



Load Study XYZ Company 1234 N. Peach St., Fruit City, CA 98331

Monitoring Period: 05/14/2008 @ 12:15:00 to 06/17/2008 @ 10:00:00

Introduction

PowerCET Corporation was retained to conduct a load study of several electrical distribution circuits associated with the XYZ Company Fruit City facility as part of the preparation for installation of additional production equipment. Dranetz-BMI PP4300 Power Platform power monitors equipped with MultiDAQ TASKCards were installed with flex current probes in the panelboard/switchgear of the selected locations and left in place for a 30-day period. The following report documents the results of the monitoring for the 800A feeder circuit and the 1200A distribution switchgear.

Key Findings & Recommendations

The following chart summarized the results of the monitoring as well as observations taken on the 2500A distribution panelboard (SWBD No. 3).

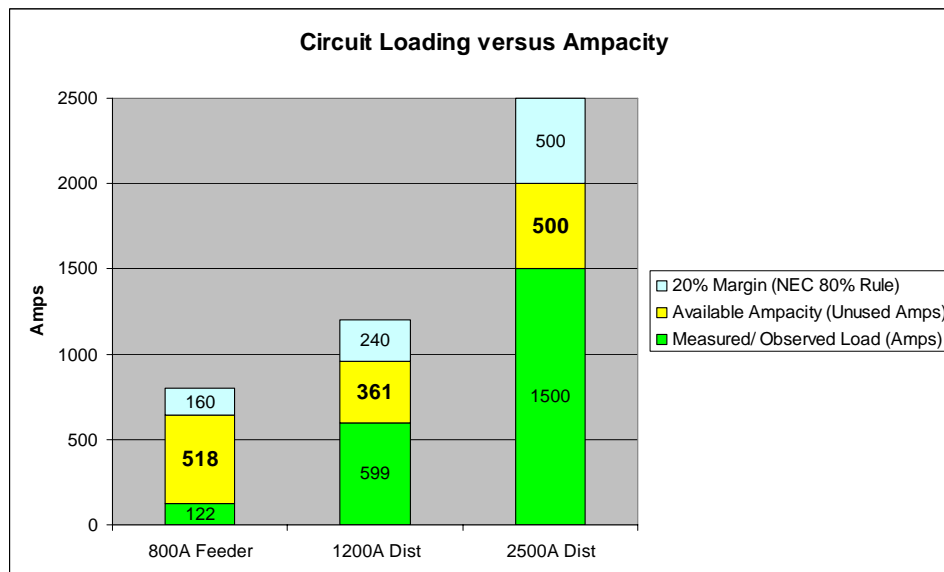


Chart 1 – Summary of load study. (Note: Yellow indicates available load amps to support additional equipment.)

Panel DB1 800Amp 480/277 3P4W

The Dranetz-BMI PP4300 monitor was installed in the base of DB1 (Photo 1, below) for a 30-day period. The following section documents the results of the monitoring for this location.

The results of the monitoring indicate that CB1 is approximately 20% loaded and that 518Amps of additional load could be placed on the circuit.



Photo 1 – Panelboard DB1 3P4W 480/277Vac 800A.

Figure 1 is the current time plot for CB1 along with limit lines graphically illustrating the existing circuit loading and available capacity.

Table 2 (below) is a summary of significant power parameters from the monitoring data. The data contained in the table is not remarkable as the values are all within expected ranges, especially when considering the lightly loaded condition.

Figure 2 (below) shows the voltage time plots for the three phases during the monitoring period. There was one significant voltage event on 6/15/08 when phase-to-neutral voltage levels dropped to 183V on phase A. With out additional monitoring waveform data it is not possible to accurately evaluate the source of the voltage sag, but in all likelihood it was a utility sources fault clearing operation. Voltage levels appear to be within expected ranges.

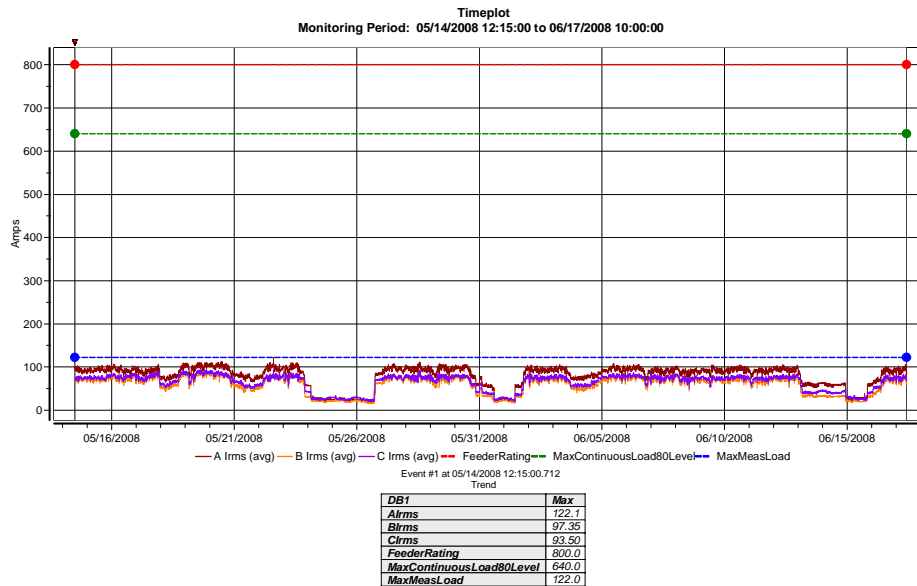


Figure 1 – Current time plot for DB1 showing limit lines for circuit rating and maximum continuous load (80% rule).

