0.0	1	75	0.076302	0.105000	
Cable3	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable4	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable5	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable6	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	
Cable7	10NCUS3	300	30.0	0.0	1	75	0.075444	0.083000	

Line / Cable / Busway resistances are listed at the specified temperatures.

2-Winding Transformer Input Data

Transformer		Rating					Z Variation			% Tap Setting		Adjusted	Phase Shift	
ID	Phase	MVA	Prim. kV	Sec. kV	% Z1	X1/R1	+ 5%	- 5%	% Tol.	Prim.	Sec.	% Z	Type	Angle
00EC01	3-Phase	2.500	10.000	0.660	7.50	6.00	0	0	1.1	-2.500	0	7.5825	Dyn	0.000
00EC03	3-Phase	2.500	10.000	0.660	7.50	6.00	0	0	1.1	-2.500	0	7.5825	Dyn	0.000
00EC04	3-Phase	1.250	10.000	0.380	7.00	3.50	0	0	1.1	-2.500	0	7.0770	Dyn	0.000

Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVA Base			
ID	Type	From Bus	To Bus	R	X	Z	Y
00EC01	2W XFMR	Bus21	LV PCC-00EB01	48.62	291.69	295.72	
00EC03	2W XFMR	Bus25	LV PCC-00EB02 F	48.62	291.69	295.72	
00EC04	2W XFMR	Bus20	00EG01	151.65	530.77	552.01	
Cable2	Cable	Bus18	00EM01	13.47	18.54	22.92	
Cable3	Cable	00EM01	Bus25	0.23	0.25	0.34	
Cable4	Cable	00EM01	Bus24	0.23	0.25	0.34	
Cable5	Cable	00EM01	Bus23	0.23	0.25	0.34	
Cable6	Cable	00EM01	Bus21	0.23	0.25	0.34	
Cable7	Cable	00EM01	Bus20	0.23	0.25	0.34	

LOAD_FLOW_REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
00EG01	0.380	102.564	0.0	0.000	0.000	0.000	0.000	Bus20	0.000	0.000	0.0	0.0	
00EM01	10.000	100.000	0.0	0.000	0.000	0.000	0.000	Bus18	0.000	0.000	0.0	0.0	
								Bus25	0.000	0.000	0.0	0.0	
								Bus24	0.000	0.000	0.0	0.0	
								Bus23	0.000	0.000	0.0	0.0	
								Bus21	0.000	0.000	0.0	0.0	
								Bus20	0.000	0.000	0.0	0.0	
* Bus18	10.000	100.000	0.0	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
Bus20	10.000	100.000	0.0	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
								00EG01	0.000	0.000	0.0	0.0	-2.500
Bus21	10.000	100.000	0.0	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
								LV PCC-00EB01	0.000	0.000	0.0	0.0	-2.500
Bus23	10.000	100.000	0.0	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
Bus24	10.000	100.000	0.0	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
Bus25	10.000	100.000	0.0	0.000	0.000	0.000	0.000	00EM01	0.000	0.000	0.0	0.0	
								LV PCC-00EB02 F	0.000	0.000	0.0	0.0	-2.500
LV PCC-00EB01	0.660	102.564	0.0	0.000	0.000	0.000	0.000	Bus21	0.000	0.000	0.0	0.0	
LV PCC-00EB02 F	0.660	102.564	0.0	0.000	0.000	0.000	0.000	Bus25	0.000	0.000	0.0	0.0	

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

# Indicates a bus with a load mismatch of more than 0.1 MVA

Bus Loading Summary Report

Bus			Directly Connected Load								Total Bus Load			
			Constant kVA		Constant Z		Constant I		Generic					
ID	kV	Rated Amp	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar	MVA	% PF	Amp	Percent Loading
Bus19	10.000													
00EG01	0.380												-	
00EM01	10.000												-	
Bus18	10.000												-	
Bus20	10.000												-	
Bus21	10.000												-	
Bus23	10.000												-	
Bus24	10.000												-	
Bus25	10.000												-	
LV PCC-00EB01	0.660												-	
LV PCC-00EB02 F	0.660												-	

* Indicates operating load of a bus exceeds the bus critical limit (100.0% of the Continuous Ampere rating).
\# Indicates operating load of a bus exceeds the bus marginal limit (95.0% of the Continuous Ampere rating).

Branch Loading Summary Report

CKT / Branch		Busway / Cable & Reactor			Transformer				
						Loading (input)		Loading (output)	
ID	Type	Ampacity (Amp)	Loading Amp	%	Capability (MVA)	MVA	%	MVA	%
Cable2	Cable	414.11	0.00	0.00					
00EC01	Transformer				2.500	0.000	0.0	0.000	0.0
00EC03	Transformer				2.500	0.000	0.0	0.000	0.0
00EC04	Transformer				1.250	0.000	0.0	0.000	0.0

* Indicates a branch with operating load exceeding the branch capability.

Branch Losses Summary Report

Branch ID	From-To Bus Flow		To-From Bus Flow		Losses		% Bus Voltage		Vd % Drop
	MW	Mvar	MW	Mvar	kW	kvar	From	To	in Vmag
00EC01	0.000	0.000	0.000	0.000	0.0	0.0	100.0	102.6	2.56
00EC03	0.000	0.000	0.000	0.000	0.0	0.0	100.0	102.6	2.56
00EC04	0.000	0.000	0.000	0.000	0.0	0.0	102.6	100.0	2.56
Cable2	0.000	0.000	0.000	0.000	0.0	0.0	100.0	100.0	0.00
Cable3	0.000	0.000	0.000	0.000	0.0	0.0	100.0	100.0	0.00
Cable4	0.000	0.000	0.000	0.000			100.0	100.0	0.00
Cable5	0.000	0.000	0.000	0.000			100.0	100.0	0.00
Cable6	0.000	0.000	0.000	0.000	0.0	0.0	100.0	100.0	0.00
Cable7	0.000	0.000	0.000	0.000	0.0	0.0	100.0	100.0	0.00
					0.0	0.0			

* This Transmission Line includes Series Capacitor.

Alert Summary Report

	% Alert Settings	
	Critical	Marginal
Loading		
Bus	100.0	95.0
Cable / Busway	100.0	95.0
Reactor	100.0	95.0
Line	100.0	95.0
Transformer	100.0	95.0
Panel	100.0	95.0
Protective Device	100.0	95.0
Generator	100.0	95.0
Inverter/Charger	100.0	95.0
Bus Voltage		
OverVoltage	105.0	102.0
UnderVoltage	95.0	98.0
Generator Excitation		
OverExcited (Q Max.)	100.0	95.0
UnderExcited (Q Min.)	100.0	

Marginal Report

Device ID	Type	Condition	Rating/Limit	Unit	Operating	% Operating	Phase Type
00EG01	Bus	Over Voltage	0.380	kV	0.390	102.6	3-Phase
LV PCC-00EB01	Bus	Over Voltage	0.660	kV	0.677	102.6	3-Phase
LV PCC-00EB02 F	Bus	Over Voltage	0.660	kV	0.677	102.6	3-Phase

SUMMARY OF TOTAL GENERATION , LOADING & DEMAND

	MW	Mvar	MVA	% PF
Source (Swing Buses):	0.000	0.000	0.000	
Source (Non-Swing Buses):	0.000	0.000	0.000	
Total Demand:	0.000	0.000	0.000	
Total Motor Load:	0.000	0.000	0.000	
Total Static Load:	0.000	0.000	0.000	
Total Constant I Load:	0.000	0.000	0.000	
Total Generic Load:	0.000	0.000	0.000	
Apparent Losses:	0.000	0.000		
System Mismatch:	0.000	0.000		

Number of Iterations: 2

Electrical Transient Analyzer Program

Short-Circuit Analysis

IEC 60909 Standard

3-Phase Fault Currents

	Swing	V-Control	Load	Total
Number of Buses:	2	0	26	28

	XFMR2	XFMR3	Reactor	Line/Cable/ Busway	Impedance	Tie PD	Total
Number of Branches:	7	0	0	6	0	13	26

	Synchronous Generator	Power Grid	Synchronous Motor	Induction Machines	Lumped Load	Total
Number of Machines:	0	2	0	47	22	71

System Frequency:	50.00
Unit System:	Metric
Project Filename:	PAT_TE
Output Filename:	C:\ETAP2102\PAT_TE\ICC.SI1S

Adjustments

Tolerance	Apply Adjustments	Individual /Global	Percent
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable / Busway Length:	No		

Temperature Correction	Apply Adjustments	Individual /Global	Degree C
Transmission Line Resistance:	Yes	Individual	
Cable / Busway Resistance:	Yes	Individual	

Bus Input Data

Bus					Initial Voltage	
ID	Type	Nom. kV	Base kV	Sub-sys	%Mag.	Ang.
00EG01	Load	0.380	0.390	1	100.00	0.00
00EG51	Load	0.380	0.390	1	100.00	0.00
00EG52	Load	0.380	0.390	1	100.00	0.00
00EM01	Load	10.000	10.000	1	100.00	0.00
Bus AREA 40	Load	0.380	0.390	1	100.00	0.00
Bus AREA 50	Load	0.380	0.390	1	100.00	0.00
Bus13	Load	0.660	0.677	1	100.00	0.00
Bus14	Load	0.660	0.677	1	100.00	0.00
Bus15	Load	0.660	0.677	1	100.00	0.00
Bus16	Load	0.660	0.677	1	100.00	0.00
Bus17	Load	0.660	0.677	1	100.00	0.00
Bus18	SWNG	10.000	10.000	1	100.00	0.00
Bus19	SWNG	10.000	10.000	2	100.00	0.00
Bus20	Load	10.000	10.000	1	100.00	0.00
Bus21	Load	10.000	10.000	1	100.00	0.00
Bus23	Load	10.000	10.000	1	100.00	0.00
Bus24	Load	10.000	10.000	1	100.00	0.00
Bus25	Load	10.000	10.000	1	100.00	0.00
LV PCC-00EB01	Load	0.660	0.677	1	100.00	0.00
LV PCC-00EB02 F	Load	0.660	0.677	1	100.00	0.00
MCC 00EB40	Load	0.660	0.677	1	110.00	0.00
MCC 00EB41	Load	0.660	0.677	1	100.00	0.00
MCC 00EB42	Load	0.660	0.677	1	100.00	0.00
MCC 00EB43-	Load	0.660	0.677	1	110.00	0.00
MCC 00EB44-	Load	0.660	0.677	1	110.00	0.00
MCC 00EB45-	Load	0.660	0.677	1	110.00	0.00
MCC 40EB40£	Load	0.660	0.677	1	100.00	0.00
MCC 50EB40	Load	0.660	0.677	1	100.00	0.00

28 Buses Total

All voltages reported by ETAP are in % of bus Nominal kV.
Base kV values of buses are calculated and used internally by ETAP .

Line/Cable/Busway Input Data

Line/Cable/Busway			ohms or siemens/1000 m per Conductor (Cable) or per Phase (Line/Busway)						
			Length						
ID	Library	Size	Adj. (m)	% Tol.	#/Phase	T (°C)	R	X	Y
Cable2	11NCUS1	300	1766.0	0	1	75	0.07630	0.10500	0.0000000
Cable3	10NCUS3	300	30.0	0	1	75	0.07544	0.08300	0.0000000
Cable4	10NCUS3	300	30.0	0	1	75	0.07544	0.08300	0.0000000
Cable5	10NCUS3	300	30.0	0	1	75	0.07544	0.08300	0.0000000
Cable6	10NCUS3	300	30.0	0	1	75	0.07544	0.08300	0.0000000
Cable7	10NCUS3	300	30.0	0	1	75	0.07544	0.08300	0.0000000

Line / Cable / Busway resistances are listed at the specified temperatures.

2-Winding Transformer Input Data

Transformer	Rating					Z Variation			% Tap Setting		Adjusted
ID	MVA	Prim. kV	Sec. kV	% Z	X/R	+ 5%	- 5%	% Tol.	Prim.	Sec.	% Z
00EC01	2.500	10.000	0.660	7.50	6.00	0	0	-1.1	-2.500	0	7.4175
00EC03	2.500	10.000	0.660	7.50	6.00	0	0	-1.1	-2.500	0	7.4175
00EC04	1.250	10.000	0.380	7.00	3.50	0	0	-1.1	-2.500	0	6.9230
00EC51	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000
00EC52	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000
T1 AREA 40	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000
T2 AREA 50	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000

Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVAb			
ID	Type	From Bus	To Bus	R	X	Z	Y
00EC01	2W XFMR	Bus21	LV PCC-00EB01	44.31	265.85	269.51	
00EC03	2W XFMR	Bus25	LV PCC-00EB02 F	44.31	265.85	269.51	
00EC04	2W XFMR	Bus20	00EG01	138.74	485.58	505.01	
00EC51	2W XFMR	MCC 00EB41	00EG51	20627.82	30941.73	37187.34	
00EC52	2W XFMR	MCC 00EB42	00EG52	20627.82	30941.73	37187.34	
T1 AREA 40	2W XFMR	MCC 40EB40£	Bus AREA 40	20627.82	30941.73	37187.34	
T2 AREA 50	2W XFMR	MCC 50EB40	Bus AREA 50	20627.82	30941.73	37187.34	
Cable2	Cable	Bus18	00EM01	13.47	18.54	22.92	
Cable3	Cable	00EM01	Bus25	0.23	0.25	0.34	
Cable4	Cable	00EM01	Bus24	0.23	0.25	0.34	
Cable5	Cable	00EM01	Bus23	0.23	0.25	0.34	
Cable6	Cable	00EM01	Bus21	0.23	0.25	0.34	
Cable7	Cable	00EM01	Bus20	0.23	0.25	0.34	
CB27	Tie Breaker	LV PCC-00EB01	MCC 00EB40				
CB28	Tie Breaker	LV PCC-00EB01	MCC 00EB41				
CB29	Tie Breaker	LV PCC-00EB01	MCC 00EB42				
CB31	Tie Breaker	LV PCC-00EB02 F	MCC 00EB43-				
CB32	Tie Breaker	LV PCC-00EB02 F	MCC 00EB45-				
CB33	Tie Breaker	LV PCC-00EB02 F	MCC 00EB44-				
CB34	Tie Breaker	LV PCC-00EB01	MCC 50EB40				
CB35	Tie Breaker	LV PCC-00EB01	MCC 40EB40£				
CB44	Tie Breaker	MCC 00EB40	Bus13				
CB47	Tie Breaker	MCC 00EB40	Bus15				
CB54	Tie Breaker	MCC 00EB40	Bus17				
CB166	Tie Breaker	MCC 00EB40	Bus14				
CB172	Tie Breaker	MCC 00EB40	Bus16				

