Harmonic Analysis

	Drive Harmonic Calculator	Harmonic-US-3.0		ID #	

Zsource,Isc,Idmd Calculator		Isc/Idmd=	17.4	Idmd/Idrv =	4.58	Isc/Idrv=	79.82435	Isc@PCC V	%Zs
Detailed Inputs are in green		Primary Impedance: R =		Primary MVA SC =	400	Pri Isc =	17,496	481,139	0.122818
Critical Inputs are in red		+jX =		ohms, Z=		ohm X/R =		1E+15	5.91E-11
Application (Spc, Gen, Ded) =	Gen	Primary Wire AWG Size:		Wire Length(ft) =		# in Paral=		1E+15	5.91E-11
T1 KVA dxfmr=	2,500	Vdxfmrpri =	13,200	Idistxfmrrated@Vpcc =	3007.121	Amps		52,298	1.129923
Dist Xfmr % Z =	5.75	Vdxfmrsec =	480	Idmd t1pri =	98.4	Vll @ pcc =	480	Total =	47,170	1.252741
% Demand: T1 KVA =	90	KVA dmd =	2,250	Idmd t1sec=	2706.409	Idmd@pcc	2,706.4	UsedHPpcc=	540
PCC Location =	t1	Ave %Mtr Loading:	80	LineFreq =	60	Idrv@pcc	590.9234	DrvHPpcc=	675

Transformer		Network Inputs:		AveSysEff*PF:		0.82	Bus#	ID TAG	Fed From	Wire Size	# in Paral	W Length	Ampacity
#	ID TAG	Fed From	KVA	% Z	Vsec	Irated pcc	B1	MSB1	t1	500	10	200	3800
T1	XFMR-T1-UTIL	Utility	2,500	5.75	480	3007.1209	B2						0
T2						0	B3						0
T3						0	B4						0
T4						0	B5						0
T5						0	B6						0
T6						0	B7						0
T7						0	B8						0
T8						0	B9						0
T9						0	B10						0

Drive #	ID TAG	Fed From	Conv Type	Hp Drive	% Z Int	% Z Ext	% Load	Wire Size	# in Paral	W Length	Ampacity	%Z Total	Vll@drv
1	CH-6, 7, 8,9	t1	1	540	5		100	4	1	50	85	6.768234	480
2	P-5, 6	t1	1	40	5			4	1	50	85	4.205054	480
3	P-7, 8	t1	1	15	5			4	1	50	85	4.076895	480
4	P-11, 12, 13	t1	1	5	5			4	1	50	85	4.025632	480
5	VF-1, 2, 3, 4, 6, 7	t1	1	6	5			4	1	50	85	4.030758	480
6	VF-5, 8, 9, 10, 11, 1	t1	1	5	5			4	1	50	85	4.025632	480
7	VF-13	t1	1	1	5			4	1	50	85	4.005126	480
8	EF-7	t1	1	3	5			4	1	50	85	4.015379	480
9	CT-1, 2	t1	1	20	5			4	1	50	85	4.102527	480
10	P-1,2,3,4	t1	1	40	5			4	1	50	85	4.205054	480
11											0	0	0
12											0	0	0
13											0	0	0
14											0	0	0
15											0	0	0
16											0	0	0
17											0	0	0
18											0	0	0
19											0	0	0
20											0	0	0
21											0	0	0
22											0	0	0
23											0	0	0
24											0	0	0
25											0	0	0

All % Impedances are with respect to the total drives connected thru the PCC.

I-demand includes both drive currents and sinusoidal currents. The ratio I-demand / I-drives is assumed the same at all points in network unless sine loads are added at a point.

6 pulse drives have built-in internal line reactor or equivalent bus choke. For : 3/2.5% for VT, 2.3/1.9% for CT; for : 5/4% @ 60/50Hz.

For Converter Input above: Input 1 = 6 pulse, 2 = 12 pulse, 3 = 18 pulse, 4 = 5th harmonic trap and 5% filter, 5 = Mirus Coupled filter, 6 = ACS800-11, 17, 31, 37

7 = New TCI Trap Filter, 8 = Active Filter, 9 = Sine Load, 10 = MTE Low Pass Filter, 11 = 18 Pulse w/AutoTransformer

Harmonic Analysis

HARMONIC ANALYSIS REPORT

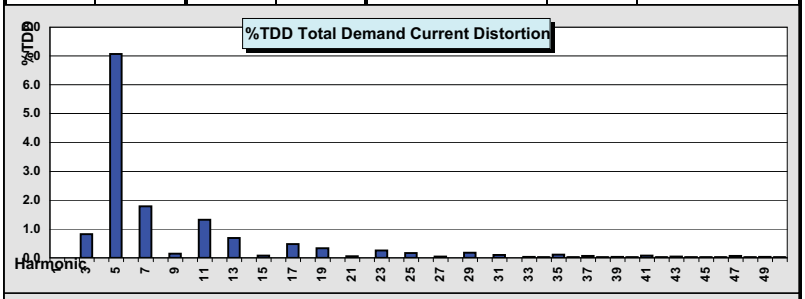
Project ID #:	
Description:	Harmonic Calculation
Requested By:	
Contact:	
FAX:	
Phone:	
By:	
Email:	
DATE:	
Phone:	
Fax:	

