IEEE POWER ENGINEERING SOCIETY
Power System Analysis, Computing and Economics Committee

Chair
MARTIN L. BAUGHMAN
Professor Emeritus
The University of Texas at Austin
5703 Painted Valley Drive
Austin, TX 78759
Vox: 512-345-8255
Fax: 512-345-9880
baughman@mail.utexas.edu

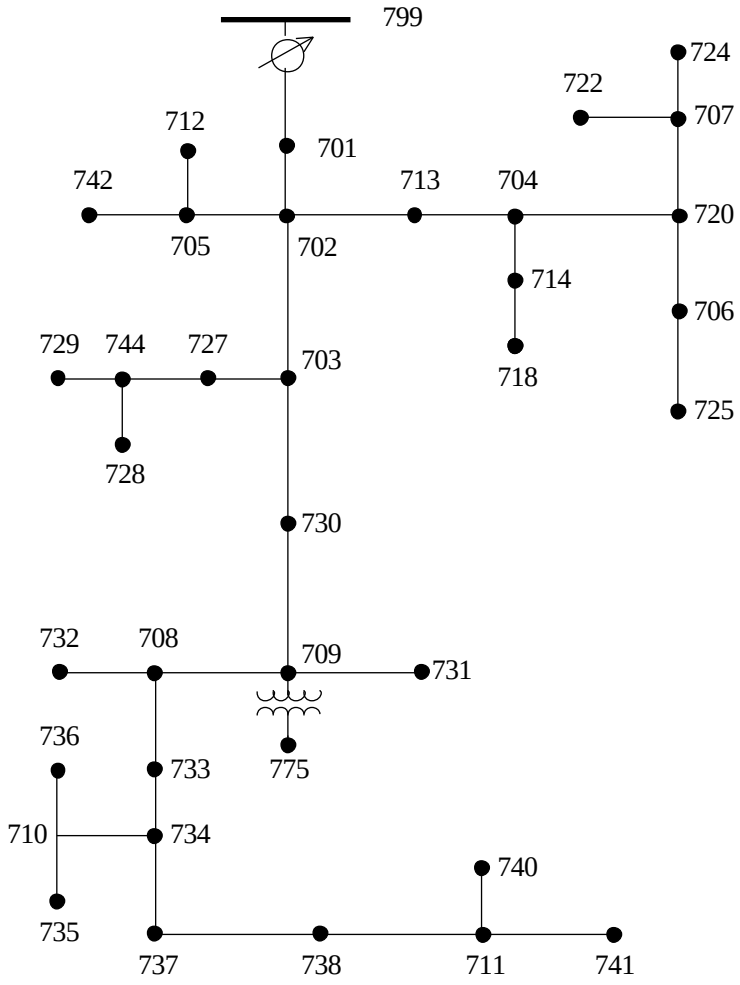
Vice Chair
CHEN-CHING LIU
Dept. of Electrical Eng.
University of Washington
Box 352500
Seattle, WA 98195
Vox: 206-543-2198
Fax: 206-543-3842
liu@ee.washington.edu

Secretary
ROGER C. DUGAN
Sr. Consultant
Electrotek Concepts, Inc.
408 N Cedar Bluff Rd
Knoxville, TN 37923
Vox: 865-470-9222
Fax: 865-470-9223
r.dugan@ieee.org

Distribution System Analysis Subcommittee

IEEE 37 Node Test Feeder

IEEE 37 Node Test Feeder



Segment Data

Node A	Node B	Length(ft.)	Config.
701	702	960	722
702	705	400	724
702	713	360	723
702	703	1320	722
703	727	240	724
703	730	600	723
704	714	80	724
704	720	800	723
705	742	320	724
705	712	240	724
706	725	280	724
707	724	760	724
707	722	120	724
708	733	320	723
708	732	320	724
709	731	600	723
709	708	320	723
710	735	200	724
710	736	1280	724
711	741	400	723
711	740	200	724
713	704	520	723
714	718	520	724
720	707	920	724
720	706	600	723
727	744	280	723
730	709	200	723
733	734	560	723
734	737	640	723
734	710	520	724
737	738	400	723
738	711	400	723
744	728	200	724
744	729	280	724
775	709	0	XFM-1
799	701	1850	721

Underground Cable Configurations (Config.)