Power Grid Input Data

Power Grid	Connected Bus	Rating		% Impedance 100 MVA Base		
ID	ID	MVASC	kV	R	X"	R/X
U1	Bus18	417.753	10.000	1.55514	23.88700	0.07
U2	Bus19	417.753	10.000	1.55514	23.88700	0.07

Total Connected Power Grids (= 2): 835.507 MVA

Induction Machine Input Data

Induction Machine			Connected Bus	Rating					% Impedance (Motor Base)			
ID	Type	Qty	ID	HP/kW	kVA	kV	Amp	PF	R	X"	R/X"	MW/PP
Diesel pump S	Motor	1	00EG52	0.37	0.55	0.380	0.84	82.00	14.11	8.87	1.59	0.00
Hydrogen Peroxide Dosing	Motor	1	Bus AREA 40	0.37	0.56	0.380	0.85	81.00	14.11	8.87	1.59	0.00
A 20 Clarified Acid P	Motor	1	Bus13	110.00	134.50	0.660	117.65	86.00	4.53	16.04	0.28	0.06
CIX Drains P	Motor	1	Bus15	3.00	4.37	0.660	3.83	86.80	10.57	12.88	0.82	0.00
Primary CIX Unit	Motor	1	Bus17	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
Primary cix feed P	Motor	1	MCC 00EB40	110.00	134.50	0.660	117.65	86.00	4.41	16.07	0.27	0.06
Return Acid P	Motor	1	MCC 00EB40	75.00	90.74	0.660	79.38	87.00	4.91	15.93	0.31	0.04
Cloth Wash P	Motor	1	MCC 00EB40	30.00	38.57	0.660	33.74	83.00	10.07	13.28	0.76	0.02
A 20 Sump pump	Motor	1	MCC 00EB40	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
Return acid Tank Agita	Motor	1	MCC 00EB40	30.00	38.57	0.660	33.74	83.00	6.59	15.31	0.43	0.02
Filter cake blower	Motor	1	MCC 00EB40	55.00	65.93	0.660	57.67	88.00	5.54	15.72	0.35	0.03
Primary CIX AIR Blo	Motor	1	MCC 00EB40	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
Clarified Acid Poilishin	Motor	1	MCC 00EB40	7.50	10.00	0.660	8.74	83.00	8.99	14.04	0.64	0.00
A 20 Clarified Acid P24	Motor	1	MCC 00EB43-	110.00	134.50	0.660	117.65	86.00	4.53	16.04	0.28	0.06
Primary cix feed P24	Motor	1	MCC 00EB43-	110.00	134.50	0.660	117.65	86.00	4.41	16.07	0.27	0.06
Return Acid P24	Motor	1	MCC 00EB43-	75.00	90.74	0.660	79.38	87.00	4.91	15.93	0.31	0.04
CIX Drains P24	Motor	1	MCC 00EB43-	3.00	4.37	0.660	3.83	86.80	10.57	12.88	0.82	0.00
Cloth Wash P17	Motor	1	MCC 00EB43-	30.00	38.57	0.660	33.74	83.00	10.07	13.28	0.76	0.02
A 20 Sump pump15	Motor	1	MCC 00EB43-	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
Return acid Tank Agita15	Motor	1	MCC 00EB43-	30.00	38.57	0.660	33.74	83.00	6.59	15.31	0.43	0.02
Filter cake blower15	Motor	1	MCC 00EB43-	55.00	65.93	0.660	57.67	88.00	5.54	15.72	0.35	0.03
Primary CIX AIR Blo24	Motor	1	MCC 00EB43-	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
Mtr28	Motor	1	MCC 00EB43-	7.50	10.00	0.660	8.74	83.00	8.99	14.04	0.64	0.00
Primary CIX Unit15	Motor	1	MCC 00EB43-	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
A 20 Clarified Acid P26	Motor	1	MCC 00EB44-	110.00	134.50	0.660	117.65	86.00	4.53	16.04	0.28	0.06
Primary cix feed P26	Motor	1	MCC 00EB44-	110.00	134.50	0.660	117.65	86.00	4.41	16.07	0.27	0.06
Return Acid P26	Motor	1	MCC 00EB44-	75.00	90.74	0.660	79.38	87.00	4.91	15.93	0.31	0.04
CIX Drains P26	Motor	1	MCC 00EB44-	3.00	4.37	0.660	3.83	86.80	10.57	12.88	0.82	0.00
Cloth Wash P18	Motor	1	MCC 00EB44-	30.00	38.57	0.660	33.74	83.00	10.07	13.28	0.76	0.02
A 20 Sump pump16	Motor	1	MCC 00EB44-	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
Return acid Tank Agita16	Motor	1	MCC 00EB44-	30.00	38.57	0.660	33.74	83.00	6.59	15.31	0.43	0.02
Filter cake blower16	Motor	1	MCC 00EB44-	55.00	65.93	0.660	57.67	88.00	5.54	15.72	0.35	0.03
Primary CIX AIR Blo26	Motor	1	MCC 00EB44-	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
Mtr30	Motor	1	MCC 00EB44-	7.50	10.00	0.660	8.74	83.00	8.99	14.04	0.64	0.00
Primary CIX Unit16	Motor	1	MCC 00EB44-	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
A 20 Clarified Acid P20	Motor	1	MCC 00EB45-	110.00	134.50	0.660	117.65	86.00	4.53	16.04	0.28	0.06
Primary cix feed P20	Motor	1	MCC 00EB45-	110.00	134.50	0.660	117.65	86.00	4.41	16.07	0.27	0.06
Return Acid P20	Motor	1	MCC 00EB45-	75.00	90.74	0.660	79.38	87.00	4.91	15.93	0.31	0.04
CIX Drains P20	Motor	1	MCC 00EB45-	3.00	4.37	0.660	3.83	86.80	10.57	12.88	0.82	0.00

Induction Machine Input Data

Induction Machine			Connected Bus	Rating					% Impedance (Motor Base)			
ID	Type	Qty	ID	HP/kW	kVA	kV	Amp	PF	R	X"	R/X"	MW/PP
Cloth Wash P15	Motor	1	MCC 00EB45-	30.00	38.57	0.660	33.74	83.00	10.07	13.28	0.76	0.02
A 20 Sump pump13	Motor	1	MCC 00EB45-	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
Return acid Tank Agita13	Motor	1	MCC 00EB45-	30.00	38.57	0.660	33.74	83.00	6.59	15.31	0.43	0.02
Filter cake blower13	Motor	1	MCC 00EB45-	55.00	65.93	0.660	57.67	88.00	5.54	15.72	0.35	0.03
Primary CIX AIR Blo20	Motor	1	MCC 00EB45-	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
Mtr25	Motor	1	MCC 00EB45-	7.50	10.00	0.660	8.74	83.00	8.99	14.04	0.64	0.00
Primary CIX Unit13	Motor	1	MCC 00EB45-	4.00	5.51	0.660	4.82	82.00	10.07	13.28	0.76	0.00
Mtr9	Motor	1	MCC 50EB40	255.00	312.12	0.660	273.03	86.00	3.50	16.30	0.21	0.13

Total Connected Induction Machines (= 47): 2448.0 kVA

Lumped Load Input Data

Lumped Load								Motor Loads					
Lumped Load	Connected Bus	Rating			% Load			Loading		% Impedance Machine Base			
ID	ID	kVA	kV	Amp	% PF	MTR	STAT	kW	kvar	R	X"	R/X"	MW/PP
GROUP W NE	MCC 00EB41	68.8	0.660	60.22	82.35	100	0	51.0	35.1	6.46	15.37	0.42	0.06
Lump W NE	MCC 00EB42	184.6	0.660	161.52	84.49	100	0	140.4	88.9	6.46	15.37	0.42	0.16
Lump W NE£	00EG52	0.7	0.380	1.12	79.00	100	0	0.5	0.4	6.46	15.37	0.42	0.00
Lump1 E W	MCC 50EB40	34.1	0.660	29.85	82.00	100	0	25.2	17.6	6.46	15.37	0.42	0.03
Lump1 NE W	MCC 50EB40	41.3	0.660	36.15	82.40	100	0	30.6	21.1	6.46	15.37	0.42	0.03
Lump1 W	00EG51	2.4	0.380	3.61	79.50	100	0	1.7	1.3	6.46	15.37	0.42	0.00
Lump1 W NE	Bus AREA 40	1.8	0.380	2.78	81.00	100	0	1.3	1.0	6.46	15.37	0.42	0.00
Lump2	Bus AREA 50	0.8	0.380	1.17	81.60	100	0	0.6	0.4	6.46	15.37	0.42	0.00
Lump5 W EME	MCC 00EB42	47.9	0.660	41.87	86.00	100	0	37.0	22.0	6.46	15.37	0.42	0.04
Lump7 W EME	MCC 40EB40£	7.6	0.660	6.64	82.00	100	0	5.6	3.9	6.46	15.37	0.42	0.01
Lump7 W NE	MCC 40EB40£	44.9	0.660	39.31	86.00	99	1	34.4	20.4	6.46	15.37	0.42	0.04
LV MCC 30EB40	LV PCC-00EB02 F	195.3	0.660	170.83	87.00	100	0	130.0	73.7	6.46	15.37	0.42	0.17
LV MCC 30EB41	LV PCC-00EB02 F	195.3	0.660	170.83	87.00	100	0	130.0	73.7	6.46	15.37	0.42	0.17
LV MCC 30EB42	LV PCC-00EB02 F	195.3	0.660	170.83	87.00	100	0	130.0	73.7	6.46	15.37	0.42	0.17
LV MCC 40EB41	LV PCC-00EB02 F	54.5	0.660	47.70	85.00	100	0	41.7	25.9	6.46	15.37	0.42	0.05
LV MCC 40EB42	LV PCC-00EB02 F	54.5	0.660	47.70	85.00	100	0	41.7	25.9	6.46	15.37	0.42	0.05
LV MCC 40EB43	LV PCC-00EB02 F	54.5	0.660	47.70	85.00	100	0	41.7	25.9	6.46	15.37	0.42	0.05
MLDB EME	00EG01	41.6	0.380	63.17	100.00	100	0	37.4	0.0	6.46	15.37	0.42	0.04
MLDB W NE 1	00EG01	434.0	0.380	659.39	100.00	80	20	312.5	0.0	6.46	15.37	0.42	0.35
MLDB W NE 2	00EG01	339.5	0.380	515.82	83.80	100	0	256.1	166.7	6.46	15.37	0.42	0.28
Secondary Regen Filtr Pac	MCC 00EB41	240.6	0.660	210.45	86.00	100	0	186.2	110.5	6.46	15.37	0.42	0.21
Spent Solution Filtr Pack	MCC 00EB41	171.1	0.660	149.72	87.00	100	0	134.0	75.9	6.46	15.37	0.42	0.15

Total Connected Lumped Loads (= 22): 2411.3 kVA

SHORT-CIRCUIT REPORT

3-Phase fault at bus: **00EG01**

Nominal kV	=	0.380	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	68.733	kA Method C
Steady State	=	27.445	kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
00EG01	Total	0.00	10.398	-32.971	3.2	34.572
Bus20	00EG01	94.22	7.698	-26.545	3.4	27.638
MLDB EME	00EG01	105.00	0.154	-0.367	2.4	0.398
MLDB W NE 1	00EG01	105.00	1.287	-3.064	2.4	3.323
MLDB W NE 2	00EG01	105.00	1.259	-2.996	2.4	3.250
00EM01	Bus20	94.28	0.300	-1.035	3.4	1.077

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	33.770	38.534	18.559
0.02	33.093	33.858	7.156
0.03	32.435	32.551	2.738
0.04	31.803	31.821	1.047
0.05	31.201	31.204	0.407
0.06	30.912	30.912	0.156
0.07	30.630	30.630	0.060
0.08	30.355	30.355	0.023
0.09	30.089	30.089	0.009
0.10	29.830	29.830	0.003
0.15	29.322	29.322	0.000
0.20	28.841	28.841	0.000
0.25	28.391	28.391	0.000
0.30	28.391	28.391	0.000

3-Phase fault at bus: **00EM01**

Nominal kV	=	10.000	
Voltage c Factor	=	1.10	(User-Defined)
Peak Value	=	28.937	kA Method C
Steady State	=	13.421	kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
00EM01	Total	0.00	4.754	-14.075	3.0	14.856
Bus18	00EM01	53.28	4.307	-12.711	3.0	13.421
Bus25	00EM01	0.04	0.202	-0.642	3.2	0.673
Bus24	00EM01	0.00	0.000	0.000	999.9	0.000
Bus23	00EM01	0.00	0.000	0.000	999.9	0.000
Bus21	00EM01	0.03	0.159	-0.502	3.2	0.526
Bus20	00EM01	0.01	0.087	-0.221	2.5	0.237
U1	Bus18	110.00	4.307	-12.711	3.0	13.421
LV PCC-00EB02 F	Bus25	32.25	0.202	-0.642	3.2	0.673
LV PCC-00EB01	Bus21	25.22	0.159	-0.502	3.2	0.526
00EG01	Bus20	21.29	0.087	-0.221	2.5	0.237