	Plant Operating	Plant Idle
Power Factor (PF)	0.81	0.41
Vthd	<1.3%	< 1.7%
lthd	17% to <41%	< 18% to <37%
Vunb (DevAvg)	< 0.4%	< 0.7%
lunb (DevAvg) ^[1]	< 21%	< 20%

Notes: [1]. Circuit is less than 20% loaded which results in higher load unbalance.

Table 1 - Summary of power related parameters for DB1

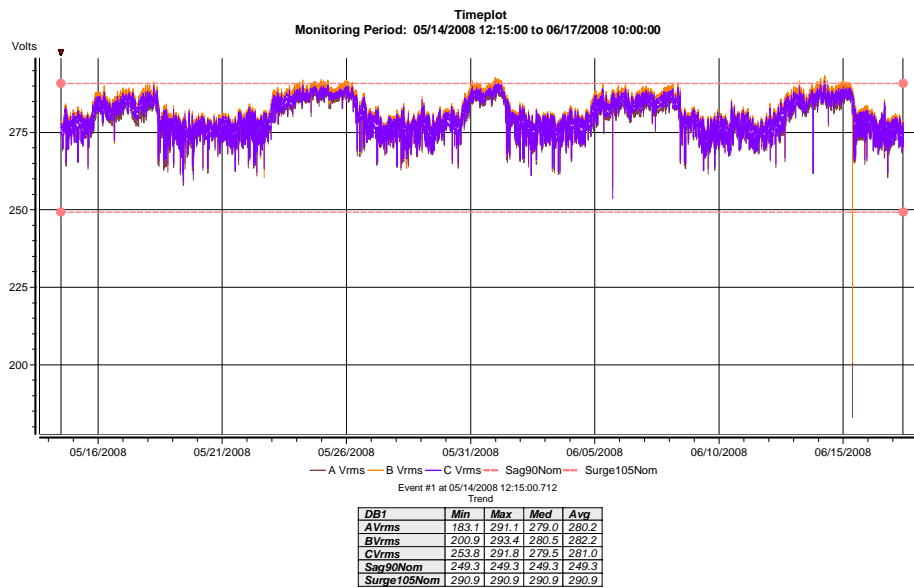


Figure 2 – Voltage time plot for DB-1.

SWBD No.3 480V 3P3W 1200Amp

This section of the report details the results of the monitoring for SWBD No. 3 a 3P3W 480Vac rated at 1200Amps.

Photo 2 (below) shows the front of SWBD No. 3



Photo 2 – SWBD NO. 3 is a 480V 3P3W 1200Amp supply.

The metering equipment was installed in the bottom of the SWBD No. 3 (Photo 3 below) just below the cables shown in the photo.

The cables, in Photo 2 appear to be a tap on the load side of the 1200A breaker. Their termination point is not known at this time. There may be some NEC code issues with this configuration as there is the question of if the tap (conductors) is rated for the 1200A application. Also there are restrictions on the length of the tap conductors.



Photo 3 – SWBD 3 showing tap off main breaker.

The results of the monitoring indicate that SWBD No. 3 is approximately 62% loaded and that 361Amps of additional load could be placed on the circuit. An additional of 90Amps of capacity could be obtained by improving the power factor (PF) by 0.15.

Figure 3 is the current time plot for CB1 along with limit lines graphically illustrating the existing circuit loading and available capacity.

Table 3 (below) is a summary of significant power parameters from the monitoring data. The data contained in the table is not remarkable as the values are all within expected ranges. Power Factor (PF) appears to be from displacement, not distortion (harmonics), and could be improved through implementation of power factor (PF) correction capacitors on inductive loads.

Figure 4 (below) shows the voltage time plots for the three phases during the monitoring period. There was one significant voltage event on 6/15/08 when phase-to-phase voltage levels dropped to 277V on phase connection CA. With out additional monitoring waveform data it is not possible to accurately evaluate the source of the voltage sag, but in all likelihood it was a utility sources fault clearing operation. Voltage levels appear to be within expected ranges.

