

Unit	Sl# of Trmr	KVA	%Z	Vpri - 3ph.L to L	Ip in Cont	Ip in pulsed	Vsec no load L-L	%X of CLR1&2 & XQT2 referred to the ckt.	Is RMS Cont	Is RMS pulsed	Pri Res. (mOhm)	Pri Res. referred to secondary (mOhm)	Sec. Res. (mOhm)	Total Res*(ref. Sec)(mOhm)	Ideal DC no load Volts	Rated DC Volts	kVA (Idc=Is*(m^0.5)) - Amps	Rated pulsed DC Current-kA	Z base (Ohms)	Z sec side	X Sec side	L	L/2	Kimbark 6fL	Total Eq. Resis - ohms	Volt Drop	Percent drop
T1	86-1258	225	6.07	4160	31.2	124.91	255	7.53	509.43	2038	838	3.1487	1.64	5.3634	344.37	300	4991.34	5	0.289	0.0175423	0.038476	0.00010206	5.103E-05	0.03674144	<b>0.042105</b>	105.26	30.57
T1	86-1264	225	6.23	4160	31.2	124.91	255	7.53	509.43	2038	832	3.1262	1.68	5.3829	344.37	300	4991.34	5	0.289	0.0180047	0.038954	0.00010333	5.166E-05	0.03719876	<b>0.042582</b>	106.45	30.91
T2	86-1260	225	5.91	4160	31.2	124.91	255	7.53	509.43	2038	841	3.1600	1.66	5.3984	344.37	300	4991.34	5	0.289	0.0170799	0.037978	0.000100739	5.037E-05	0.03626593	<b>0.041664</b>	104.16	30.25
T2	86-1262	225	6.12	4160	31.2	124.91	255	7.53	509.43	2038	831	3.1224	1.76	5.4683	344.37	300	4991.34	5	0.289	0.0176868	0.038593	0.000102372	5.119E-05	0.03685408	<b>0.042322</b>	105.81	30.72
T3	86-1259	225	5.99	4160	31.2	124.91	255	7.53	509.43	2038	837	3.1450	1.66	5.3816	344.37	300	4991.34	5	0.289	0.0173111	0.038227	0.000101399	5.07E-05	0.03650373	<b>0.041885</b>	104.71	30.41
T3	86-1263	225	5.95	4160	31.2	124.91	255	7.53	509.43	2038	830	3.1187	1.67	5.3633	344.37	300	4991.34	5	0.289	0.0171955	0.038111	0.000101092	5.055E-05	0.03639328	<b>0.041757</b>	104.39	30.31
T4	86-1261	225	6.25	4160	31.2	124.91	255	7.53	509.43	2038	836	3.1412	1.65	5.3662	344.37	300	4991.34	5	0.289	0.0180625	0.03902	0.000103504	5.175E-05	0.03726158	<b>0.042628</b>	106.57	30.95
T4	86-1265	225	6.15	4160	31.2	124.91	255	7.53	509.43	2038	834	3.1337	1.74	5.4586	344.37	300	4991.34	5	0.289	0.0177735	0.038688	0.000102623	5.131E-05	0.03694413	<b>0.042403</b>	106.01	30.78
DF	86-1256	300	6.85	4160	41.6	166.54	170	7.53	1018.85	4075	625	1.0437	0.594	1.8343	229.58	200	9982.68	10	0.09633	0.0065988	0.013597	3.60659E-05	1.803E-05	0.01298373	<b>0.014818</b>	74.09	32.27
DF	86-1257	300	6.92	4160	41.6	166.54	170	7.53	1018.85	4075	632	1.0554	0.578	1.8294	229.58	200	9982.68	10	0.09633	0.0066663	0.013668	3.62557E-05	1.813E-05	0.01305206	<b>0.014881</b>	74.41	32.41
IF	86-1175	1505	5.96	4160	208.9	835.49	426	7.53	2039.70	8159	50.3	0.5275	0.714	1.3905	575.30	500	19984.9	20	0.12058	0.0071867	0.016136	4.28009E-05	2.14E-05	0.01540832	<b>0.016799</b>	167.99	29.20
IF	86-1176	1505	5.72	4160	208.9	835.49	426	7.53	2039.70	8159	50.6	0.5306	0.706	1.3850	575.30	500	19984.9	20	0.12058	0.0068973	0.015841	4.20208E-05	2.101E-05	0.01512748	<b>0.016512</b>	165.12	28.70
PEI	DELTA	342	1.2	4160	50.0	199.89	407.40	7.53	513.00	2052	174.74	1.6759	2.74	4.0073	550.18	500	2513.18	2.5	0.48531	0.0058237	0.040789	0.000108195	5.41E-05	0.03895035	<b>0.042958</b>	107.96	19.62
	WYE	342	1.2	4160	50.0	199.89	407.40	7.53	513.00	2052	174.74	1.6759	0.95	2.0025	550.18	500	2513.18	2.5	0.48531	0.0058237	0.042032	0.000111492	5.575E-05	0.04013718	<b>0.042140</b>	105.90	19.25