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	14.589	16.323	7.322
0.02	14.489	14.715	2.570
0.03	14.391	14.419	0.899
0.04	14.296	14.299	0.314
0.05	14.205	14.206	0.111
0.06	14.161	14.161	0.039
0.07	14.117	14.117	0.014
0.08	14.074	14.074	0.005
0.09	14.033	14.033	0.002
0.10	13.992	13.992	0.001
0.15	13.917	13.917	0.000
0.20	13.845	13.845	0.000
0.25	13.778	13.778	0.000
0.30	13.778	13.778	0.000

3-Phase fault at bus: **LV PCC-00EB01**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
LV PCC-00EB01	Total	0.00	8.366	-36.082	4.3	37.040
Bus21	LV PCC-00EB01	87.98	5.215	-27.348	5.2	27.841
Bus AREA 40	MCC 40EB40£	5.39	0.006	-0.010	1.7	0.012
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Lump7 W NE	MCC 40EB40£	105.00	0.095	-0.226	2.4	0.245
Bus AREA 50	MCC 50EB40	1.87	0.002	-0.004	2.4	0.004
Mtr9	MCC 50EB40	105.00	0.361	-1.682	4.7	1.720
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
Lump1 NE W	MCC 50EB40	105.00	0.088	-0.210	2.4	0.228
00EG52	MCC 00EB42	2.94	0.004	-0.005	1.3	0.007
Lump W NE	MCC 00EB42	105.00	0.394	-0.938	2.4	1.018
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	5.55	0.005	-0.011	2.3	0.012
GROUP W NE	MCC 00EB41	105.00	0.147	-0.350	2.4	0.379
Secondary Regen Filtr Pac	MCC 00EB41	105.00	0.514	-1.222	2.4	1.326
Spent Solution Filtr Pack	MCC 00EB41	105.00	0.365	-0.870	2.4	0.943
Primary cix feed P	MCC 00EB40	105.00	0.196	-0.715	3.6	0.741
Return Acid P	MCC 00EB40	105.00	0.147	-0.478	3.2	0.500
Cloth Wash P	MCC 00EB40	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Filter cake blower	MCC 00EB40	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Clarified Acid Poilishin	MCC 00EB40	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit	Bus17	105.00	0.018	-0.024	1.3	0.030
CIX Drains P	Bus15	105.00	0.015	-0.019	1.2	0.024
A 20 Clarified Acid P	Bus13	105.00	0.202	-0.713	3.5	0.741
00EM01	Bus21	88.07	0.353	-1.851	5.2	1.885
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Lump1 W NE	Bus AREA 40	105.00	0.006	-0.015	2.4	0.017

(Cont.)

3-Phase fault at bus: **LV PCC-00EB01**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
Lump2	Bus AREA 50	105.00	0.003	-0.007	2.4	0.007
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Lump W NE£	00EG52	105.00	0.003	-0.006	2.4	0.007
Lump1 W	00EG51	105.00	0.009	-0.020	2.3	0.022
Bus13	MCC 00EB40	0.00	0.202	-0.713	3.5	0.741
MCC 00EB40	Bus14	0.00	0.000	0.000	9999.0	0.000
Bus15	MCC 00EB40	0.00	0.015	-0.019	1.2	0.024
MCC 00EB40	Bus16	0.00	0.000	0.000	9999.0	0.000
Bus17	MCC 00EB40	0.00	0.018	-0.024	1.3	0.030
MCC 00EB40	LV PCC-00EB01	0.00	0.979	-2.751	2.8	2.920
MCC 00EB41	LV PCC-00EB01	0.00	1.031	-2.453	2.4	2.661
MCC 00EB42	LV PCC-00EB01	0.00	0.500	-1.186	2.4	1.288
MCC 50EB40	LV PCC-00EB01	0.00	0.524	-2.069	4.0	2.134
MCC 40EB40£	LV PCC-00EB01	0.00	0.117	-0.275	2.3	0.299

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	34.691	43.812	26.760
0.02	33.834	36.701	14.220
0.03	33.008	33.829	7.409
0.04	32.218	32.448	3.861
0.05	31.470	31.539	2.093
0.06	31.105	31.125	1.099
0.07	30.751	30.756	0.577
0.08	30.407	30.409	0.303
0.09	30.074	30.074	0.159
0.10	29.751	29.752	0.087
0.15	29.163	29.163	0.004
0.20	28.609	28.609	0.000

(Cont.)

3-Phase fault at bus: **LV PCC-00EB01**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	79.982	kA Method C
Steady State	=	27.579	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.25	28.092	28.092	0.000
0.30	28.092	28.092	0.000

3-Phase fault at bus: **LV PCC-00EB02 F**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 86.587 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
LV PCC-00EB02 F	Total	0.00	9.750	-39.368	4.0	40.557
Bus25	LV PCC-00EB02 F	87.85	5.214	-27.308	5.2	27.801
LV MCC 30EB40	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 30EB41	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 30EB42	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 40EB41	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
LV MCC 40EB42	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
LV MCC 40EB43	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
A 20 Clarified Acid P26	MCC 00EB44-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P26	MCC 00EB44-	105.00	0.196	-0.715	3.6	0.741
Return Acid P26	MCC 00EB44-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P26	MCC 00EB44-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P18	MCC 00EB44-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump16	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower16	MCC 00EB44-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo26	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030
Mtr30	MCC 00EB44-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit16	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030
A 20 Clarified Acid P20	MCC 00EB45-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P20	MCC 00EB45-	105.00	0.196	-0.715	3.6	0.741
Return Acid P20	MCC 00EB45-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P20	MCC 00EB45-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P15	MCC 00EB45-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump13	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower13	MCC 00EB45-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo20	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030
Mtr25	MCC 00EB45-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit13	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030

(Cont.)

3-Phase fault at bus: **LV PCC-00EB02 F**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 86.587 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
A 20 Clarified Acid P24	MCC 00EB43-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P24	MCC 00EB43-	105.00	0.196	-0.715	3.6	0.741
Return Acid P24	MCC 00EB43-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P24	MCC 00EB43-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P17	MCC 00EB43-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump15	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower15	MCC 00EB43-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo24	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
Mtr28	MCC 00EB43-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit15	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
00EM01	Bus25	87.94	0.353	-1.849	5.2	1.882
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.979	-2.751	2.8	2.920
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.979	-2.751	2.8	2.920
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.979	-2.751	2.8	2.920

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	36.735	46.436	28.406
0.02	35.565	38.527	14.814
0.03	34.438	35.251	7.529
0.04	33.364	33.582	3.826
0.05	32.349	32.414	2.053
0.06	31.852	31.870	1.055
0.07	31.370	31.374	0.542
0.08	30.902	30.903	0.278
0.09	30.449	30.449	0.143
0.10	30.011	30.011	0.077
0.15	29.233	29.233	0.003

(Cont.)

3-Phase fault at bus: **LV PCC-00EB02 F**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	86.587	kA Method C
Steady State	=	27.579	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.20	28.502	28.502	0.000
0.25	27.821	27.821	0.000
0.30	27.821	27.821	0.000

3-Phase fault at bus: **MCC 00EB40**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB40	Total	0.00	8.366	-36.082	4.3	37.040
Primary cix feed P	MCC 00EB40	105.00	0.196	-0.715	3.6	0.741
Return Acid P	MCC 00EB40	105.00	0.147	-0.478	3.2	0.500
Cloth Wash P	MCC 00EB40	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Filter cake blower	MCC 00EB40	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Clarified Acid Poilishin	MCC 00EB40	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit	Bus17	105.00	0.018	-0.024	1.3	0.030
CIX Drains P	Bus15	105.00	0.015	-0.019	1.2	0.024
A 20 Clarified Acid P	Bus13	105.00	0.202	-0.713	3.5	0.741
Bus21	LV PCC-00EB01	87.98	5.215	-27.348	5.2	27.841
Bus AREA 40	MCC 40EB40£	5.39	0.006	-0.010	1.7	0.012
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Lump7 W NE	MCC 40EB40£	105.00	0.095	-0.226	2.4	0.245
Bus AREA 50	MCC 50EB40	1.87	0.002	-0.004	2.4	0.004
Mtr9	MCC 50EB40	105.00	0.361	-1.682	4.7	1.720
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
Lump1 NE W	MCC 50EB40	105.00	0.088	-0.210	2.4	0.228
00EG52	MCC 00EB42	2.94	0.004	-0.005	1.3	0.007
Lump W NE	MCC 00EB42	105.00	0.394	-0.938	2.4	1.018
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	5.55	0.005	-0.011	2.3	0.012
GROUP W NE	MCC 00EB41	105.00	0.147	-0.350	2.4	0.379
Secondary Regen Filtr Pac	MCC 00EB41	105.00	0.514	-1.222	2.4	1.326
Spent Solution Filtr Pack	MCC 00EB41	105.00	0.365	-0.870	2.4	0.943
00EM01	Bus21	88.07	0.353	-1.851	5.2	1.885
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Lump1 W NE	Bus AREA 40	105.00	0.006	-0.015	2.4	0.017

(Cont.)

3-Phase fault at bus: **MCC 00EB40**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
Lump2	Bus AREA 50	105.00	0.003	-0.007	2.4	0.007
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Lump W NE£	00EG52	105.00	0.003	-0.006	2.4	0.007
Lump1 W	00EG51	105.00	0.009	-0.020	2.3	0.022
Bus13	MCC 00EB40	0.00	0.202	-0.713	3.5	0.741
MCC 00EB40	Bus14	0.00	0.000	0.000	9999.0	0.000
Bus15	MCC 00EB40	0.00	0.015	-0.019	1.2	0.024
MCC 00EB40	Bus16	0.00	0.000	0.000	9999.0	0.000
Bus17	MCC 00EB40	0.00	0.018	-0.024	1.3	0.030
LV PCC-00EB01	MCC 00EB40	0.00	7.387	-33.332	4.5	34.140
MCC 00EB41	LV PCC-00EB01	0.00	1.031	-2.453	2.4	2.661
MCC 00EB42	LV PCC-00EB01	0.00	0.500	-1.186	2.4	1.288
MCC 50EB40	LV PCC-00EB01	0.00	0.524	-2.069	4.0	2.134
MCC 40EB40£	LV PCC-00EB01	0.00	0.117	-0.275	2.3	0.299

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	34.691	43.812	26.760
0.02	33.834	36.701	14.220
0.03	33.008	33.829	7.409
0.04	32.218	32.448	3.861
0.05	31.470	31.539	2.093
0.06	31.105	31.125	1.099
0.07	30.751	30.756	0.577
0.08	30.407	30.409	0.303
0.09	30.074	30.074	0.159
0.10	29.751	29.752	0.087
0.15	29.163	29.163	0.004
0.20	28.609	28.609	0.000

(Cont.)

3-Phase fault at bus: **MCC 00EB40**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	79.982	kA Method C
Steady State	=	27.579	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.25	28.092	28.092	0.000
0.30	28.092	28.092	0.000

3-Phase fault at bus: **MCC 00EB41**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB41	Total	0.00	8.366	-36.082	4.3	37.040
00EG51	MCC 00EB41	5.55	0.005	-0.011	2.3	0.012
GROUP W NE	MCC 00EB41	105.00	0.147	-0.350	2.4	0.379
Secondary Regen Filtr Pac	MCC 00EB41	105.00	0.514	-1.222	2.4	1.326
Spent Solution Filtr Pack	MCC 00EB41	105.00	0.365	-0.870	2.4	0.943
Bus21	LV PCC-00EB01	87.98	5.215	-27.348	5.2	27.841
Bus AREA 40	MCC 40EB40£	5.39	0.006	-0.010	1.7	0.012
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Lump7 W NE	MCC 40EB40£	105.00	0.095	-0.226	2.4	0.245
Bus AREA 50	MCC 50EB40	1.87	0.002	-0.004	2.4	0.004
Mtr9	MCC 50EB40	105.00	0.361	-1.682	4.7	1.720
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
Lump1 NE W	MCC 50EB40	105.00	0.088	-0.210	2.4	0.228
00EG52	MCC 00EB42	2.94	0.004	-0.005	1.3	0.007
Lump W NE	MCC 00EB42	105.00	0.394	-0.938	2.4	1.018
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
Primary cix feed P	MCC 00EB40	105.00	0.196	-0.715	3.6	0.741
Return Acid P	MCC 00EB40	105.00	0.147	-0.478	3.2	0.500
Cloth Wash P	MCC 00EB40	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Filter cake blower	MCC 00EB40	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Clarified Acid Poilishin	MCC 00EB40	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit	Bus17	105.00	0.018	-0.024	1.3	0.030
CIX Drains P	Bus15	105.00	0.015	-0.019	1.2	0.024
A 20 Clarified Acid P	Bus13	105.00	0.202	-0.713	3.5	0.741
Lump1 W	00EG51	105.00	0.009	-0.020	2.3	0.022
00EM01	Bus21	88.07	0.353	-1.851	5.2	1.885
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005

(Cont.)

3-Phase fault at bus: **MCC 00EB41**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
Lump1 W NE	Bus AREA 40	105.00	0.006	-0.015	2.4	0.017
Lump2	Bus AREA 50	105.00	0.003	-0.007	2.4	0.007
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Lump W NE£	00EG52	105.00	0.003	-0.006	2.4	0.007
Bus13	MCC 00EB40	0.00	0.202	-0.713	3.5	0.741
MCC 00EB40	Bus14	0.00	0.000	0.000	9999.0	0.000
Bus15	MCC 00EB40	0.00	0.015	-0.019	1.2	0.024
MCC 00EB40	Bus16	0.00	0.000	0.000	9999.0	0.000
Bus17	MCC 00EB40	0.00	0.018	-0.024	1.3	0.030
MCC 00EB40	LV PCC-00EB01	0.00	0.979	-2.751	2.8	2.920
LV PCC-00EB01	MCC 00EB41	0.00	7.335	-33.629	4.6	34.420
MCC 00EB42	LV PCC-00EB01	0.00	0.500	-1.186	2.4	1.288
MCC 50EB40	LV PCC-00EB01	0.00	0.524	-2.069	4.0	2.134
MCC 40EB40£	LV PCC-00EB01	0.00	0.117	-0.275	2.3	0.299

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	34.691	43.812	26.760
0.02	33.834	36.701	14.220
0.03	33.008	33.829	7.409
0.04	32.218	32.448	3.861
0.05	31.470	31.539	2.093
0.06	31.105	31.125	1.099
0.07	30.751	30.756	0.577
0.08	30.407	30.409	0.303
0.09	30.074	30.074	0.159
0.10	29.751	29.752	0.087
0.15	29.163	29.163	0.004
0.20	28.609	28.609	0.000

(Cont.)