Config.	Phasing	Cable	Spacing ID
721	A B C	1,000,000 AA, CN	515
722	A B C	500,000 AA, CN	515
723	A B C	2/0 AA, CN	515
724	A B C	#2 AA, CN	515

Regulator Data

Regulator ID:	1	
Line Segment:	799 -701	
Location:	799	
Phases:	A - B -C	
Connection:	AB - CB	
Monitoring Phase:	AB & CB	
Bandwidth:	2.0 volts	
PT Ratio:	40	
Primary CT Rating:	350	
Compensator Settings:	Ph-AB	Ph-CB
R - Setting:	1.5	1.5
X - Setting:	3	3
Voltage Level:	122	122

Transformer Data

	kVA	kV-high	kV-low	R - %	X - %
Substation:	2,500	230 D	4.8 D	2	8
XFM -1	500	4.8 D	.480 D	0.09	1.81

Spot Loads

Node	Load Model	Ph-1 kW	Ph-1 kVAr	Ph-2 kW	Ph-2 kVAr	Ph-3 kW	Ph-4 kVAr
701	D-PQ	140	70	140	70	350	175
712	D-PQ	0	0	0	0	85	40
713	D-PQ	0	0	0	0	85	40
714	D-I	17	8	21	10	0	0
718	D-Z	85	40	0	0	0	0
720	D-PQ	0	0	0	0	85	40
722	D-I	0	0	140	70	21	10
724	D-Z	0	0	42	21	0	0
725	D-PQ	0	0	42	21	0	0
727	D-PQ	0	0	0	0	42	21
728	D-PQ	42	21	42	21	42	21
729	D-I	42	21	0	0	0	0
730	D-Z	0	0	0	0	85	40
731	D-Z	0	0	85	40	0	0
732	D-PQ	0	0	0	0	42	21
733	D-I	85	40	0	0	0	0
734	D-PQ	0	0	0	0	42	21
735	D-PQ	0	0	0	0	85	40
736	D-Z	0	0	42	21	0	0
737	D-I	140	70	0	0	0	0
738	D-PQ	126	62	0	0	0	0
740	D-PQ	0	0	0	0	85	40
741	D-I	0	0	0	0	42	21
742	D-Z	8	4	85	40	0	0
744	D-PQ	42	21	0	0	0	0
Total		727	357	639	314	1091	530

IEEE 37 NODE TEST FEEDER
Phase Impedance and Admittance Matrices

Configuration 721

```
          Z (R +jX) in ohms per mile
0.2926  0.1973   0.0673 -0.0368   0.0337 -0.0417
                 0.2646  0.1900   0.0673 -0.0368
                                  0.2926  0.1973
         B in micro Siemens per mile
         159.7919    0.0000    0.0000
                   159.7919    0.0000
                             159.7919
```

Configuration 722

```
          Z (R +jX) in ohms per mile
0.4751  0.2973   0.1629 -0.0326   0.1234 -0.0607
                 0.4488  0.2678   0.1629 -0.0326
                                  0.4751  0.2973
         B in micro Siemens per mile
         127.8306    0.0000    0.0000
                   127.8306    0.0000
                             127.8306
```

Configuration 723

```
          Z (R +jX) in ohms per mile
1.2936  0.6713   0.4871  0.2111   0.4585  0.1521
                 1.3022  0.6326   0.4871  0.2111
                                  1.2936  0.6713
         B in micro Siemens per mile
          74.8405    0.0000    0.0000
                    74.8405    0.0000
                              74.8405
```

Configuration 724

```
          Z (R +jX) in ohms per mile
2.0952  0.7758   0.5204  0.2738   0.4926  0.2123
                 2.1068  0.7398   0.5204  0.2738
                                  2.0952  0.7758
         B in micro Siemens per mile
          60.2483    0.0000    0.0000
                    60.2483    0.0000
                              60.2483
```

