



DELTA
ELECTRIC CO., INC.
Electrical Analytical Services

2004 LINE 8 POWER QUALITY STUDY

JONES PLASTICS



FOR THE CONSIDERATION OF:
Jones Plastics and Circuit Rider Corp.

LOCATION: Plantside Drive. - Louisville, KY

2004 INSPECTION DATE:
MAY 28 - JULY 26



DELTA TECHNICAL SOLUTIONS
4300 Purchase Road
Louisville, KY 40218



DELTA ELECTRIC CO., INC.

July 26, 2004

Circuit Rider Corp.
RE: Jones Plastics – Line 8 PQ Survey
Site: 2410 Plantside Drive
Louisville, Ky. 40299

Circuit Rider Corp;

Thank you for the opportunity to provide our Delta Analytical Service and analysis for you. The following is a summary of your recent survey.

OVERVIEW:

On May 28th, 2004 Delta Electric Company, Inc.'s Service Division conducted a Power Quality survey of Machine Line 8. To perform the inspection, we used:

- (1) Metrosonics PA-7 Power Quality recorder
- (2) Digital Amprobe
- (3) Fluke 41B Harmonics Analyzer
- (4) Lap-Top computer

The objective and intent of this inspection was to examine the highlighted electrical equipment within the facility before and after any energy savings devices were installed.

It is the intention of Delta Electric Inc. to locate and properly diagnose all electrical anomalies within the scope of this survey. It is our goal to provide you with the information and service offerings necessary to have a safe and continuous electrical distribution system.

This is a subjective process based on scientific method but analyzed with field knowledge and experience. If you feel that we have made an error or omission in our reporting, please bring it to our attention and we will make it right. We guarantee it.

There are conditions that will impact the quality of a Power Quality analysis, that are beyond the control of the Technician conducting the survey:

1. Equipment not operational or not electrically loaded.

2. We must depend on your personnel to direct us to all of the equipment you choose to have inspected. If we are not aware of its existence we cannot inspect it. An inspection is usually limited to the equipment inventory specified in the proposal/scope.

3. Recommendation for repair is acknowledged, prioritized, and scheduled accordingly by the owner accordingly.

In no event will Delta Electric Inc. be liable to the customer for any damages, including without limitation, any lost profits, revenues or savings or any other incidental, consequential or special damages of any nature, arising at any time during or after your inspection has been performed.

In the 2004 survey of the specified equipment, we provided both before and after Power Quality results of machine Line #8. We will brief you on our findings and will offer the best solution to accommodate your needs. We sincerely appreciate your business, and hope that we can serve you in the future. Please remember that we are a full service electrical company offering contracting, analysis and design capability. If we can be of assistance in any way, please call us.

Sincerely,

Charles S. Lopresto

Charles S. Lopresto

Delta Electric Project Mgr. / Service Technician
Master Elect. Lic. No. ME - 17556
Cert. No. 4063



System Information

Model and Version pa74.3
Serial Number 1079
Report printed on 07/26/2004 at 12:19:31
File Name jp-l-8-test1.met
Customer/Department JP-L-8 CKT RIDER TEST 1 OF 2
Account/Meter Number
Address 1
Address 2
City, State, Zip
Phone Number
Comment 1
Comment 2

Recorder Setup

Setup File Name JP
Recorder Tag
Test Start 06/28/2004 at 10:30:00
Test End 07/12/2004 at 10:59:50
Clock hour orientation On
On Exceedance Only Off
Operating mode Power Quantity
Power measurement method 3-Wire Configuration (Two Wattmeter)
Memory Mode Stop When Full
Voltage range 600

RMS Test Started 06/28/2004 at 10:30:00
RMS Test Ended 07/12/2004 at 11:00:00
Total RMS Intervals 1346
RMS Data: Stats Saved MIN, MAX, RMS
RMS Storage Interval 0000:15:00
RMS Response Time 1.0 cycle(s)

Waveform Capture Rate On
Pre-Trigger cycles 0
Post-Trigger cycles 0

Demand storage rate 0000:15:00 (Fixed)
Demand interval length 15 minute(s)
Power factor sign (+) lagging, (-)leading

<<< Summary report for pa74.3 serial # 1079 >>>

Power Consumption for Whole Test

Channel	KWH	KVARH	KVAH
PH A	8612.5	6010.2	10502.3
PH B	8550.6	5266.7	10042.4
Total	17163.1	11276.9	20536.3