3-Phase fault at bus: **MCC 00EB41**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	79.982	kA Method C
Steady State	=	27.579	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.25	28.092	28.092	0.000
0.30	28.092	28.092	0.000

3-Phase fault at bus: **MCC 00EB42**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB42	Total	0.00	8.366	-36.082	4.3	37.040
00EG52	MCC 00EB42	2.94	0.004	-0.005	1.3	0.007
Lump W NE	MCC 00EB42	105.00	0.394	-0.938	2.4	1.018
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
Bus21	LV PCC-00EB01	87.98	5.215	-27.348	5.2	27.841
Bus AREA 40	MCC 40EB40£	5.39	0.006	-0.010	1.7	0.012
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Lump7 W NE	MCC 40EB40£	105.00	0.095	-0.226	2.4	0.245
Bus AREA 50	MCC 50EB40	1.87	0.002	-0.004	2.4	0.004
Mtr9	MCC 50EB40	105.00	0.361	-1.682	4.7	1.720
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
Lump1 NE W	MCC 50EB40	105.00	0.088	-0.210	2.4	0.228
00EG51	MCC 00EB41	5.55	0.005	-0.011	2.3	0.012
GROUP W NE	MCC 00EB41	105.00	0.147	-0.350	2.4	0.379
Secondary Regen Filtr Pac	MCC 00EB41	105.00	0.514	-1.222	2.4	1.326
Spent Solution Filtr Pack	MCC 00EB41	105.00	0.365	-0.870	2.4	0.943
Primary cix feed P	MCC 00EB40	105.00	0.196	-0.715	3.6	0.741
Return Acid P	MCC 00EB40	105.00	0.147	-0.478	3.2	0.500
Cloth Wash P	MCC 00EB40	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Filter cake blower	MCC 00EB40	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Clarified Acid Poilishin	MCC 00EB40	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit	Bus17	105.00	0.018	-0.024	1.3	0.030
CIX Drains P	Bus15	105.00	0.015	-0.019	1.2	0.024
A 20 Clarified Acid P	Bus13	105.00	0.202	-0.713	3.5	0.741
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Lump W NE£	00EG52	105.00	0.003	-0.006	2.4	0.007
00EM01	Bus21	88.07	0.353	-1.851	5.2	1.885

(Cont.)

3-Phase fault at bus: **MCC 00EB42**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Lump1 W NE	Bus AREA 40	105.00	0.006	-0.015	2.4	0.017
Lump2	Bus AREA 50	105.00	0.003	-0.007	2.4	0.007
Lump1 W	00EG51	105.00	0.009	-0.020	2.3	0.022
Bus13	MCC 00EB40	0.00	0.202	-0.713	3.5	0.741
MCC 00EB40	Bus14	0.00	0.000	0.000	9999.0	0.000
Bus15	MCC 00EB40	0.00	0.015	-0.019	1.2	0.024
MCC 00EB40	Bus16	0.00	0.000	0.000	9999.0	0.000
Bus17	MCC 00EB40	0.00	0.018	-0.024	1.3	0.030
MCC 00EB40	LV PCC-00EB01	0.00	0.979	-2.751	2.8	2.920
MCC 00EB41	LV PCC-00EB01	0.00	1.031	-2.453	2.4	2.661
LV PCC-00EB01	MCC 00EB42	0.00	7.865	-34.896	4.4	35.771
MCC 50EB40	LV PCC-00EB01	0.00	0.524	-2.069	4.0	2.134
MCC 40EB40£	LV PCC-00EB01	0.00	0.117	-0.275	2.3	0.299

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	34.691	43.812	26.760
0.02	33.834	36.701	14.220
0.03	33.008	33.829	7.409
0.04	32.218	32.448	3.861
0.05	31.470	31.539	2.093
0.06	31.105	31.125	1.099
0.07	30.751	30.756	0.577
0.08	30.407	30.409	0.303
0.09	30.074	30.074	0.159
0.10	29.751	29.752	0.087
0.15	29.163	29.163	0.004
0.20	28.609	28.609	0.000

(Cont.)

3-Phase fault at bus: **MCC 00EB42**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	79.982	kA Method C
Steady State	=	27.579	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.25	28.092	28.092	0.000
0.30	28.092	28.092	0.000

3-Phase fault at bus: **MCC 00EB43-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 86.587 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB43-	Total	0.00	9.750	-39.368	4.0	40.557
A 20 Clarified Acid P24	MCC 00EB43-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P24	MCC 00EB43-	105.00	0.196	-0.715	3.6	0.741
Return Acid P24	MCC 00EB43-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P24	MCC 00EB43-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P17	MCC 00EB43-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump15	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower15	MCC 00EB43-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo24	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
Mtr28	MCC 00EB43-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit15	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
Bus25	LV PCC-00EB02 F	87.85	5.214	-27.308	5.2	27.801
LV MCC 30EB40	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 30EB41	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 30EB42	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 40EB41	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
LV MCC 40EB42	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
LV MCC 40EB43	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
A 20 Clarified Acid P26	MCC 00EB44-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P26	MCC 00EB44-	105.00	0.196	-0.715	3.6	0.741
Return Acid P26	MCC 00EB44-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P26	MCC 00EB44-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P18	MCC 00EB44-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump16	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower16	MCC 00EB44-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo26	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030
Mtr30	MCC 00EB44-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit16	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030

(Cont.)

3-Phase fault at bus: **MCC 00EB43-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 86.587 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
A 20 Clarified Acid P20	MCC 00EB45-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P20	MCC 00EB45-	105.00	0.196	-0.715	3.6	0.741
Return Acid P20	MCC 00EB45-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P20	MCC 00EB45-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P15	MCC 00EB45-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump13	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower13	MCC 00EB45-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo20	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030
Mtr25	MCC 00EB45-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit13	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030
00EM01	Bus25	87.94	0.353	-1.849	5.2	1.882
LV PCC-00EB02 F	MCC 00EB43-	0.00	8.771	-36.617	4.2	37.653
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.979	-2.751	2.8	2.920
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.979	-2.751	2.8	2.920

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	36.735	46.436	28.406
0.02	35.565	38.527	14.814
0.03	34.438	35.251	7.529
0.04	33.364	33.582	3.826
0.05	32.349	32.414	2.053
0.06	31.852	31.870	1.055
0.07	31.370	31.374	0.542
0.08	30.902	30.903	0.278
0.09	30.449	30.449	0.143
0.10	30.011	30.011	0.077
0.15	29.233	29.233	0.003

(Cont.)

3-Phase fault at bus: **MCC 00EB43-**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	86.587	kA Method C
Steady State	=	27.579	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.20	28.502	28.502	0.000
0.25	27.821	27.821	0.000
0.30	27.821	27.821	0.000

3-Phase fault at bus: **MCC 00EB44-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 86.587 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB44-	Total	0.00	9.750	-39.368	4.0	40.557
A 20 Clarified Acid P26	MCC 00EB44-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P26	MCC 00EB44-	105.00	0.196	-0.715	3.6	0.741
Return Acid P26	MCC 00EB44-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P26	MCC 00EB44-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P18	MCC 00EB44-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump16	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower16	MCC 00EB44-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo26	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030
Mtr30	MCC 00EB44-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit16	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030
Bus25	LV PCC-00EB02 F	87.85	5.214	-27.308	5.2	27.801
LV MCC 30EB40	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 30EB41	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 30EB42	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 40EB41	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
LV MCC 40EB42	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
LV MCC 40EB43	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
A 20 Clarified Acid P20	MCC 00EB45-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P20	MCC 00EB45-	105.00	0.196	-0.715	3.6	0.741
Return Acid P20	MCC 00EB45-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P20	MCC 00EB45-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P15	MCC 00EB45-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump13	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower13	MCC 00EB45-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo20	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030
Mtr25	MCC 00EB45-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit13	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030

(Cont.)

3-Phase fault at bus: **MCC 00EB44-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 86.587 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
A 20 Clarified Acid P24	MCC 00EB43-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P24	MCC 00EB43-	105.00	0.196	-0.715	3.6	0.741
Return Acid P24	MCC 00EB43-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P24	MCC 00EB43-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P17	MCC 00EB43-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump15	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower15	MCC 00EB43-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo24	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
Mtr28	MCC 00EB43-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit15	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
00EM01	Bus25	87.94	0.353	-1.849	5.2	1.882
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.979	-2.751	2.8	2.920
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.979	-2.751	2.8	2.920
LV PCC-00EB02 F	MCC 00EB44-	0.00	8.771	-36.617	4.2	37.653

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	36.735	46.436	28.406
0.02	35.565	38.527	14.814
0.03	34.438	35.251	7.529
0.04	33.364	33.582	3.826
0.05	32.349	32.414	2.053
0.06	31.852	31.870	1.055
0.07	31.370	31.374	0.542
0.08	30.902	30.903	0.278
0.09	30.449	30.449	0.143
0.10	30.011	30.011	0.077
0.15	29.233	29.233	0.003

(Cont.)

3-Phase fault at bus: **MCC 00EB44-**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	86.587	kA Method C
Steady State	=	27.579	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.20	28.502	28.502	0.000
0.25	27.821	27.821	0.000
0.30	27.821	27.821	0.000

3-Phase fault at bus: **MCC 00EB45-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 86.587 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB45-	Total	0.00	9.750	-39.368	4.0	40.557
A 20 Clarified Acid P20	MCC 00EB45-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P20	MCC 00EB45-	105.00	0.196	-0.715	3.6	0.741
Return Acid P20	MCC 00EB45-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P20	MCC 00EB45-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P15	MCC 00EB45-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump13	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower13	MCC 00EB45-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo20	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030
Mtr25	MCC 00EB45-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit13	MCC 00EB45-	105.00	0.018	-0.024	1.3	0.030
Bus25	LV PCC-00EB02 F	87.85	5.214	-27.308	5.2	27.801
LV MCC 30EB40	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 30EB41	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 30EB42	LV PCC-00EB02 F	105.00	0.417	-0.992	2.4	1.076
LV MCC 40EB41	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
LV MCC 40EB42	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
LV MCC 40EB43	LV PCC-00EB02 F	105.00	0.116	-0.277	2.4	0.301
A 20 Clarified Acid P26	MCC 00EB44-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P26	MCC 00EB44-	105.00	0.196	-0.715	3.6	0.741
Return Acid P26	MCC 00EB44-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P26	MCC 00EB44-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P18	MCC 00EB44-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump16	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower16	MCC 00EB44-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo26	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030
Mtr30	MCC 00EB44-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit16	MCC 00EB44-	105.00	0.018	-0.024	1.3	0.030

(Cont.)

3-Phase fault at bus: **MCC 00EB45-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 86.587 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
A 20 Clarified Acid P24	MCC 00EB43-	105.00	0.202	-0.713	3.5	0.741
Primary cix feed P24	MCC 00EB43-	105.00	0.196	-0.715	3.6	0.741
Return Acid P24	MCC 00EB43-	105.00	0.147	-0.478	3.2	0.500
CIX Drains P24	MCC 00EB43-	105.00	0.015	-0.019	1.2	0.024
Cloth Wash P17	MCC 00EB43-	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump15	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
Filter cake blower15	MCC 00EB43-	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo24	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
Mtr28	MCC 00EB43-	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit15	MCC 00EB43-	105.00	0.018	-0.024	1.3	0.030
00EM01	Bus25	87.94	0.353	-1.849	5.2	1.882
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.979	-2.751	2.8	2.920
LV PCC-00EB02 F	MCC 00EB45-	0.00	8.771	-36.617	4.2	37.653
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.979	-2.751	2.8	2.920

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	36.735	46.436	28.406
0.02	35.565	38.527	14.814
0.03	34.438	35.251	7.529
0.04	33.364	33.582	3.826
0.05	32.349	32.414	2.053
0.06	31.852	31.870	1.055
0.07	31.370	31.374	0.542
0.08	30.902	30.903	0.278
0.09	30.449	30.449	0.143
0.10	30.011	30.011	0.077
0.15	29.233	29.233	0.003

(Cont.)

3-Phase fault at bus: **MCC 00EB45-**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	86.587	kA Method C
Steady State	=	27.579	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.20	28.502	28.502	0.000
0.25	27.821	27.821	0.000
0.30	27.821	27.821	0.000

3-Phase fault at bus: **MCC 40EB40£**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 40EB40£	Total	0.00	8.366	-36.082	4.3	37.040
Bus AREA 40	MCC 40EB40£	5.39	0.006	-0.010	1.7	0.012
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Lump7 W NE	MCC 40EB40£	105.00	0.095	-0.226	2.4	0.245
Bus21	LV PCC-00EB01	87.98	5.215	-27.348	5.2	27.841
Bus AREA 50	MCC 50EB40	1.87	0.002	-0.004	2.4	0.004
Mtr9	MCC 50EB40	105.00	0.361	-1.682	4.7	1.720
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
Lump1 NE W	MCC 50EB40	105.00	0.088	-0.210	2.4	0.228
00EG52	MCC 00EB42	2.94	0.004	-0.005	1.3	0.007
Lump W NE	MCC 00EB42	105.00	0.394	-0.938	2.4	1.018
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	5.55	0.005	-0.011	2.3	0.012
GROUP W NE	MCC 00EB41	105.00	0.147	-0.350	2.4	0.379
Secondary Regen Filtr Pac	MCC 00EB41	105.00	0.514	-1.222	2.4	1.326
Spent Solution Filtr Pack	MCC 00EB41	105.00	0.365	-0.870	2.4	0.943
Primary cix feed P	MCC 00EB40	105.00	0.196	-0.715	3.6	0.741
Return Acid P	MCC 00EB40	105.00	0.147	-0.478	3.2	0.500
Cloth Wash P	MCC 00EB40	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Filter cake blower	MCC 00EB40	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Clarified Acid Poilishin	MCC 00EB40	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit	Bus17	105.00	0.018	-0.024	1.3	0.030
CIX Drains P	Bus15	105.00	0.015	-0.019	1.2	0.024
A 20 Clarified Acid P	Bus13	105.00	0.202	-0.713	3.5	0.741
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Lump1 W NE	Bus AREA 40	105.00	0.006	-0.015	2.4	0.017
00EM01	Bus21	88.07	0.353	-1.851	5.2	1.885

(Cont.)