Power Flow Results

- **R A D I A L F L O W S U M M A R Y** - DATE: 6-24-2004 AT 16:23:14 HOURS ---
SUBSTATION: IEEE 37; FEEDER: IEEE 37

SYSTEM INPUT	PHASE (A)	PHASE (B)	PHASE (C)	TOTAL
kW :	895.496	683.879	942.452	2521.827
kVAr :	565.765	389.365	294.305	1249.435
kVA :	1059.246	786.954	987.335	2814.374
PF :	.8454	.8690	.9545	.8961

LOAD	(A-B)	(B-C)	(C-A)	DELTA
kW :	732.331	638.824	1090.100	2461.255
kVAr :	359.538	313.874	529.558	1202.970
kVA :	815.829	711.768	1211.920	2739.510
PF :	.8977	.8975	.8995	.8984

LOSSES	(A)	(B)	(C)	
kW :	26.671	13.804	20.088	60.563
kVAr :	18.769	9.953	17.733	46.455
kVA :	32.613	17.018	26.796	76.328

CAPAC	(A-N)	(A-B)	(B-N)	(B-C)	(C-N)	(C-A)	WYE	DELTA
R-kVA:	.0	.0	.0	.0	.0	.0	.0	.0
TOT :	.000		.000		.000		.000	
A-kVA:	.0	.0	.0	.0	.0	.0	.0	.0
TOT :	.000		.000		.000		.000	

--- **V O L T A G E P R O F I L E** ---- DATE: 6-24-2004 AT 16:23:24 HOURS ----
SUBSTATION: IEEE 37; FEEDER: IEEE 37

NODE	MAG	ANGLE	MAG	ANGLE	MAG	ANGLE	mi.to SR
	A-B		B-C		C-A		
799	1.0000 at	.00	1.0000 at	-120.00	1.0000 at	120.00	.000
RG7	1.0437 at	.00	1.0250 at	-120.00	1.0345 at	120.90	.000
701	1.0317 at	-.08	1.0144 at	-120.39	1.0183 at	120.61	.351
702	1.0248 at	-.14	1.0088 at	-120.58	1.0101 at	120.43	.532
703	1.0178 at	-.17	1.0051 at	-120.70	1.0034 at	120.20	.782
727	1.0167 at	-.16	1.0044 at	-120.69	1.0025 at	120.19	.828
744	1.0160 at	-.16	1.0041 at	-120.68	1.0021 at	120.17	.881
728	1.0156 at	-.15	1.0037 at	-120.68	1.0017 at	120.18	.919
729	1.0157 at	-.15	1.0040 at	-120.67	1.0019 at	120.17	.934
730	1.0127 at	-.12	1.0021 at	-120.73	.9981 at	120.10	.896
709	1.0111 at	-.11	1.0012 at	-120.73	.9967 at	120.07	.934
708	1.0087 at	-.08	1.0002 at	-120.73	.9945 at	120.02	.995
732	1.0086 at	-.07	1.0001 at	-120.74	.9941 at	120.02	1.055
733	1.0063 at	-.05	.9993 at	-120.73	.9925 at	119.96	1.055
734	1.0029 at	-.01	.9978 at	-120.74	.9893 at	119.88	1.161
710	1.0024 at	.01	.9968 at	-120.77	.9878 at	119.91	1.260
735	1.0023 at	.03	.9966 at	-120.78	.9873 at	119.91	1.298
736	1.0019 at	-.02	.9951 at	-120.75	.9875 at	119.95	1.502
737	.9996 at	.02	.9969 at	-120.71	.9872 at	119.79	1.282
738	.9985 at	.04	.9965 at	-120.71	.9861 at	119.76	1.358
711	.9982 at	.06	.9963 at	-120.74	.9852 at	119.76	1.434
740	.9981 at	.07	.9961 at	-120.75	.9847 at	119.76	1.472
741	.9981 at	.07	.9962 at	-120.75	.9849 at	119.76	1.510
731	1.0109 at	-.13	1.0004 at	-120.74	.9964 at	120.10	1.048
XF7	1.0111 at	-.11	1.0012 at	-120.73	.9967 at	120.07	.934
775	1.0111 at	-.11	1.0012 at	-120.73	.9967 at	120.07	.934
705	1.0241 at	-.13	1.0075 at	-120.59	1.0088 at	120.46	.608
712	1.0240 at	-.11	1.0073 at	-120.61	1.0082 at	120.46	.654
742	1.0238 at	-.15	1.0067 at	-120.59	1.0086 at	120.48	.669
713	1.0234 at	-.15	1.0070 at	-120.60	1.0083 at	120.44	.601
704	1.0217 at	-.17	1.0044 at	-120.61	1.0065 at	120.46	.699
714	1.0214 at	-.17	1.0043 at	-120.60	1.0064 at	120.46	.714
718	1.0201 at	-.16	1.0041 at	-120.57	1.0060 at	120.42	.813
720	1.0205 at	-.21	1.0011 at	-120.66	1.0041 at	120.53	.851
706	1.0204 at	-.22	1.0007 at	-120.66	1.0039 at	120.54	.964
725	1.0202 at	-.23	1.0003 at	-120.65	1.0039 at	120.55	1.017
707	1.0187 at	-.30	.9959 at	-120.62	1.0025 at	120.67	1.025
722	1.0185 at	-.30	.9954 at	-120.62	1.0023 at	120.68	1.048
724	1.0184 at	-.32	.9950 at	-120.61	1.0023 at	120.69	1.169