Total pulsed current in the feeder to Q1B5A through E 3403.10 A

401.79

Total voltage drop in XQT2,CLRs1&2 if all pulsed simultaneously at peak with

66% diversity factor

169.22 V

**Summary of the equivalent resistance to compute voltage drop**

Unit	Sl# of Trmr	KVA	Volt drop on full load	Re*	Average Drop	Av. Re per tmfr or wdg(PEI)	Rec per CKT; Rec=Re/2
					Volts	Ohms	Ohms
T1	86-1258	225	105.262	0.042105			
	86-1264	225	106.454	0.042582	105.9	0.042343	0.021172
T2	86-1260	225	104.161	0.041664			
	86-1262	225	105.806	0.042322	105.0	0.041993	0.020997
T3	86-1259	225	104.713	0.041885			
	86-1263	225	104.392	0.041757	104.6	0.041821	0.020910
T4	86-1261	225	106.569	0.042628			
	86-1265	225	106.007	0.042403	106.3	0.042515	0.021258
DF	86-1256	300	74.09	0.014818			
	86-1257	300	74.4075	0.014881	74.2	0.014850	0.007425
IF	86-1175	1505	167.988	0.016799			
	86-1176	1505	165.125	0.016512	166.6	0.016656	0.008328
PEI	Delta	342	88.1491	0.042958			
	Wye	342	86.4706	0.042140	87.3	0.042549	0.021274

\* Equivalent Resistance Re per tmfr.

The drop in the Interphase transformer is not included in the above.

(\$G\$18/E3)\*100

**Load assignment**

1/3/2006

Load Coil	Supply	Amp max	Ideal Volts	Cable#	Cabling Loop resis.	Eff. Loop resis. to coil term.	Adjusted Resis*. mohms	Total Resis. mohms	Volt drop	Forcing Volt for coil	Shunt in Supply	Coil Resis	Total ckt. Resis-no kimbark	Coil Inductance	Total ckt. Inductance	L/R	Volt drop with 50A	
M2+M3	T1    T4	10000	344.37	41875CA	4.87	3.14744	3.53	14.07	140.67	203.70	50mV= 1.5kA	0.01399	0.01751	0.02096	0.02104	1.20117	12275.2422	0.875606425
					4.92													
PF4	T2	5000	344.37	41856CA	4.87	10.44	11.69	53.88	269.39	625.17	50mV= 1.5kA	0.00311	0.01480	0.01520	0.01528	1.03176	6042.6799	0.74024
	PEI**	5000	550.18		4.87													
M1	DF	10000	229.58	41805CA	3.34	4.04	4.52	11.95	119.50	110.08	50mV= 2.5kA	0.00778	0.01230	0.01500	0.01508	1.22543	11638.0499	0.61509
PF1a	IF	20000	575.3	41816CA	1.67	2.37	2.65	10.98	219.64	355.66	50mV= 5kA	0.00067	0.00332	0.00080	0.00087	0.26232	49389.5389	0.16602
PF6	T3	5000	344.37	41826CA	4.87	5.57	6.2384	27.15	135.74	208.63	50mV= 1.5 kA	0.00284	0.00908	0.00624	0.00632	0.69561	11483.256	0.45392