3-Phase fault at bus: **MCC 40EB40£**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
Lump2	Bus AREA 50	105.00	0.003	-0.007	2.4	0.007
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Lump W NE£	00EG52	105.00	0.003	-0.006	2.4	0.007
Lump1 W	00EG51	105.00	0.009	-0.020	2.3	0.022
Bus13	MCC 00EB40	0.00	0.202	-0.713	3.5	0.741
MCC 00EB40	Bus14	0.00	0.000	0.000	9999.0	0.000
Bus15	MCC 00EB40	0.00	0.015	-0.019	1.2	0.024
MCC 00EB40	Bus16	0.00	0.000	0.000	9999.0	0.000
Bus17	MCC 00EB40	0.00	0.018	-0.024	1.3	0.030
MCC 00EB40	LV PCC-00EB01	0.00	0.979	-2.751	2.8	2.920
MCC 00EB41	LV PCC-00EB01	0.00	1.031	-2.453	2.4	2.661
MCC 00EB42	LV PCC-00EB01	0.00	0.500	-1.186	2.4	1.288
MCC 50EB40	LV PCC-00EB01	0.00	0.524	-2.069	4.0	2.134
LV PCC-00EB01	MCC 40EB40£	0.00	8.248	-35.808	4.3	36.745

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	34.691	43.812	26.760
0.02	33.834	36.701	14.220
0.03	33.008	33.829	7.409
0.04	32.218	32.448	3.861
0.05	31.470	31.539	2.093
0.06	31.105	31.125	1.099
0.07	30.751	30.756	0.577
0.08	30.407	30.409	0.303
0.09	30.074	30.074	0.159
0.10	29.751	29.752	0.087
0.15	29.163	29.163	0.004
0.20	28.609	28.609	0.000

(Cont.)

3-Phase fault at bus: **MCC 40EB40£**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	79.982	kA Method C
Steady State	=	27.579	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.25	28.092	28.092	0.000
0.30	28.092	28.092	0.000

3-Phase fault at bus: **MCC 50EB40**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 50EB40	Total	0.00	8.366	-36.082	4.3	37.040
Bus AREA 50	MCC 50EB40	1.87	0.002	-0.004	2.4	0.004
Mtr9	MCC 50EB40	105.00	0.361	-1.682	4.7	1.720
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
Lump1 NE W	MCC 50EB40	105.00	0.088	-0.210	2.4	0.228
Bus21	LV PCC-00EB01	87.98	5.215	-27.348	5.2	27.841
Bus AREA 40	MCC 40EB40£	5.39	0.006	-0.010	1.7	0.012
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Lump7 W NE	MCC 40EB40£	105.00	0.095	-0.226	2.4	0.245
00EG52	MCC 00EB42	2.94	0.004	-0.005	1.3	0.007
Lump W NE	MCC 00EB42	105.00	0.394	-0.938	2.4	1.018
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	5.55	0.005	-0.011	2.3	0.012
GROUP W NE	MCC 00EB41	105.00	0.147	-0.350	2.4	0.379
Secondary Regen Filtr Pac	MCC 00EB41	105.00	0.514	-1.222	2.4	1.326
Spent Solution Filtr Pack	MCC 00EB41	105.00	0.365	-0.870	2.4	0.943
Primary cix feed P	MCC 00EB40	105.00	0.196	-0.715	3.6	0.741
Return Acid P	MCC 00EB40	105.00	0.147	-0.478	3.2	0.500
Cloth Wash P	MCC 00EB40	105.00	0.129	-0.169	1.3	0.213
A 20 Sump pump	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Filter cake blower	MCC 00EB40	105.00	0.121	-0.343	2.8	0.363
Primary CIX AIR Blo	MCC 00EB40	105.00	0.018	-0.024	1.3	0.030
Clarified Acid Poilishin	MCC 00EB40	105.00	0.030	-0.046	1.6	0.055
Primary CIX Unit	Bus17	105.00	0.018	-0.024	1.3	0.030
CIX Drains P	Bus15	105.00	0.015	-0.019	1.2	0.024
A 20 Clarified Acid P	Bus13	105.00	0.202	-0.713	3.5	0.741
Lump2	Bus AREA 50	105.00	0.003	-0.007	2.4	0.007
00EM01	Bus21	88.07	0.353	-1.851	5.2	1.885
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005

(Cont.)

3-Phase fault at bus: **MCC 50EB40**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 79.982 kA Method C
Steady State = 27.579 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
Lump1 W NE	Bus AREA 40	105.00	0.006	-0.015	2.4	0.017
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Lump W NE£	00EG52	105.00	0.003	-0.006	2.4	0.007
Lump1 W	00EG51	105.00	0.009	-0.020	2.3	0.022
Bus13	MCC 00EB40	0.00	0.202	-0.713	3.5	0.741
MCC 00EB40	Bus14	0.00	0.000	0.000	9999.0	0.000
Bus15	MCC 00EB40	0.00	0.015	-0.019	1.2	0.024
MCC 00EB40	Bus16	0.00	0.000	0.000	9999.0	0.000
Bus17	MCC 00EB40	0.00	0.018	-0.024	1.3	0.030
MCC 00EB40	LV PCC-00EB01	0.00	0.979	-2.751	2.8	2.920
MCC 00EB41	LV PCC-00EB01	0.00	1.031	-2.453	2.4	2.661
MCC 00EB42	LV PCC-00EB01	0.00	0.500	-1.186	2.4	1.288
LV PCC-00EB01	MCC 50EB40	0.00	7.842	-34.014	4.3	34.906
MCC 40EB40£	LV PCC-00EB01	0.00	0.117	-0.275	2.3	0.299

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	34.691	43.812	26.760
0.02	33.834	36.701	14.220
0.03	33.008	33.829	7.409
0.04	32.218	32.448	3.861
0.05	31.470	31.539	2.093
0.06	31.105	31.125	1.099
0.07	30.751	30.756	0.577
0.08	30.407	30.409	0.303
0.09	30.074	30.074	0.159
0.10	29.751	29.752	0.087
0.15	29.163	29.163	0.004
0.20	28.609	28.609	0.000

(Cont.)

3-Phase fault at bus: **MCC 50EB40**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	79.982	kA Method C
Steady State	=	27.579	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.25	28.092	28.092	0.000
0.30	28.092	28.092	0.000

Short-Circuit Summary Report

3-Phase Fault Currents

Bus		Device		Device Capacity (kA)				Short-Circuit Current (kA)					
				Making									
ID	kV	ID	Type	Peak	Ib sym	Ib asym	Idc	I"k	ip	Ib sym	Ib asym	Idc	Ik
00EG01	0.380	00EG01	Bus					34.572	68.733				27.445
00EM01	10.000	00EM01	Bus					14.856	28.937				13.421
LV PCC-00EB01	0.660	LV PCC-00EB01	Bus					37.040	79.982				27.579
LV PCC-00EB02 F	0.660	LV PCC-00EB02 F	Bus					40.557	86.587				27.579
MCC 00EB40	0.660	MCC 00EB40	Bus					37.040	79.982				27.579
MCC 00EB41	0.660	MCC 00EB41	Bus					37.040	79.982				27.579
MCC 00EB42	0.660	MCC 00EB42	Bus					37.040	79.982				27.579
MCC 00EB43-	0.660	MCC 00EB43-	Bus					40.557	86.587				27.579
MCC 00EB44-	0.660	MCC 00EB44-	Bus					40.557	86.587				27.579
MCC 00EB45-	0.660	MCC 00EB45-	Bus					40.557	86.587				27.579
MCC 40EB40£	0.660	MCC 40EB40£	Bus					37.040	79.982				27.579
MCC 50EB40	0.660	MCC 50EB40	Bus					37.040	79.982				27.579

ip is calculated using method C
Ib does not include decay of non-terminal faulted induction motors
Ik is the maximum steady state fault current
Idc is based on X/R from Method C and Ib as specified above

LV CB duty determined based on service rating.
Total through current is used for device duty.

* Indicates a device with calculated duty exceeding the device capability.

\# Indicates a device with calculated duty exceeding the device marginal limit. (95 % times device capability)

Short-Circuit Summary Report

		Device Capacity			3-Phase Short-Circuit Duty Results		
Bus ID	Device ID	Ithr (kA)	Tkr (sec.)	Rated Thermal Energy (MJ)	Ith (kA)	Tkr (sec.)	Thermal Energy (MJ)

Electrical Transient Analyzer Program

Short-Circuit Analysis

IEC 60909 Standard

3-Phase Fault Currents

	Swing	V-Control	Load	Total
Number of Buses:	3	0	15	18

	XFMR2	XFMR3	Reactor	Line/Cable/ Busway	Impedance	Tie PD	Total
Number of Branches:	6	0	0	0	0	9	15

	Synchronous Generator	Power Grid	Synchronous Motor	Induction Machines	Lumped Load	Total
Number of Machines:	1	2	0	7	5	15

System Frequency:	50.00
Unit System:	Metric
Project Filename:	PAT_TE
Output Filename:	C:\ETAP2102\PAT_TE\ICC.SI1S

Adjustments

Tolerance	Apply Adjustments	Individual /Global	Percent
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable / Busway Length:	No		

Temperature Correction	Apply Adjustments	Individual /Global	Degree C
Transmission Line Resistance:	Yes	Individual	
Cable / Busway Resistance:	Yes	Individual	

Bus Input Data

Bus					Initial Voltage	
ID	Type	Nom. kV	Base kV	Sub-sys	%Mag.	Ang.
00EG01	Load	0.380	0.400	3	100.00	0.00
00EG51	Load	0.380	0.380	3	100.00	0.00
00EG52	Load	0.380	0.380	3	100.00	0.00
Bus AREA 40	Load	0.380	0.380	3	100.00	0.00
Bus AREA 50	Load	0.380	0.380	3	100.00	0.00
Bus18	SWNG	10.000	10.000	1	100.00	0.00
Bus19	SWNG	10.000	10.000	2	100.00	0.00
Bus21	Load	10.000	9.750	3	100.00	0.00
LV PCC-00EB01	SWNG	0.660	0.660	3	100.00	0.00
LV PCC-00EB02 F	Load	0.660	0.660	3	100.00	0.00
MCC 00EB40	Load	0.660	0.660	3	110.00	0.00
MCC 00EB41	Load	0.660	0.660	3	100.00	0.00
MCC 00EB42	Load	0.660	0.660	3	100.00	0.00
MCC 00EB43-	Load	0.660	0.660	3	110.00	0.00
MCC 00EB44-	Load	0.660	0.660	3	110.00	0.00
MCC 00EB45-	Load	0.660	0.660	3	110.00	0.00
MCC 40EB40£	Load	0.660	0.660	3	100.00	0.00
MCC 50EB40	Load	0.660	0.660	3	100.00	0.00

18 Buses Total

All voltages reported by ETAP are in % of bus Nominal kV.
Base kV values of buses are calculated and used internally by ETAP .

2-Winding Transformer Input Data

Transformer	Rating					Z Variation			% Tap Setting		Adjusted
ID	MVA	Prim. kV	Sec. kV	% Z	X/R	+ 5%	- 5%	% Tol.	Prim.	Sec.	% Z
00EC01	2.500	10.000	0.660	7.50	6.00	0	0	-1.1	-2.500	0	7.4175
00EC06	0.160	0.660	0.400	4.00	1.50	0	0	-1.1	0	0	3.9560
00EC51	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000
00EC52	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000
T1 AREA 40	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000
T2 AREA 50	0.010	0.660	0.380	4.00	1.50	0	0	0	0	0	4.0000

Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVAb			
ID	Type	From Bus	To Bus	R	X	Z	Y
00EC01	2W XFMR	Bus21	LV PCC-00EB01	46.61	279.65	283.51	
00EC06	2W XFMR	LV PCC-00EB01	00EG01	1341.57	2012.36	2418.55	
00EC51	2W XFMR	MCC 00EB41	00EG51	21699.22	32548.83	39118.83	
00EC52	2W XFMR	MCC 00EB42	00EG52	21699.22	32548.83	39118.83	
T1 AREA 40	2W XFMR	MCC 40EB40£	Bus AREA 40	21699.22	32548.83	39118.83	
T2 AREA 50	2W XFMR	MCC 50EB40	Bus AREA 50	21699.22	32548.83	39118.83	
CB22	Tie Breaker	LV PCC-00EB01	LV PCC-00EB02 F				
CB27	Tie Breaker	LV PCC-00EB01	MCC 00EB40				
CB28	Tie Breaker	LV PCC-00EB01	MCC 00EB41				
CB29	Tie Breaker	LV PCC-00EB01	MCC 00EB42				
CB31	Tie Breaker	LV PCC-00EB02 F	MCC 00EB43-				
CB32	Tie Breaker	LV PCC-00EB02 F	MCC 00EB45-				
CB33	Tie Breaker	LV PCC-00EB02 F	MCC 00EB44-				
CB34	Tie Breaker	LV PCC-00EB01	MCC 50EB40				
CB35	Tie Breaker	LV PCC-00EB01	MCC 40EB40£				