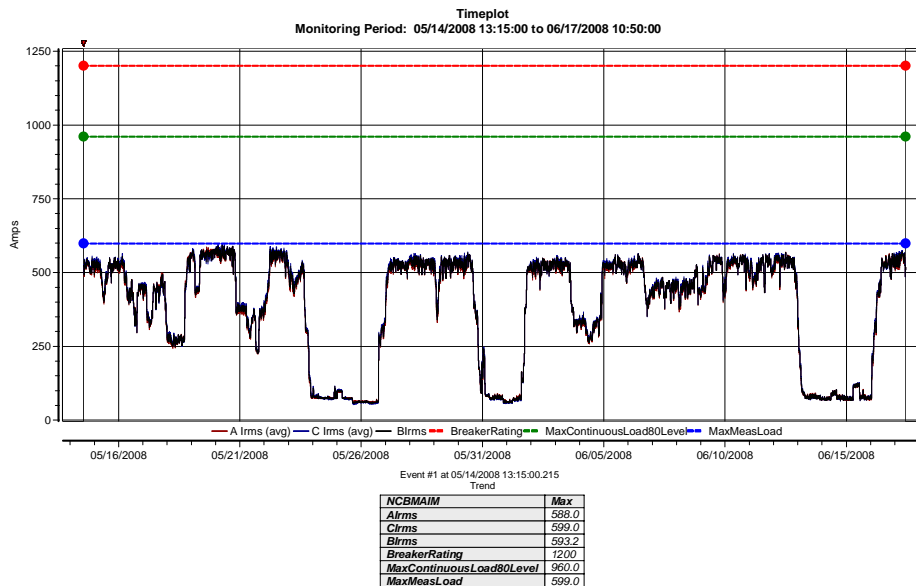


Figure 3 – Current time plot showing limit lines for circuit rating and maximum continuous load (80% rule) for SWBD 3.

	Operating	Idle
Power Factor (PF)	0.76	0.89
Vthd	< 2.3%	< 1.4%
Ithd	< 17 to <22%	< 24%
Vunb (DevAvg)	< 0.6%	< 0.87%
Iunb (DevAvg)	< 1.2%	< 4%

Table 2 - Summary of power related parameters for SWBD 3.

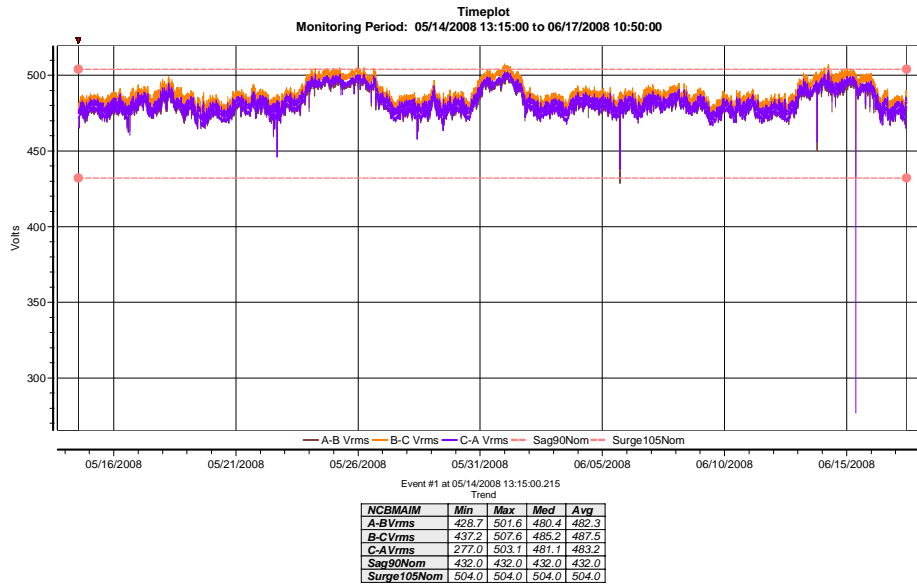


Figure 4 – Voltage time plot showing +5% and -10% limit lines for SWBD 3.

SWBD No.3A 480/277 3P4W 2500A

No power monitor was connected to this switchgear, but the phase amp readings were observed from the installed PowerLogic (Electrical Meter #3) panel meter with the plant operating on Tuesday, Jun 17th at approximately 11AM.

Actual observations were approximately 1450Amps/Phase. The following table summarized the likely loading conditions existing for this switchboard.

	Circuit Rating	Maximum Continuous Load (80% Rule)	Estimated Load	Available Capacity
Observed (6/17/08)	2500A	2000A	1500A	500A
Adjusted for PF Correction (0.75 corrected to 0.85)	2500A	2000A	1275A	775A

Table 3 – Summary of SWBD No. 3A ratings and loading along with additional capacity assuming a 0.15 improvement in power factor (PF).



Photo 4 – SWBD No. 3A.

Summary

The monitoring of the two locations, DB1 and SWBD No. 3, has documented the availability of an additional 879Amps of unused capacity in the distribution system. In addition observations of SWBD No. 3A indicate a high probability of an additional 500Amps of capacity.

It may be possible to gain additional distribution efficiencies through the application of power factor (PF) correction capacitors. It appears that the plant operates with a PF of 0.75. A PF improvement of 0.15 could recover an additional 366Amps of capacity. Additional measurements would be required to determine the actual recover of capacity and where PF capacitors would be installed.

The configuration of SWBD No. 3 (1200A) and SWBD No. 3A (2500A) needs to be documented and then reviewed by an engineer as there may be some code issues with the present configuration.

Report prepared by:



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