---------- **VOLTAGE REGULATOR DATA** ---- DATE: 6-24-2004 AT 16:27:42 HOURS --
SUBSTATION: IEEE 37; FEEDER: IEEE 37

[NODE]	[VREG]	[SEG]	[NODE]	MODEL	OPT	BNDW
799	RG7	701	701	Phase AB & CB, Open Delta	RX	2.00

PHASE	LDCTR	VOLT HOLD	R-VOLT	X-VOLT	PT RATIO	CT RATE	TAP
1		122.000	1.500	3.000	40.00	350.00	7
3		122.000	1.500	3.000	40.00	350.00	4

- **R A D I A L P O W E R F L O W** --- DATE: 6-24-2004 AT 16:23:38 HOURS ---
SUBSTATION: IEEE 37; FEEDER: IEEE 37

NODE	VALUE	PHASE A-B (LINE A)		PHASE B-C (LINE B)		PHASE C-A (LINE C)		UNT O/L< 60.%
NODE: 799	VOLTS:	1.000	.00	1.000	-120.00	1.000	120.00	MAG/ANG
kVll 4.800	NO LOAD OR CAPACITOR REPRESENTED AT SOURCE NODE							
TO NODE RG7 <VRG>..:		382.22	-62.28	283.97	-179.65	356.27	72.66	AMP/DG <
<RG7 > LOSS= .000:		(.000)		(.000)		(.000)		kW
NODE: RG7	VOLTS:	1.044	.00	1.025	-120.00	1.035	120.90	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	CAP:		.00		.00		.00	kVR
FROM NODE 799 <VRG>:		366.20	-62.28	274.03	-178.41	347.58	72.66	AMP/DG <
<RG7 > LOSS= .000:		(.000)		(.000)		(.000)		kW
TO NODE 701 .....:		366.20	-62.28	274.03	-178.41	347.58	72.66	AMP/DG <
<701 > LOSS= 27.437:		(11.802)		(5.192)		(10.443)		kW
NODE: 701	VOLTS:	1.032	-.08	1.014	-120.39	1.018	120.61	MAG/ANG
	D-LD:	140.00	70.00	140.00	70.00	350.00	175.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE RG7 .....:		366.29	-62.31	274.10	-178.44	347.63	72.63	AMP/DG <
<701 > LOSS= 27.437:		(11.802)		(5.192)		(10.443)		kW
TO NODE 702 .....:		267.63	-59.37	218.84	-178.93	248.48	70.62	AMP/DG
<702 > LOSS= 10.675:		(4.633)		(2.490)		(3.552)		kW
NODE: 702	VOLTS:	1.025	-.14	1.009	-120.58	1.010	120.43	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	CAP:		.00		.00		.00	kVR
FROM NODE 701 .....:		267.66	-59.39	218.87	-178.94	248.51	70.60	AMP/DG
<702 > LOSS= 10.675:		(4.633)		(2.490)		(3.552)		kW
TO NODE 703 .....:		189.70	-55.62	134.29	168.37	131.76	79.32	AMP/DG
<703 > LOSS= 5.803:		(3.108)		(1.290)		(1.405)		kW
TO NODE 705 .....:		20.46	-80.15	20.70	-150.32	33.68	64.53	AMP/DG
<705 > LOSS= .239:		(.053)		(.051)		(.135)		kW
TO NODE 713 .....:		59.47	-64.41	72.39	-163.24	86.35	59.65	AMP/DG
<713 > LOSS= .908:		(.217)		(.292)		(.399)		kW
NODE: 703	VOLTS:	1.018	-.17	1.005	-120.70	1.003	120.20	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	CAP:		.00		.00		.00	kVR