Power Projections

	Hour	Day	Week	Month	Year
PH A					
KWH	25.6	614.3	4299.9	18696.9	224362.7
KVARH	17.9	428.7	3000.7	13047.5	156569.7
KVAH	31.2	749.1	5243.4	22799.4	273592.2
PH B					
KWH	25.4	609.9	4269.0	18562.4	222748.6
KVARH	15.7	375.6	2629.4	11433.4	137200.2
KVAH	29.8	716.3	5013.8	21801.0	261612.0
Total					
KWH	51.0	1224.1	8568.9	37259.3	447111.3
KVARH	33.5	804.3	5630.1	24480.8	293769.9
KVAH	61.0	1464.7	10253.0	44582.1	534985.4

Power Factor for Whole Test

Channel	Min PF	Date	Time	Max PF	Date
PH A	+0.08	07/11/2004	07:30:00	+0.95	07/06/2004
PH B	-0.09	07/11/2004	09:30:00	+0.96	07/06/2004
Total	-0.25	07/04/2004	09:30:00	+0.96	07/06/2004

Maximum Imbalance for Whole Test

	Imbalance	Date	Time
Voltage	17.74%	07/09/2004	08:45:00
Current	13.04%	07/04/2004	08:30:00

Demand : For Whole Test

Channel	Min KW	Date	Time	Max KW	Date
PH A	0.2	07/04/2004	07:15:00	56.7	07/06/2004
PH B	0.2	07/04/2004	07:15:00	57.4	07/06/2004
Total	0.000	06/28/2004	10:45:00	0.000	06/28/2004
Total	0.4	07/04/2004	07:15:00	114.2	07/06/2004

Demand : Last Day					
Channel	Min KW	Date	Time	Max KW	Date
PH A	0.9	07/11/2004	11:00:00	31.9	07/12/2004
PH B	0.7	07/11/2004	11:00:00	31.9	07/12/2004
	0.000	07/11/2004	11:00:00	0.000	07/11/2004
Total	1.7	07/11/2004	11:00:00	63.7	07/12/2004

Demand : Last Hour					
Channel	Min KW	Date	Time	Max KW	Date
PH A	31.1	07/12/2004	10:00:00	31.3	07/12/2004
PH B	31.1	07/12/2004	10:00:00	31.7	07/12/2004
	0.000	07/12/2004	10:00:00	0.000	07/12/2004
Total	62.2	07/12/2004	10:00:00	63.0	07/12/2004

Vector Information				
Channel	Voltage	Angle	Current	Angle
PH A	495.8V	0°	76.9A	345°
PH B	494.0V	60°	74.8A	46°

Recorder Setup				
Input	Ratio	RMS Sag Limit	RMS Swell Limit	Sub Cycle Limit
PH A	1.0	432.0Volts(On)	528.1Volts(On)	
PH A	1.0	100Amps(Off)	320Amps(On)	
PH B	1.0	432.0Volts(On)	528.1Volts(On)	
PH B	1.0	100Amps(Off)	320Amps(On)	
PH C	1.0	100Amps(Off)	1000Amps(On)	

Overall Voltage/Current Statistics for Whole Test					
Input	MIN	Date	Time	RMS	MAX
PH A	200.0	06/30/2004	06:48:32.79	501.7	526.8
PH A	3	06/29/2004	05:04:44.91	70	640
PH B	339.2	07/09/2004	09:12:49.81	498.4	525.5
PH B	2	06/29/2004	05:04:45.87	68	640
PH C	1	06/29/2004	05:04:43.96	66	902

Overall Events for Whole Test

Swell events	92
Sag events	75

System Information

Model and Version pa74.3
Serial Number 1079
Report printed on 07/26/2004 at 12:51:41
File Name JP-L-8-TEST2.met
Customer/Department JONES PLASTICS
Account/Meter Number LINE 8
Address 1 TEST 2
Address 2
City, State, Zip
Phone Number
Comment 1
Comment 2

Recorder Setup

Setup File Name JP
Recorder Tag
Test Start 07/12/2004 at 12:45:00
Test End 07/26/2004 at 08:29:19
Clock hour orientation On
On Exceedance Only Off
Operating mode Power Quantity
Power measurement method 3-Wire Configuration (Two Wattmeter)
Memory Mode Stop When Full
Voltage range 600