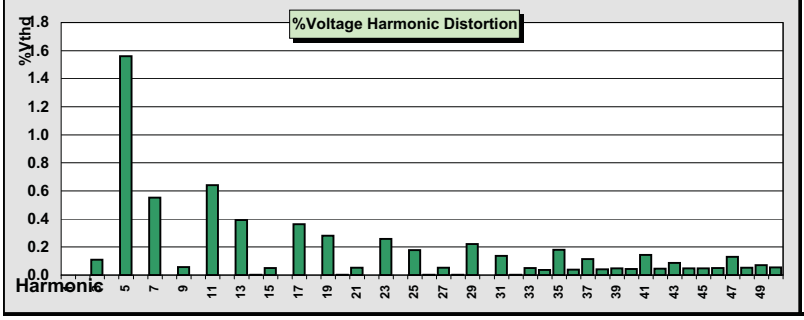
System Data:	PCC =	t1
MVAsc before Xfmr =	400	MVA
Other Z primary: R =		ohm
X =		ohm
Z =		ohm
AWG Wire Size =		
Wire Length =		feet
# in Parallel =		
% Wire Voltage Drop		%
Dist Xfmr KVA:	2500	KVA
Dist Xfmr % Z:	5.75	%
DXfmr Irate @ PCC:	3007.12	Amps
Demand % KVA Xfmr:	90	%
Demand KVA:	2250	KVA
Ave % Motor Loading:	80	%

Meets IEEE-519: % TDD at T1 PRI

% Ithdf:	36.720	IEEE-519 Limits:	
% TDD	7.526	%TDD limit	
		@ PCC	5
		@ t1 Pri	15
% Vthdf:	1.956	% Vthdlm	5

Line Freq =	60	Hz
Vll @ PCC =	480	Volts
Total Drive HP @ PCC	675	HP
Total Used HP @ PCC	540.002	HP
I Short Ckt @ PCC =	47,170	Amps
I demand @ PCC =	2,706.4	Amps
I drives in @ PCC =	590.9	Amps
Isc / Idmd =	17.4	
Idmd/Idrv =	4.6	
Isc/Idrv =	79.8	
%Zs before PCC =	1.3	%
% Zf after PCC =	6.0	%
% Z loop @ PCC=	7.3	%
If drvs@ PCC =	554.7	Amps
Ih @ PCC =	203.7	Amps
Irms @ PCC =	590.9	Amps
K factor =	5.001	
Disp PF =	0.965	
Act PF =	0.906	
Vrms @ PCC =	471	Volts AC
Vbus @ D1 =	617.6	Volts DC





Harmonic	Frequency	%TDD Limit	%Ithd	Ih amps	% Vthd	% TDD
1	60		100.0	554.71	0.000	0.000
2	120	1.00	0.02	0.09	0.000	0.003
3	180	1.00	4.00	22.17	0.108	0.819
4	240	1.00	0.02	0.10	0.001	0.004
5	300	4.00	34.51	191.42	1.561	7.073
6	360	1.00	0.01	0.05	0.000	0.002
7	420	4.00	8.71	48.32	0.552	1.785
8	480	1.00	0.01	0.04	0.001	0.001
9	540	1.00	0.71	3.96	0.058	0.146
10	600	1.00	0.00	0.03	0.000	0.001
11	660	2.00	6.44	35.73	0.641	1.320
12	720	0.50	0.00	0.02	0.000	0.001
13	780	2.00	3.33	18.50	0.392	0.684
14	840	0.50	0.01	0.05	0.001	0.002
15	900	0.50	0.36	2.01	0.049	0.074
16	960	0.50	0.01	0.04	0.001	0.002
17	1020	1.50	2.35	13.05	0.362	0.482
18	1080	0.38	0.00	0.02	0.001	0.001
19	1140	1.50	1.63	9.04	0.280	0.334
20	1200	0.38	0.01	0.04	0.001	0.002
21	1260	0.38	0.28	1.53	0.053	0.057
22	1320	0.38	0.01	0.03	0.001	0.001
23	1380	0.60	1.24	6.89	0.258	0.255
24	1440	0.15	0.00	0.02	0.001	0.001
25	1500	0.60	0.79	4.39	0.179	0.162
26	1560	0.15	0.01	0.05	0.002	0.002
27	1620	0.15	0.22	1.21	0.053	0.045
28	1680	0.15	0.01	0.03	0.002	0.001
29	1740	0.60	0.84	4.67	0.221	0.173
30	1800	0.15	0.00	0.02	0.001	0.001
31	1860	0.60	0.49	2.71	0.137	0.100
32	1920	0.15	0.01	0.05	0.003	0.002
33	1980	0.15	0.17	0.92	0.050	0.034
34	2040	0.15	0.12	0.66	0.037	0.025
35	2100	0.30	0.57	3.15	0.180	0.116
36	2160	0.08	0.12	0.66	0.039	0.025
37	2220	0.30	0.34	1.91	0.115	0.071
38	2280	0.08	0.12	0.66	0.041	0.025
39	2340	0.08	0.14	0.76	0.049	0.028
40	2400	0.08	0.12	0.66	0.043	0.025
41	2460	0.30	0.39	2.15	0.144	0.079
42	2520	0.08	0.12	0.66	0.046	0.025
43	2580	0.30	0.22	1.23	0.086	0.045
44	2640	0.08	0.12	0.66	0.048	0.025
45	2700	0.08	0.12	0.66	0.049	0.025
46	2760	0.08	0.12	0.66	0.050	0.025
47	2820	0.30	0.31	1.70	0.130	0.063
48	2880	0.08	0.12	0.66	0.052	0.025
49	2940	0.30	0.16	0.89	0.071	0.033
50	3000	0.08	0.12	0.66	0.054	0.025