FROM NODE 702 .....:		189.73	-55.64	134.35	168.34	131.78	79.28	AMP/DG
<703 > LOSS= 5.803:		(3.108)		(1.290)		(1.405)		kW
TO NODE 727 .....:		42.39	-50.10	34.99	167.20	25.71	74.36	AMP/DG
<727 > LOSS= .266:		(.132)		(.088)		(.046)		kW
TO NODE 730 .....:		147.60	-57.23	99.37	168.74	106.19	80.47	AMP/DG
<730 > LOSS= 4.021:		(2.106)		(.915)		(1.000)		kW

- **R A D I A L P O W E R F L O W** --- DATE: 6-24-2004 AT 16:23:38 HOURS ---
SUBSTATION: IEEE 37; FEEDER: IEEE 37

NODE	VALUE	PHASE A-B (LINE A)		PHASE B-C (LINE B)		PHASE C-A (LINE C)		UNT O/L< 60.%
NODE: 727	VOLTS:	1.017	-.16	1.004	-120.69	1.002	120.19	MAG/ANG
	D-LD:	.00	.00	.00	.00	42.00	21.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 703 ....:		42.39	-50.11	35.00	167.19	25.71	74.34	AMP/DG
<727 > LOSS= .266:		(.132)		(.088)		(.046)		kW
TO NODE 744 .....:		35.00	-40.61	35.00	167.19	16.81	63.30	AMP/DG
<744 > LOSS= .118:		(.054)		(.053)		(.011)		kW
NODE: 744	VOLTS:	1.016	-.16	1.004	-120.68	1.002	120.17	MAG/ANG
	D-LD:	42.00	21.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 727 ....:		35.00	-40.63	35.01	167.17	16.82	63.26	AMP/DG
<744 > LOSS= .118:		(.054)		(.053)		(.011)		kW
TO NODE 728 .....:		16.82	-56.76	16.82	-176.77	16.82	63.24	AMP/DG
<728 > LOSS= .051:		(.018)		(.017)		(.016)		kW
TO NODE 729 .....:		9.78	-26.67	9.78	153.31	.01	.00	AMP/DG
<729 > LOSS= .016:		(.008)		(.008)		(.000)		kW
NODE: 728	VOLTS:	1.016	-.15	1.004	-120.68	1.002	120.18	MAG/ANG
	D-LD:	42.00	21.00	42.00	21.00	42.00	21.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 744 ....:		16.83	-56.78	16.83	-176.79	16.83	63.22	AMP/DG
<728 > LOSS= .051:		(.018)		(.017)		(.016)		kW
NODE: 729	VOLTS:	1.016	-.15	1.004	-120.67	1.002	120.17	MAG/ANG
	D-LD:	42.66	21.33	.00	.00	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 744 ....:		9.78	-26.72	9.78	153.28	.00	.00	AMP/DG
<729 > LOSS= .016:		(.008)		(.008)		(.000)		kW
NODE: 730	VOLTS:	1.013	-.12	1.002	-120.73	.998	120.10	MAG/ANG
	D-LD:	.00	.00	.00	.00	84.69	39.85	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 703 ....:		147.61	-57.24	99.38	168.73	106.19	80.46	AMP/DG
<730 > LOSS= 4.021:		(2.106)		(.915)		(1.000)		kW
TO NODE 709 .....:		130.66	-53.24	99.38	168.73	87.41	77.27	AMP/DG
<709 > LOSS= 1.076:		(.549)		(.305)		(.222)		kW