RMS Test Started 07/12/2004 at 12:45:00
RMS Test Ended 07/26/2004 at 08:30:00
Total RMS Intervals 1327
RMS Data: Stats Saved MIN, MAX, RMS
RMS Storage Interval 0000:15:00
RMS Response Time 1.0 cycle(s)

Waveform Capture Rate On
Pre-Trigger cycles 0
Post-Trigger cycles 0

Demand storage rate 0000:15:00 (Fixed)
Demand interval length 15 minute(s)
Power factor sign (+) lagging, (-)leading

<<< Summary report for pa74.3 serial # 1079 >>>

Power Consumption for Whole Test

Channel	KWH	KVARH	KVAH
PH A	7024.7	4398.1	8287.9
PH B	6963.6	3787.2	7926.9
Total	13988.3	8185.3	16207.1

Power Projections

	Hour	Day	Week	Month	Year
PH A					
KWH	21.2	508.2	3557.5	15468.7	185623.9
KVARH	13.3	318.2	2227.3	9684.7	116216.7
KVAH	25.0	599.6	4197.2	18250.3	219003.5
PH B					
KWH	21.0	503.8	3526.5	15334.1	184009.7
KVARH	11.4	274.0	1917.9	8339.6	100075.5
KVAH	23.9	573.5	4014.3	17455.2	209462.8
Total					
KWH	42.2	1012.0	7084.0	30802.8	369633.6
KVARH	24.7	592.2	4145.2	18024.3	216292.1
KVAH	48.9	1172.5	8207.7	35688.8	428265.4

Power Factor for Whole Test

Channel	Min PF	Date	Time	Max PF	Date
PH A	0.00	07/17/2004	07:15:00	+0.89	07/26/2004
PH B	0.00	07/17/2004	07:15:00	+0.92	07/26/2004
Total	0.00	07/17/2004	07:15:00	+0.91	07/26/2004

Maximum Imbalance for Whole Test

	Imbalance	Date	Time
Voltage	21.61%	07/18/2004	10:30:00
Current	2.94%	07/13/2004	21:15:00

Demand : For Whole Test

Channel	Min KW	Date	Time	Max KW	Date
PH A	-1.3	07/17/2004	07:30:00	33.1	07/26/2004
PH B	-1.7	07/17/2004	16:15:00	33.3	07/26/2004
	0.000	07/12/2004	13:00:00	0.000	07/12/2004
Total	-2.6	07/17/2004	07:30:00	66.5	07/26/2004

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Demand : Last Day					
Channel	Min KW	Date	Time	Max KW	Date
PH A	-0.6	07/25/2004	10:30:00	33.1	07/26/2004
PH B	-0.7	07/25/2004	08:30:00	33.3	07/26/2004
	0.000	07/25/2004	08:30:00	0.000	07/25/2004
Total	-1.3	07/25/2004	10:30:00	66.5	07/26/2004

Demand : Last Hour					
Channel	Min KW	Date	Time	Max KW	Date
PH A	23.0	07/26/2004	07:30:00	30.0	07/26/2004
PH B	22.6	07/26/2004	07:30:00	27.6	07/26/2004
	0.000	07/26/2004	07:30:00	0.000	07/26/2004
Total	45.7	07/26/2004	07:30:00	57.6	07/26/2004

Vector Information				
Channel	Voltage	Angle	Current	Angle
PH A	497.6V	0°	72.4A	346°
PH B	495.3V	240°	70.6A	227°

Recorder Setup				
Input	Ratio	RMS Sag Limit	RMS Swell Limit	Sub Cycle Limit
PH A	1.0	432.0Volts(On)	528.1Volts(On)	
PH A	1.0	100Amps(Off)	320Amps(On)	
PH B	1.0	432.0Volts(On)	528.1Volts(On)	
PH B	1.0	100Amps(Off)	320Amps(On)	
PH C	1.0	100Amps(Off)	1000Amps(On)	

Overall Voltage/Current Statistics for Whole Test					
Input	MIN	Date	Time	RMS	MAX
PH A	19.4	07/16/2004	10:28:35.55	496.3	519.0
PH A	4	07/13/2004	20:58:37.02	62	561
PH B	32.0	07/13/2004	20:58:37.04	480.3	518.3
PH B	3	07/13/2004	22:11:16.90	60	665
PH C	3	07/13/2004	20:58:37.00	255	1413

Overall Events for Whole Test

Swell events	254
Sag events	46