Power Grid Input Data

Power Grid	Connected Bus	Rating		% Impedance 100 MVA Base		
ID	ID	MVASC	kV	R	X"	R/X
U1	Bus18	417.753	10.000	1.55514	23.88700	0.07
U2	Bus19	417.753	10.000	1.55514	23.88700	0.07

Total Connected Power Grids (= 2): 835.507 MVA

Synchronous Generator Input Data

Synchronous Generator		Connected Bus	Rating				% Impedance in Machine Base					
								Xd"				Excitation
ID	Type	ID	MVA	kV	RPM	% PF	R	Adj.	Tol.	R/X	Xd, sat	Type
GE	Steam Turbo	LV PCC-00EB01	0.700	0.660	1500	85.00	1.000	19.00	0.0	0.05	155.00	Turbine 130%

Total Connected Synchronous Generators (= 1) : 0.700 MVA

Induction Machine Input Data

Induction Machine			Connected Bus	Rating					% Impedance (Motor Base)			
ID	Type	Qty	ID	HP/kW	kVA	kV	Amp	PF	R	X"	R/X"	MW/PP
Diesel pump S	Motor	1	00EG52	0.37	0.55	0.380	0.84	82.00	14.11	8.87	1.59	0.00
Foam concentrated pump S	Motor	1	00EG52	0.37	0.56	0.380	0.85	81.00	14.11	8.87	1.59	0.00
Hydrogen Peroxide Dosing	Motor	1	Bus AREA 40	0.37	0.56	0.380	0.85	81.00	14.11	8.87	1.59	0.00
Return acid Tank Agita	Motor	1	MCC 00EB40	30.00	38.57	0.660	33.74	83.00	6.59	15.31	0.43	0.02
Return acid Tank Agita15	Motor	1	MCC 00EB43-	30.00	38.57	0.660	33.74	83.00	6.59	15.31	0.43	0.02
Return acid Tank Agita16	Motor	1	MCC 00EB44-	30.00	38.57	0.660	33.74	83.00	6.59	15.31	0.43	0.02
Return acid Tank Agita13	Motor	1	MCC 00EB45-	30.00	38.57	0.660	33.74	83.00	6.59	15.31	0.43	0.02

Total Connected Induction Machines (= 7): 156.0 kVA

Lumped Load Input Data

Lumped Load								Motor Loads					
Lumped Load	Connected Bus	Rating			% Load			Loading		% Impedance Machine Base			
ID	ID	kVA	kV	Amp	% PF	MTR	STAT	kW	kvar	R	X"	R/X"	MW/PP
Lump1 E W	MCC 50EB40	34.1	0.660	29.85	82.00	100	0	25.2	17.6	6.46	15.37	0.42	0.03
Lump5 W EME	MCC 00EB42	47.9	0.660	41.87	86.00	100	0	37.0	22.0	6.46	15.37	0.42	0.04
Lump7 S EME	MCC 40EB40£	3.2	0.660	2.83	80.00	100	0	2.6	1.9	6.46	15.37	0.42	0.00
Lump7 W EME	MCC 40EB40£	7.6	0.660	6.64	82.00	100	0	5.6	3.9	6.46	15.37	0.42	0.01
MLDB EME	00EG01	41.6	0.380	63.17	100.00	100	0	37.4	0.0	6.46	15.37	0.42	0.04

Total Connected Lumped Loads (= 5): 134.4 kVA

SHORT-CIRCUIT REPORT

3-Phase fault at bus: **00EG01**

Nominal kV = 0.380
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 7.133 kA Method C
Steady State = 1.701 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
00EG01	Total	0.00	1.474	-3.520	2.4	3.816
LV PCC-00EB01	00EG01	57.28	1.320	-3.153	2.4	3.418
MLDB EME	00EG01	105.00	0.154	-0.367	2.4	0.398
Bus21	LV PCC-00EB01	55.85	0.000	0.000	999.9	0.000
GE	LV PCC-00EB01	99.75	0.445	-1.446	3.3	1.513
Bus AREA 40	MCC 40EB40£	57.66	0.001	0.000	0.3	0.001
Lump7 S EME	MCC 40EB40£	99.75	0.005	-0.006	1.3	0.008
Lump7 W EME	MCC 40EB40£	99.75	0.011	-0.014	1.3	0.018
Bus AREA 50	MCC 50EB40	57.28	0.000	0.000	999.9	0.000
Lump1 E W	MCC 50EB40	99.75	0.048	-0.064	1.3	0.080
00EG52	MCC 00EB42	58.04	0.002	-0.001	0.3	0.003
Lump5 W EME	MCC 00EB42	99.75	0.068	-0.090	1.3	0.113
00EG51	MCC 00EB41	57.28	0.000	0.000	999.9	0.000
Return acid Tank Agita	MCC 00EB40	99.75	0.055	-0.072	1.3	0.091
Return acid Tank Agita16	MCC 00EB44-	99.75	0.055	-0.072	1.3	0.091
Return acid Tank Agita13	MCC 00EB45-	99.75	0.055	-0.072	1.3	0.091
Return acid Tank Agita15	MCC 00EB43-	99.75	0.055	-0.072	1.3	0.091

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	3.532	3.900	1.653
0.02	3.465	3.512	0.571
0.03	3.397	3.402	0.186
0.04	3.327	3.328	0.060
0.05	3.258	3.258	0.022
0.06	3.227	3.227	0.007

(Cont.)

3-Phase fault at bus: **00EG01**

Nominal kV	=	0.380	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	7.133	kA Method C
Steady State	=	1.701	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.07	3.197	3.197	0.002
0.08	3.167	3.167	0.001
0.09	3.137	3.137	0.000
0.10	3.108	3.108	0.000
0.15	3.056	3.056	0.000
0.20	3.003	3.003	0.000
0.25	2.950	2.950	0.000
0.30	2.950	2.950	0.000

3-Phase fault at bus: **LV PCC-00EB01**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
LV PCC-00EB01	Total	0.00	0.823	-5.012	6.1	5.079
Bus21	LV PCC-00EB01	0.00	0.000	0.000	999.9	0.000
00EG01	LV PCC-00EB01	6.93	0.095	-0.219	2.3	0.238
GE	LV PCC-00EB01	105.00	0.186	-3.536	19.0	3.541
Bus AREA 40	MCC 40EB40£	1.36	0.003	-0.002	0.6	0.003
Lump7 S EME	MCC 40EB40£	105.00	0.007	-0.016	2.4	0.018
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Bus AREA 50	MCC 50EB40	0.00	0.000	0.000	999.9	0.000
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
00EG52	MCC 00EB42	2.67	0.005	-0.003	0.6	0.006
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	0.00	0.000	0.000	999.9	0.000
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
MLDB EME	00EG01	110.53	0.157	-0.361	2.3	0.393
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Foam concentrated pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
LV PCC-00EB02 F	LV PCC-00EB01	0.00	0.252	-0.586	2.3	0.638
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB40	LV PCC-00EB01	0.00	0.084	-0.195	2.3	0.213
MCC 00EB41	LV PCC-00EB01	0.00	0.000	0.000	9999.0	0.000
MCC 00EB42	LV PCC-00EB01	0.00	0.107	-0.246	2.3	0.269
MCC 40EB40£	LV PCC-00EB01	0.00	0.026	-0.057	2.2	0.062
MCC 50EB40	LV PCC-00EB01	0.00	0.073	-0.173	2.4	0.188

(Cont.)

3-Phase fault at bus: **LV PCC-00EB01**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	12.181	kA Method C
Steady State	=	1.152	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	4.192	6.711	5.240
0.02	3.955	5.998	4.510
0.03	3.714	5.154	3.574
0.04	3.473	4.481	2.832
0.05	3.232	4.188	2.663
0.06	3.129	3.815	2.183
0.07	3.026	3.516	1.790
0.08	2.924	3.272	1.468
0.09	2.823	3.069	1.204
0.10	2.723	2.956	1.150
0.15	2.561	2.602	0.460
0.20	2.401	2.408	0.184
0.25	2.245	2.246	0.074
0.30	2.245	2.245	0.030

3-Phase fault at bus: **LV PCC-00EB02 F**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
LV PCC-00EB02 F	Total	0.00	0.823	-5.012	6.1	5.079
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
Bus21	LV PCC-00EB01	0.00	0.000	0.000	999.9	0.000
00EG01	LV PCC-00EB01	6.93	0.095	-0.219	2.3	0.238
GE	LV PCC-00EB01	105.00	0.186	-3.536	19.0	3.541
Bus AREA 40	MCC 40EB40£	1.36	0.003	-0.002	0.6	0.003
Lump7 S EME	MCC 40EB40£	105.00	0.007	-0.016	2.4	0.018
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Bus AREA 50	MCC 50EB40	0.00	0.000	0.000	999.9	0.000
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
00EG52	MCC 00EB42	2.67	0.005	-0.003	0.6	0.006
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	0.00	0.000	0.000	999.9	0.000
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
MLDB EME	00EG01	110.53	0.157	-0.361	2.3	0.393
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Foam concentrated pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
LV PCC-00EB01	LV PCC-00EB02 F	0.00	0.571	-4.426	7.8	4.462
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB40	LV PCC-00EB01	0.00	0.084	-0.195	2.3	0.213
MCC 00EB41	LV PCC-00EB01	0.00	0.000	0.000	9999.0	0.000
MCC 00EB42	LV PCC-00EB01	0.00	0.107	-0.246	2.3	0.269
MCC 40EB40£	LV PCC-00EB01	0.00	0.026	-0.057	2.2	0.062
MCC 50EB40	LV PCC-00EB01	0.00	0.073	-0.173	2.4	0.188

(Cont.)

3-Phase fault at bus: **LV PCC-00EB02 F**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	12.181	kA Method C
Steady State	=	1.152	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	4.192	6.711	5.240
0.02	3.955	5.998	4.510
0.03	3.714	5.154	3.574
0.04	3.473	4.481	2.832
0.05	3.232	4.188	2.663
0.06	3.129	3.815	2.183
0.07	3.026	3.516	1.790
0.08	2.924	3.272	1.468
0.09	2.823	3.069	1.204
0.10	2.723	2.956	1.150
0.15	2.561	2.602	0.460
0.20	2.401	2.408	0.184
0.25	2.245	2.246	0.074
0.30	2.245	2.245	0.030

3-Phase fault at bus: **MCC 00EB40**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB40	Total	0.00	0.823	-5.012	6.1	5.079
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Bus21	LV PCC-00EB01	0.00	0.000	0.000	999.9	0.000
00EG01	LV PCC-00EB01	6.93	0.095	-0.219	2.3	0.238
GE	LV PCC-00EB01	105.00	0.186	-3.536	19.0	3.541
Bus AREA 40	MCC 40EB40£	1.36	0.003	-0.002	0.6	0.003
Lump7 S EME	MCC 40EB40£	105.00	0.007	-0.016	2.4	0.018
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Bus AREA 50	MCC 50EB40	0.00	0.000	0.000	999.9	0.000
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
00EG52	MCC 00EB42	2.67	0.005	-0.003	0.6	0.006
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	0.00	0.000	0.000	999.9	0.000
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
MLDB EME	00EG01	110.53	0.157	-0.361	2.3	0.393
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Foam concentrated pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
LV PCC-00EB02 F	LV PCC-00EB01	0.00	0.252	-0.586	2.3	0.638
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
LV PCC-00EB01	MCC 00EB40	0.00	0.739	-4.816	6.5	4.873
MCC 00EB41	LV PCC-00EB01	0.00	0.000	0.000	9999.0	0.000
MCC 00EB42	LV PCC-00EB01	0.00	0.107	-0.246	2.3	0.269
MCC 40EB40£	LV PCC-00EB01	0.00	0.026	-0.057	2.2	0.062
MCC 50EB40	LV PCC-00EB01	0.00	0.073	-0.173	2.4	0.188

(Cont.)

3-Phase fault at bus: **MCC 00EB40**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	12.181	kA Method C
Steady State	=	1.152	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	4.192	6.711	5.240
0.02	3.955	5.998	4.510
0.03	3.714	5.154	3.574
0.04	3.473	4.481	2.832
0.05	3.232	4.188	2.663
0.06	3.129	3.815	2.183
0.07	3.026	3.516	1.790
0.08	2.924	3.272	1.468
0.09	2.823	3.069	1.204
0.10	2.723	2.956	1.150
0.15	2.561	2.602	0.460
0.20	2.401	2.408	0.184
0.25	2.245	2.246	0.074
0.30	2.245	2.245	0.030

3-Phase fault at bus: **MCC 00EB41**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB41	Total	0.00	0.823	-5.012	6.1	5.079
00EG51	MCC 00EB41	0.00	0.000	0.000	999.9	0.000
Bus21	LV PCC-00EB01	0.00	0.000	0.000	999.9	0.000
00EG01	LV PCC-00EB01	6.93	0.095	-0.219	2.3	0.238
GE	LV PCC-00EB01	105.00	0.186	-3.536	19.0	3.541
Bus AREA 40	MCC 40EB40£	1.36	0.003	-0.002	0.6	0.003
Lump7 S EME	MCC 40EB40£	105.00	0.007	-0.016	2.4	0.018
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Bus AREA 50	MCC 50EB40	0.00	0.000	0.000	999.9	0.000
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
00EG52	MCC 00EB42	2.67	0.005	-0.003	0.6	0.006
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
MLDB EME	00EG01	110.53	0.157	-0.361	2.3	0.393
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Foam concentrated pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
LV PCC-00EB02 F	LV PCC-00EB01	0.00	0.252	-0.586	2.3	0.638
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB40	LV PCC-00EB01	0.00	0.084	-0.195	2.3	0.213
LV PCC-00EB01	MCC 00EB41	0.00	0.823	-5.012	6.1	5.079
MCC 00EB42	LV PCC-00EB01	0.00	0.107	-0.246	2.3	0.269
MCC 40EB40£	LV PCC-00EB01	0.00	0.026	-0.057	2.2	0.062
MCC 50EB40	LV PCC-00EB01	0.00	0.073	-0.173	2.4	0.188

(Cont.)