- **R A D I A L P O W E R F L O W** --- DATE: 6-24-2004 AT 16:23:38 HOURS ---
SUBSTATION: IEEE 37; FEEDER: IEEE 37

NODE	VALUE	PHASE A-B (LINE A)		PHASE B-C (LINE B)		PHASE C-A (LINE C)		UNT O/L< 60.%
NODE: 709	VOLTS:	1.011	-.11	1.001	-120.73	.997	120.07	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	CAP:		.00		.00		.00	kVR
FROM NODE 730		130.67	-53.24	99.39	168.73	87.41	77.26	AMP/DG
<709 > LOSS= 1.076:		(.549)		(.305)		(.222)		kW
TO NODE 708		130.67	-53.25	86.77	159.48	74.36	87.63	AMP/DG
<708 > LOSS= 1.503:		(.870)		(.372)		(.261)		kW
TO NODE 731		.02	.00	19.58	-145.87	19.56	34.10	AMP/DG
<731 > LOSS= .071:		(.000)		(.036)		(.035)		kW
TO NODE XF7		.00	.00	.00	.00	.00	.00	AMP/DG
<XF7 > LOSS= .000:		(.000)		(.000)		(.000)		kW
NODE: 708	VOLTS:	1.009	-.08	1.000	-120.73	.994	120.02	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	CAP:		.00		.00		.00	kVR
FROM NODE 709		130.68	-53.25	86.78	159.48	74.36	87.62	AMP/DG
<708 > LOSS= 1.503:		(.870)		(.372)		(.261)		kW
TO NODE 732		9.83	-86.51	.01	.00	9.84	93.51	AMP/DG
<732 > LOSS= .019:		(.009)		(.000)		(.009)		kW
TO NODE 733		122.58	-50.73	86.79	159.47	64.57	86.72	AMP/DG
<733 > LOSS= 1.331:		(.764)		(.372)		(.195)		kW
NODE: 732	VOLTS:	1.009	-.07	1.000	-120.74	.994	120.02	MAG/ANG
	D-LD:	.00	.00	.00	.00	42.00	21.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 708		9.84	-86.55	.00	.00	9.84	93.45	AMP/DG
<732 > LOSS= .019:		(.009)		(.000)		(.009)		kW
NODE: 733	VOLTS:	1.006	-.05	.999	-120.73	.993	119.96	MAG/ANG
	D-LD:	85.53	40.25	.00	.00	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 708		122.58	-50.74	86.80	159.47	64.57	86.71	AMP/DG
<733 > LOSS= 1.331:		(.764)		(.372)		(.195)		kW
TO NODE 734		105.25	-55.33	67.31	160.84	64.57	86.71	AMP/DG
<734 > LOSS= 1.729:		(.990)		(.392)		(.347)		kW