\* Adjusted (12%) to compensate for temp. - arbitrary

\*\* Assumed cable loop resistance of 4.87mOhms; Design should be such that the T3 supply can be connected to feed & test TF

PEI TRANSFORMER DATA FROM EARNIE SCHOOP				JANUARY 04 2006			
2500MW (pulsed) power supply at 500V dc- PEI part# 11345; PEI Job# 90-027 S/N 01							
Three winding transformer with Delta primary comprising of two parallel windings and WYE & DELTA secondaries							
Power delivered (Pulsed)	2500.00	kW					
DC Voltage (open circuit)	549.64	V	(Calculated from data furnished)				
DC Volt (Pulse Loaded)	500.00	V	(Based on nameplate?)				
kVA -RMS	684.00	kVA					
kVA -Pulsed	2736.00	kVA					
Primary Voltage	4160.00	V	(+/- 5%)				
Secondary Volt - Delta	407.40	V	(+/- 5%)				
Secondary Volt - Wye	407.40	V	(+/- 5%)				
Voltage Ratio	10.21						
Impedance	1.20	%					
Note: The primary voltage required to inject full RMS current in both secondaries is 49.76V with the secondaries shorted.							
Primary Current	29.20	A	in each of the two parallel primary windings				
Primary Line current	101.15	A					
Sec. Line Current-Delta	513.00	A					
Sec. Line Current-Wye	513.00	A					
Primary Resis.- Parallel 1	331.53	mOhms	per phase				
Primary Resis.- Parallel 2	369.50	mOhms	per phase				
Pri. Resis.(both parallels)	174.74	mOhms	per phase				
Secondary Delta Resis.	2.74	mOhms	per phase				
Secondary Wye Resis.	0.95	mOhms	per phase				
Insulation tests: primary to ground at 10kV; Primary to Secondary at 10kV; Secondary (Wye) to ground at 2.5kV							
Secondary (Delta) to Ground at 2.5kV; Also passed induced voltage tests							

**GENERAL**

Vdo = $3 \cdot (6^{0.5}) \cdot \text{Eln}/\text{PI}$	1.35*E Line to Line	2.34* E Line to Neutral
	% Impedance = $(I Z/V) \cdot 100 = (V^2 \cdot Z/VA) \cdot 1$	OR
	Z= $\%Z \cdot ((V/I)/100)$	Z/Zbase
Is = $I_{dc}/(m^{0.5})$	Kimbark = $6fLc$	Drop = $I \cdot (\text{Kimbark} + \text{Res.})$

XQT2	Q bus CLR	XQT2 CLR	Total%	based on 20MVA	
MVA S/S	30	0.0500	0.0300		
%Imp	7.5	0.5021	3.0026	11.045	7.534
I full load	4164				
I at 2/3 load	2776				
Sev.Volt	4160				
Z of trmr.	0.0753	Ohms			
IZ	209				

0.289  
0.0175423

0.251049416

0

t(s)	M1	M2/3	PF1A	PF4	PF6	TF	Plasma
Start charging coils	-4	0	0	0	0	0	0.00
Dwell	0	9115	9115	0	0	0	0.00
Start Ip ramp	0.05	9115	9115	0	0	0	0.00
Heat to high beta	0.12	9115	9115	18109	2947	227	-26068.00
Hold at high beta	0.123	9115	9115	18466	3005	231	-26068.00
Start discharging coils	0.13	9115	9115	19299	3141	241	-26068.00
Coils discharged	2.63	0	0	0	0	0	0.00
MVA	2.09262	3.13893	11.102715	2.80979	0.0829932		
MVA Total							19.22705
MW	1.02207	1.45496	1.2366876		0.0005273		
MW (Total)							3.714252
PF							0.193178
From Wayne on 05/16/06							
	0.385						
	3.3						