3-Phase fault at bus: **MCC 00EB41**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	4.192	6.711	5.240
0.02	3.955	5.998	4.510
0.03	3.714	5.154	3.574
0.04	3.473	4.481	2.832
0.05	3.232	4.188	2.663
0.06	3.129	3.815	2.183
0.07	3.026	3.516	1.790
0.08	2.924	3.272	1.468
0.09	2.823	3.069	1.204
0.10	2.723	2.956	1.150
0.15	2.561	2.602	0.460
0.20	2.401	2.408	0.184
0.25	2.245	2.246	0.074
0.30	2.245	2.245	0.030

3-Phase fault at bus: **MCC 00EB42**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB42	Total	0.00	0.823	-5.012	6.1	5.079
00EG52	MCC 00EB42	2.67	0.005	-0.003	0.6	0.006
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
Bus21	LV PCC-00EB01	0.00	0.000	0.000	999.9	0.000
00EG01	LV PCC-00EB01	6.93	0.095	-0.219	2.3	0.238
GE	LV PCC-00EB01	105.00	0.186	-3.536	19.0	3.541
Bus AREA 40	MCC 40EB40£	1.36	0.003	-0.002	0.6	0.003
Lump7 S EME	MCC 40EB40£	105.00	0.007	-0.016	2.4	0.018
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Bus AREA 50	MCC 50EB40	0.00	0.000	0.000	999.9	0.000
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
00EG51	MCC 00EB41	0.00	0.000	0.000	999.9	0.000
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Foam concentrated pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
MLDB EME	00EG01	110.53	0.157	-0.361	2.3	0.393
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
LV PCC-00EB02 F	LV PCC-00EB01	0.00	0.252	-0.586	2.3	0.638
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB40	LV PCC-00EB01	0.00	0.084	-0.195	2.3	0.213
MCC 00EB41	LV PCC-00EB01	0.00	0.000	0.000	9999.0	0.000
LV PCC-00EB01	MCC 00EB42	0.00	0.716	-4.765	6.7	4.819
MCC 40EB40£	LV PCC-00EB01	0.00	0.026	-0.057	2.2	0.062
MCC 50EB40	LV PCC-00EB01	0.00	0.073	-0.173	2.4	0.188

(Cont.)

3-Phase fault at bus: **MCC 00EB42**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	4.192	6.711	5.240
0.02	3.955	5.998	4.510
0.03	3.714	5.154	3.574
0.04	3.473	4.481	2.832
0.05	3.232	4.188	2.663
0.06	3.129	3.815	2.183
0.07	3.026	3.516	1.790
0.08	2.924	3.272	1.468
0.09	2.823	3.069	1.204
0.10	2.723	2.956	1.150
0.15	2.561	2.602	0.460
0.20	2.401	2.408	0.184
0.25	2.245	2.246	0.074
0.30	2.245	2.245	0.030

3-Phase fault at bus: **MCC 00EB43-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB43-	Total	0.00	0.823	-5.012	6.1	5.079
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Bus21	LV PCC-00EB01	0.00	0.000	0.000	999.9	0.000
00EG01	LV PCC-00EB01	6.93	0.095	-0.219	2.3	0.238
GE	LV PCC-00EB01	105.00	0.186	-3.536	19.0	3.541
Bus AREA 40	MCC 40EB40£	1.36	0.003	-0.002	0.6	0.003
Lump7 S EME	MCC 40EB40£	105.00	0.007	-0.016	2.4	0.018
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Bus AREA 50	MCC 50EB40	0.00	0.000	0.000	999.9	0.000
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
00EG52	MCC 00EB42	2.67	0.005	-0.003	0.6	0.006
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	0.00	0.000	0.000	999.9	0.000
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
MLDB EME	00EG01	110.53	0.157	-0.361	2.3	0.393
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Foam concentrated pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
LV PCC-00EB01	LV PCC-00EB02 F	0.00	0.571	-4.426	7.8	4.462
LV PCC-00EB02 F	MCC 00EB43-	0.00	0.739	-4.816	6.5	4.873
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB40	LV PCC-00EB01	0.00	0.084	-0.195	2.3	0.213
MCC 00EB41	LV PCC-00EB01	0.00	0.000	0.000	9999.0	0.000
MCC 00EB42	LV PCC-00EB01	0.00	0.107	-0.246	2.3	0.269
MCC 40EB40£	LV PCC-00EB01	0.00	0.026	-0.057	2.2	0.062
MCC 50EB40	LV PCC-00EB01	0.00	0.073	-0.173	2.4	0.188

(Cont.)

3-Phase fault at bus: **MCC 00EB43-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	4.192	6.711	5.240
0.02	3.955	5.998	4.510
0.03	3.714	5.154	3.574
0.04	3.473	4.481	2.832
0.05	3.232	4.188	2.663
0.06	3.129	3.815	2.183
0.07	3.026	3.516	1.790
0.08	2.924	3.272	1.468
0.09	2.823	3.069	1.204
0.10	2.723	2.956	1.150
0.15	2.561	2.602	0.460
0.20	2.401	2.408	0.184
0.25	2.245	2.246	0.074
0.30	2.245	2.245	0.030

3-Phase fault at bus: **MCC 00EB44-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB44-	Total	0.00	0.823	-5.012	6.1	5.079
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
Bus21	LV PCC-00EB01	0.00	0.000	0.000	999.9	0.000
00EG01	LV PCC-00EB01	6.93	0.095	-0.219	2.3	0.238
GE	LV PCC-00EB01	105.00	0.186	-3.536	19.0	3.541
Bus AREA 40	MCC 40EB40£	1.36	0.003	-0.002	0.6	0.003
Lump7 S EME	MCC 40EB40£	105.00	0.007	-0.016	2.4	0.018
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Bus AREA 50	MCC 50EB40	0.00	0.000	0.000	999.9	0.000
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
00EG52	MCC 00EB42	2.67	0.005	-0.003	0.6	0.006
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	0.00	0.000	0.000	999.9	0.000
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
MLDB EME	00EG01	110.53	0.157	-0.361	2.3	0.393
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Foam concentrated pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
LV PCC-00EB01	LV PCC-00EB02 F	0.00	0.571	-4.426	7.8	4.462
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
LV PCC-00EB02 F	MCC 00EB44-	0.00	0.739	-4.816	6.5	4.873
MCC 00EB40	LV PCC-00EB01	0.00	0.084	-0.195	2.3	0.213
MCC 00EB41	LV PCC-00EB01	0.00	0.000	0.000	9999.0	0.000
MCC 00EB42	LV PCC-00EB01	0.00	0.107	-0.246	2.3	0.269
MCC 40EB40£	LV PCC-00EB01	0.00	0.026	-0.057	2.2	0.062
MCC 50EB40	LV PCC-00EB01	0.00	0.073	-0.173	2.4	0.188

(Cont.)

3-Phase fault at bus: **MCC 00EB44-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	4.192	6.711	5.240
0.02	3.955	5.998	4.510
0.03	3.714	5.154	3.574
0.04	3.473	4.481	2.832
0.05	3.232	4.188	2.663
0.06	3.129	3.815	2.183
0.07	3.026	3.516	1.790
0.08	2.924	3.272	1.468
0.09	2.823	3.069	1.204
0.10	2.723	2.956	1.150
0.15	2.561	2.602	0.460
0.20	2.401	2.408	0.184
0.25	2.245	2.246	0.074
0.30	2.245	2.245	0.030

3-Phase fault at bus: **MCC 00EB45-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 00EB45-	Total	0.00	0.823	-5.012	6.1	5.079
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
Bus21	LV PCC-00EB01	0.00	0.000	0.000	999.9	0.000
00EG01	LV PCC-00EB01	6.93	0.095	-0.219	2.3	0.238
GE	LV PCC-00EB01	105.00	0.186	-3.536	19.0	3.541
Bus AREA 40	MCC 40EB40£	1.36	0.003	-0.002	0.6	0.003
Lump7 S EME	MCC 40EB40£	105.00	0.007	-0.016	2.4	0.018
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Bus AREA 50	MCC 50EB40	0.00	0.000	0.000	999.9	0.000
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
00EG52	MCC 00EB42	2.67	0.005	-0.003	0.6	0.006
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	0.00	0.000	0.000	999.9	0.000
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
MLDB EME	00EG01	110.53	0.157	-0.361	2.3	0.393
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Foam concentrated pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
LV PCC-00EB01	LV PCC-00EB02 F	0.00	0.571	-4.426	7.8	4.462
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
LV PCC-00EB02 F	MCC 00EB45-	0.00	0.739	-4.816	6.5	4.873
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB40	LV PCC-00EB01	0.00	0.084	-0.195	2.3	0.213
MCC 00EB41	LV PCC-00EB01	0.00	0.000	0.000	9999.0	0.000
MCC 00EB42	LV PCC-00EB01	0.00	0.107	-0.246	2.3	0.269
MCC 40EB40£	LV PCC-00EB01	0.00	0.026	-0.057	2.2	0.062
MCC 50EB40	LV PCC-00EB01	0.00	0.073	-0.173	2.4	0.188

(Cont.)

3-Phase fault at bus: **MCC 00EB45-**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	4.192	6.711	5.240
0.02	3.955	5.998	4.510
0.03	3.714	5.154	3.574
0.04	3.473	4.481	2.832
0.05	3.232	4.188	2.663
0.06	3.129	3.815	2.183
0.07	3.026	3.516	1.790
0.08	2.924	3.272	1.468
0.09	2.823	3.069	1.204
0.10	2.723	2.956	1.150
0.15	2.561	2.602	0.460
0.20	2.401	2.408	0.184
0.25	2.245	2.246	0.074
0.30	2.245	2.245	0.030

3-Phase fault at bus: **MCC 40EB40£**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 40EB40£	Total	0.00	0.823	-5.012	6.1	5.079
Bus AREA 40	MCC 40EB40£	1.36	0.003	-0.002	0.6	0.003
Lump7 S EME	MCC 40EB40£	105.00	0.007	-0.016	2.4	0.018
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
Bus21	LV PCC-00EB01	0.00	0.000	0.000	999.9	0.000
00EG01	LV PCC-00EB01	6.93	0.095	-0.219	2.3	0.238
GE	LV PCC-00EB01	105.00	0.186	-3.536	19.0	3.541
Bus AREA 50	MCC 50EB40	0.00	0.000	0.000	999.9	0.000
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
00EG52	MCC 00EB42	2.67	0.005	-0.003	0.6	0.006
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	0.00	0.000	0.000	999.9	0.000
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
MLDB EME	00EG01	110.53	0.157	-0.361	2.3	0.393
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Foam concentrated pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
LV PCC-00EB02 F	LV PCC-00EB01	0.00	0.252	-0.586	2.3	0.638
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB40	LV PCC-00EB01	0.00	0.084	-0.195	2.3	0.213
MCC 00EB41	LV PCC-00EB01	0.00	0.000	0.000	9999.0	0.000
MCC 00EB42	LV PCC-00EB01	0.00	0.107	-0.246	2.3	0.269
LV PCC-00EB01	MCC 40EB40£	0.00	0.797	-4.955	6.2	5.019
MCC 50EB40	LV PCC-00EB01	0.00	0.073	-0.173	2.4	0.188

(Cont.)

3-Phase fault at bus: **MCC 40EB40£**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	4.192	6.711	5.240
0.02	3.955	5.998	4.510
0.03	3.714	5.154	3.574
0.04	3.473	4.481	2.832
0.05	3.232	4.188	2.663
0.06	3.129	3.815	2.183
0.07	3.026	3.516	1.790
0.08	2.924	3.272	1.468
0.09	2.823	3.069	1.204
0.10	2.723	2.956	1.150
0.15	2.561	2.602	0.460
0.20	2.401	2.408	0.184
0.25	2.245	2.246	0.074
0.30	2.245	2.245	0.030

3-Phase fault at bus: **MCC 50EB40**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 12.181 kA Method C
Steady State = 1.152 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
MCC 50EB40	Total	0.00	0.823	-5.012	6.1	5.079
Bus AREA 50	MCC 50EB40	0.00	0.000	0.000	999.9	0.000
Lump1 E W	MCC 50EB40	105.00	0.073	-0.173	2.4	0.188
Bus21	LV PCC-00EB01	0.00	0.000	0.000	999.9	0.000
00EG01	LV PCC-00EB01	6.93	0.095	-0.219	2.3	0.238
GE	LV PCC-00EB01	105.00	0.186	-3.536	19.0	3.541
Bus AREA 40	MCC 40EB40£	1.36	0.003	-0.002	0.6	0.003
Lump7 S EME	MCC 40EB40£	105.00	0.007	-0.016	2.4	0.018
Lump7 W EME	MCC 40EB40£	105.00	0.016	-0.039	2.4	0.042
00EG52	MCC 00EB42	2.67	0.005	-0.003	0.6	0.006
Lump5 W EME	MCC 00EB42	105.00	0.102	-0.243	2.4	0.264
00EG51	MCC 00EB41	0.00	0.000	0.000	999.9	0.000
Return acid Tank Agita	MCC 00EB40	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita16	MCC 00EB44-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita13	MCC 00EB45-	105.00	0.084	-0.195	2.3	0.213
Return acid Tank Agita15	MCC 00EB43-	105.00	0.084	-0.195	2.3	0.213
MLDB EME	00EG01	110.53	0.157	-0.361	2.3	0.393
Hydrogen Peroxide Dosing	Bus AREA 40	105.00	0.004	-0.003	0.6	0.005
Diesel pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
Foam concentrated pump S	00EG52	105.00	0.004	-0.003	0.6	0.005
LV PCC-00EB02 F	LV PCC-00EB01	0.00	0.252	-0.586	2.3	0.638
MCC 00EB43-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB45-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB44-	LV PCC-00EB02 F	0.00	0.084	-0.195	2.3	0.213
MCC 00EB40	LV PCC-00EB01	0.00	0.084	-0.195	2.3	0.213
MCC 00EB41	LV PCC-00EB01	0.00	0.000	0.000	9999.0	0.000
MCC 00EB42	LV PCC-00EB01	0.00	0.107	-0.246	2.3	0.269
MCC 40EB40£	LV PCC-00EB01	0.00	0.026	-0.057	2.2	0.062
LV PCC-00EB01	MCC 50EB40	0.00	0.750	-4.838	6.5	4.896

(Cont.)