- **R A D I A L P O W E R F L O W** --- DATE: 6-24-2004 AT 16:23:38 HOURS ---
SUBSTATION: IEEE 37; FEEDER: IEEE 37

NODE	VALUE	PHASE A-B (LINE A)		PHASE B-C (LINE B)		PHASE C-A (LINE C)		UNT O/L< 60.%
NODE: 734	VOLTS:	1.003	-.01	.998	-120.74	.989	119.88	MAG/ANG
	D-LD:	.00	.00	.00	.00	42.00	21.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 733		105.26	-55.34	67.33	160.83	64.58	86.69	AMP/DG
<734 > LOSS=	1.729:	(.990)		(.392)		(.347)		kW
TO NODE 710		19.77	-85.19	9.74	-146.94	25.85	75.43	AMP/DG
<710 > LOSS=	.182:	(.063)		(.015)		(.104)		kW
TO NODE 737		81.06	-44.69	61.84	153.68	29.66	94.26	AMP/DG
<737 > LOSS=	1.119:	(.660)		(.378)		(.081)		kW
NODE: 710	VOLTS:	1.002	.01	.997	-120.77	.988	119.91	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	CAP:		.00		.00		.00	kVR
FROM NODE 734		19.78	-85.21	9.74	-147.04	25.85	75.39	AMP/DG
<710 > LOSS=	.182:	(.063)		(.015)		(.104)		kW
TO NODE 735		19.82	-85.28	.01	.00	19.82	94.73	AMP/DG
<735 > LOSS=	.048:	(.024)		(.000)		(.024)		kW
TO NODE 736		.04	.00	9.74	-147.08	9.70	32.81	AMP/DG
<736 > LOSS=	.073:	(.000)		(.037)		(.036)		kW
NODE: 735	VOLTS:	1.002	.03	.997	-120.78	.987	119.91	MAG/ANG
	D-LD:	.00	.00	.00	.00	85.00	40.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 710		19.82	-85.29	.00	.00	19.82	94.71	AMP/DG
<735 > LOSS=	.048:	(.024)		(.000)		(.024)		kW
NODE: 736	VOLTS:	1.002	-.02	.995	-120.75	.987	119.95	MAG/ANG
	D-LD:	.00	.00	41.59	20.80	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 710		.00	.00	9.74	-147.31	9.74	32.69	AMP/DG
<736 > LOSS=	.073:	(.000)		(.037)		(.036)		kW
NODE: 737	VOLTS:	1.000	.02	.997	-120.71	.987	119.79	MAG/ANG
	D-LD:	139.94	69.97	.00	.00	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 734		81.07	-44.70	61.87	153.66	29.66	94.21	AMP/DG
<737 > LOSS=	1.119:	(.660)		(.378)		(.081)		kW
TO NODE 738		51.10	-56.17	29.26	153.90	29.66	94.21	AMP/DG
<738 > LOSS=	.272:	(.166)		(.053)		(.053)		kW