3-Phase fault at bus: **MCC 50EB40**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	12.181	kA Method C
Steady State	=	1.152	kA rms

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	4.192	6.711	5.240
0.02	3.955	5.998	4.510
0.03	3.714	5.154	3.574
0.04	3.473	4.481	2.832
0.05	3.232	4.188	2.663
0.06	3.129	3.815	2.183
0.07	3.026	3.516	1.790
0.08	2.924	3.272	1.468
0.09	2.823	3.069	1.204
0.10	2.723	2.956	1.150
0.15	2.561	2.602	0.460
0.20	2.401	2.408	0.184
0.25	2.245	2.246	0.074
0.30	2.245	2.245	0.030

Short-Circuit Summary Report

3-Phase Fault Currents

Bus		Device		Device Capacity (kA)				Short-Circuit Current (kA)					
				Making									
ID	kV	ID	Type	Peak	Ib sym	Ib asym	Idc	I"k	ip	Ib sym	Ib asym	Idc	Ik
00EG01	0.380	00EG01	Bus					3.816	7.133				1.701
LV PCC-00EB01	0.660	LV PCC-00EB01	Bus					5.079	12.181				1.152
LV PCC-00EB02 F	0.660	LV PCC-00EB02 F	Bus					5.079	12.181				1.152
MCC 00EB40	0.660	MCC 00EB40	Bus					5.079	12.181				1.152
MCC 00EB41	0.660	MCC 00EB41	Bus					5.079	12.181				1.152
MCC 00EB42	0.660	MCC 00EB42	Bus					5.079	12.181				1.152
MCC 00EB43-	0.660	MCC 00EB43-	Bus					5.079	12.181				1.152
MCC 00EB44-	0.660	MCC 00EB44-	Bus					5.079	12.181				1.152
MCC 00EB45-	0.660	MCC 00EB45-	Bus					5.079	12.181				1.152
MCC 40EB40£	0.660	MCC 40EB40£	Bus					5.079	12.181				1.152
MCC 50EB40	0.660	MCC 50EB40	Bus					5.079	12.181				1.152

ip is calculated using method C
Ib does not include decay of non-terminal faulted induction motors
Ik is the maximum steady state fault current
Idc is based on X/R from Method C and Ib as specified above

LV CB duty determined based on service rating.
Total through current is used for device duty.

* Indicates a device with calculated duty exceeding the device capability.

\# Indicates a device with calculated duty exceeding the device marginal limit. (95 % times device capability)

Short-Circuit Summary Report

		Device Capacity			3-Phase Short-Circuit Duty Results		
Bus ID	Device ID	Ithr (kA)	Tkr (sec.)	Rated Thermal Energy (MJ)	Ith (kA)	Tkr (sec.)	Thermal Energy (MJ)

Electrical Transient Analyzer Program

Short-Circuit Analysis

IEC 60909 Standard

3-Phase Fault Currents

	Swing	V-Control	Load	Total
Number of Buses:	2	0	9	11

	XFMR2	XFMR3	Reactor	Line/Cable/ Busway	Impedance	Tie PD	Total
Number of Branches:	3	0	0	6	0	0	9

	Synchronous Generator	Power Grid	Synchronous Motor	Induction Machines	Lumped Load	Total
Number of Machines:	0	2	0	0	0	2

System Frequency:	50.00
Unit System:	Metric
Project Filename:	PAT_TE
Output Filename:	C:\ETAP2102\PAT_TE\ICC.SI1S

Adjustments

Tolerance	Apply Adjustments	Individual /Global	Percent
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable / Busway Length:	No		

Temperature Correction	Apply Adjustments	Individual /Global	Degree C
Transmission Line Resistance:	Yes	Individual	
Cable / Busway Resistance:	Yes	Individual	

Bus Input Data

Bus					Initial Voltage	
ID	Type	Nom. kV	Base kV	Sub-sys	%Mag.	Ang.
00EG01	Load	0.380	0.390	1	100.00	0.00
00EM01	Load	10.000	10.000	1	100.00	0.00
Bus18	SWNG	10.000	10.000	1	100.00	0.00
Bus19	SWNG	10.000	10.000	2	100.00	0.00
Bus20	Load	10.000	10.000	1	100.00	0.00
Bus21	Load	10.000	10.000	1	100.00	0.00
Bus23	Load	10.000	10.000	1	100.00	0.00
Bus24	Load	10.000	10.000	1	100.00	0.00
Bus25	Load	10.000	10.000	1	100.00	0.00
LV PCC-00EB01	Load	0.660	0.677	1	100.00	0.00
LV PCC-00EB02 F	Load	0.660	0.677	1	100.00	0.00

11 Buses Total

All voltages reported by ETAP are in % of bus Nominal kV.
Base kV values of buses are calculated and used internally by ETAP.

Line/Cable/Busway Input Data

Line/Cable/Busway			ohms or siemens/1000 m per Conductor (Cable) or per Phase (Line/Busway)						
			Length						
ID	Library	Size	Adj. (m)	% Tol.	#/Phase	T (°C)	R	X	Y
Cable2	11NCUS1	300	1766.0	0	1	75	0.07630	0.10500	0.0000000
Cable3	10NCUS3	300	30.0	0	1	75	0.07544	0.08300	0.0000000
Cable4	10NCUS3	300	30.0	0	1	75	0.07544	0.08300	0.0000000
Cable5	10NCUS3	300	30.0	0	1	75	0.07544	0.08300	0.0000000
Cable6	10NCUS3	300	30.0	0	1	75	0.07544	0.08300	0.0000000
Cable7	10NCUS3	300	30.0	0	1	75	0.07544	0.08300	0.0000000

Line / Cable / Busway resistances are listed at the specified temperatures.

2-Winding Transformer Input Data

Transformer	Rating					Z Variation			% Tap Setting		Adjusted
ID	MVA	Prim. kV	Sec. kV	% Z	X/R	+ 5%	- 5%	% Tol.	Prim.	Sec.	% Z
00EC01	2.500	10.000	0.660	7.50	6.00	0	0	-1.1	-2.500	0	7.4175
00EC03	2.500	10.000	0.660	7.50	6.00	0	0	-1.1	-2.500	0	7.4175
00EC04	1.250	10.000	0.380	7.00	3.50	0	0	-1.1	-2.500	0	6.9230

Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVAb			
ID	Type	From Bus	To Bus	R	X	Z	Y
00EC01	2W XFMR	Bus21	LV PCC-00EB01	44.31	265.85	269.51	
00EC03	2W XFMR	Bus25	LV PCC-00EB02 F	44.31	265.85	269.51	
00EC04	2W XFMR	Bus20	00EG01	138.74	485.58	505.01	
Cable2	Cable	Bus18	00EM01	13.47	18.54	22.92	
Cable3	Cable	00EM01	Bus25	0.23	0.25	0.34	
Cable4	Cable	00EM01	Bus24	0.23	0.25	0.34	
Cable5	Cable	00EM01	Bus23	0.23	0.25	0.34	
Cable6	Cable	00EM01	Bus21	0.23	0.25	0.34	
Cable7	Cable	00EM01	Bus20	0.23	0.25	0.34	

Power Grid Input Data

Power Grid	Connected Bus	Rating		% Impedance 100 MVA Base		
ID	ID	MVASC	kV	R	X"	R/X
U1	Bus18	241.257	10.000	1.86437	41.40757	0.05
U2	Bus19	241.257	10.000	1.86437	41.40757	0.05

Total Connected Power Grids (= 2): 482.515 MVA

SHORT-CIRCUIT REPORT

3-Phase fault at bus: **00EG01**

Nominal kV	=	0.380	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	54.139	kA Method C
Steady State	=	26.550	kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
00EG01	Total	0.00	7.181	-25.560	3.6	26.550
Bus20	00EG01	90.51	7.181	-25.560	3.6	26.550
00EM01	Bus20	90.56	0.280	-0.996	3.6	1.035

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	26.550	30.760	15.534
0.02	26.550	27.317	6.427
0.03	26.550	26.683	2.659
0.04	26.550	26.573	1.100
0.05	26.550	26.554	0.455
0.06	26.550	26.550	0.188
0.07	26.550	26.550	0.078
0.08	26.550	26.550	0.032
0.09	26.550	26.550	0.013
0.10	26.550	26.550	0.006
0.15	26.550	26.550	0.000
0.20	26.550	26.550	0.000
0.25	26.550	26.550	0.000
0.30	26.550	26.550	0.000

3-Phase fault at bus: **00EM01**

Nominal kV = 10.000
Voltage c Factor = 1.10 (User-Defined)
Peak Value = 20.345 kA Method C
Steady State = 9.631 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
00EM01	Total	0.00	2.267	-9.360	4.1	9.631
Bus18	00EM01	38.24	2.267	-9.360	4.1	9.631
Bus25	00EM01	0.00	0.000	0.000	999.9	0.000
Bus24	00EM01	0.00	0.000	0.000	999.9	0.000
Bus23	00EM01	0.00	0.000	0.000	999.9	0.000
Bus21	00EM01	0.00	0.000	0.000	999.9	0.000
Bus20	00EM01	0.00	0.000	0.000	999.9	0.000
U1	Bus18	110.00	2.267	-9.360	4.1	9.631
LV PCC-00EB02 F	Bus25	0.00	0.000	0.000	999.9	0.000
LV PCC-00EB01	Bus21	0.00	0.000	0.000	999.9	0.000
00EG01	Bus20	0.00	0.000	0.000	999.9	0.000

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	9.631	11.543	6.363
0.02	9.631	10.079	2.973
0.03	9.631	9.730	1.389
0.04	9.631	9.652	0.649
0.05	9.631	9.635	0.303
0.06	9.631	9.632	0.142
0.07	9.631	9.631	0.066
0.08	9.631	9.631	0.031
0.09	9.631	9.631	0.014
0.10	9.631	9.631	0.007
0.15	9.631	9.631	0.000
0.20	9.631	9.631	0.000
0.25	9.631	9.631	0.000
0.30	9.631	9.631	0.000

3-Phase fault at bus: **LV PCC-00EB01**

Nominal kV = 0.660
Voltage c Factor = 1.05 (User-Defined)
Peak Value = 58.424 kA Method C
Steady State = 26.018 kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
LV PCC-00EB01	Total	0.00	4.656	-25.597	5.5	26.018
Bus21	LV PCC-00EB01	82.21	4.656	-25.597	5.5	26.018
00EM01	Bus21	82.30	0.315	-1.733	5.5	1.761

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	26.018	33.296	20.778
0.02	26.018	28.541	11.734
0.03	26.018	26.848	6.626
0.04	26.018	26.285	3.742
0.05	26.018	26.103	2.113
0.06	26.018	26.045	1.193
0.07	26.018	26.026	0.674
0.08	26.018	26.020	0.381
0.09	26.018	26.018	0.215
0.10	26.018	26.018	0.121
0.15	26.018	26.018	0.007
0.20	26.018	26.018	0.000
0.25	26.018	26.018	0.000
0.30	26.018	26.018	0.000

3-Phase fault at bus: **LV PCC-00EB02 F**

Nominal kV	=	0.660	
Voltage c Factor	=	1.05	(User-Defined)
Peak Value	=	58.424	kA Method C
Steady State	=	26.018	kA rms

Contribution		Voltage & Initial Symmetrical Current (rms)				
From Bus ID	To Bus ID	% V From Bus	kA Real	kA Imaginary	X/R Ratio	kA Magnitude
LV PCC-00EB02 F	Total	0.00	4.656	-25.597	5.5	26.018
Bus25	LV PCC-00EB02 F	82.21	4.656	-25.597	5.5	26.018
00EM01	Bus25	82.30	0.315	-1.733	5.5	1.761

Breaking and DC Fault Current (kA)

Based on Total Bus Fault Current

TD (S)	Ib sym	Ib asym	Idc
0.01	26.018	33.296	20.778
0.02	26.018	28.541	11.734
0.03	26.018	26.848	6.626
0.04	26.018	26.285	3.742
0.05	26.018	26.103	2.113
0.06	26.018	26.045	1.193
0.07	26.018	26.026	0.674
0.08	26.018	26.020	0.381
0.09	26.018	26.018	0.215
0.10	26.018	26.018	0.121
0.15	26.018	26.018	0.007
0.20	26.018	26.018	0.000
0.25	26.018	26.018	0.000
0.30	26.018	26.018	0.000

Short-Circuit Summary Report

3-Phase Fault Currents

Bus		Device		Device Capacity (kA)				Short-Circuit Current (kA)					
				Making									
ID	kV	ID	Type	Peak	Ib sym	Ib asym	Idc	I"k	ip	Ib sym	Ib asym	Idc	Ik
00EG01	0.380	00EG01	Bus					26.550	54.139				26.550
00EM01	10.000	00EM01	Bus					9.631	20.345				9.631
LV PCC-00EB01	0.660	LV PCC-00EB01	Bus					26.018	58.424				26.018
LV PCC-00EB02 F	0.660	LV PCC-00EB02 F	Bus					26.018	58.424				26.018

ip is calculated using method C
Ib does not include decay of non-terminal faulted induction motors
Ik is the maximum steady state fault current
Idc is based on X/R from Method C and Ib as specified above

LV CB duty determined based on service rating.
Total through current is used for device duty.

* Indicates a device with calculated duty exceeding the device capability.

\# Indicates a device with calculated duty exceeding the device marginal limit. (95 % times device capability)

Short-Circuit Summary Report

		Device Capacity			3-Phase Short-Circuit Duty Results		
Bus ID	Device ID	Ithr (kA)	Tkr (sec.)	Rated Thermal Energy (MJ)	Ith (kA)	Tkr (sec.)	Thermal Energy (MJ)