- **R A D I A L P O W E R F L O W** --- DATE: 6-24-2004 AT 16:23:38 HOURS ---
SUBSTATION: IEEE 37; FEEDER: IEEE 37

NODE	VALUE	PHASE A-B (LINE A)		PHASE B-C (LINE B)		PHASE C-A (LINE C)		UNT O/L< 60.%
NODE: 738	VOLTS:	.998	.04	.996	-120.71	.986	119.76	MAG/ANG
	D-LD:	126.00	62.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 737 ....:		51.11	-56.19	29.27	153.88	29.66	94.18	AMP/DG
<738 > LOSS= .272:		(.166)		(.053)		(.053)		kW
TO NODE 711 .....:		29.63	-85.85	.04	.00	29.66	94.18	AMP/DG
<711 > LOSS= .111:		(.056)		(.000)		(.056)		kW
NODE: 711	VOLTS:	.998	.06	.996	-120.74	.985	119.76	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	CAP:		.00		.00		.00	kVR
FROM NODE 738 ....:		29.64	-85.87	.02	.00	29.66	94.15	AMP/DG
<711 > LOSS= .111:		(.056)		(.000)		(.056)		kW
TO NODE 740 .....:		19.87	-85.43	.01	.00	19.88	94.58	AMP/DG
<740 > LOSS= .048:		(.024)		(.000)		(.024)		kW
TO NODE 741 .....:		9.77	-86.76	.02	.00	9.78	93.28	AMP/DG
<741 > LOSS= .012:		(.006)		(.000)		(.006)		kW
NODE: 740	VOLTS:	.998	.07	.996	-120.75	.985	119.76	MAG/ANG
	D-LD:	.00	.00	.00	.00	85.00	40.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 711 ....:		19.88	-85.44	.00	.00	19.88	94.56	AMP/DG
<740 > LOSS= .048:		(.024)		(.000)		(.024)		kW
NODE: 741	VOLTS:	.998	.07	.996	-120.75	.985	119.76	MAG/ANG
	D-LD:	.00	.00	.00	.00	41.37	20.68	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 711 ....:		9.78	-86.81	.00	.00	9.78	93.19	AMP/DG
<741 > LOSS= .012:		(.006)		(.000)		(.006)		kW
NODE: 731	VOLTS:	1.011	-.13	1.000	-120.74	.996	120.10	MAG/ANG
	D-LD:	.00	.00	85.06	40.03	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 709 ....:		.00	.00	19.58	-145.94	19.58	34.06	AMP/DG
<731 > LOSS= .071:		(.000)		(.036)		(.035)		kW
NODE: XF7	VOLTS:	1.011	-.11	1.001	-120.73	.997	120.07	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll .480	CAP:		.00		.00		.00	kVR
FROM NODE 709 ....:		.00	.00	.00	.00	.00	.00	AMP/DG
<XF7 > LOSS= .000:		(.000)		(.000)		(.000)		kW
TO NODE 775 .....:		.00	.00	.00	.00	.00	.00	AMP/DG
<775 > LOSS= .000:		(.000)		(.000)		(.000)		kW

- **R A D I A L P O W E R F L O W** --- DATE: 6-24-2004 AT 16:23:38 HOURS ---
SUBSTATION: IEEE 37; FEEDER: IEEE 37

NODE	VALUE	PHASE A-B (LINE A)		PHASE B-C (LINE B)		PHASE C-A (LINE C)		UNT O/L< 60.%
NODE: 775	VOLTS:	1.011	-.11	1.001	-120.73	.997	120.07	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll .480	CAP:		.00		.00		.00	kVR
FROM NODE XF7		.00	.00	.00	.00	.00	.00	AMP/DG
<775 > LOSS= .000:		(.000)		(.000)		(.000)		kW
NODE: 705	VOLTS:	1.024	-.13	1.008	-120.59	1.009	120.46	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	CAP:		.00		.00		.00	kVR
FROM NODE 702		20.47	-80.18	20.70	-150.36	33.69	64.51	AMP/DG
<705 > LOSS= .239:		(.053)		(.051)		(.135)		kW
TO NODE 712		19.41	-84.73	.01	.00	19.41	95.28	AMP/DG
<712 > LOSS= .055:		(.027)		(.000)		(.027)		kW
TO NODE 742		1.91	-26.40	20.70	-150.38	19.69	34.23	AMP/DG
<742 > LOSS= .079:		(.000)		(.041)		(.037)		kW
NODE: 712	VOLTS:	1.024	-.11	1.007	-120.61	1.008	120.46	MAG/ANG
	D-LD:	.00	.00	.00	.00	85.00	40.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 705		19.41	-84.74	.00	.00	19.41	95.26	AMP/DG
<712 > LOSS= .055:		(.027)		(.000)		(.027)		kW
NODE: 742	VOLTS:	1.024	-.15	1.007	-120.59	1.009	120.48	MAG/ANG
	D-LD:	8.39	4.19	86.14	40.54	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 705		1.91	-26.71	20.70	-150.41	19.70	34.21	AMP/DG
<742 > LOSS= .079:		(.000)		(.041)		(.037)		kW
NODE: 713	VOLTS:	1.023	-.15	1.007	-120.60	1.008	120.44	MAG/ANG
	D-LD:	.00	.00	.00	.00	85.00	40.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 702		59.48	-64.42	72.40	-163.25	86.35	59.64	AMP/DG
<713 > LOSS= .908:		(.217)		(.292)		(.399)		kW
TO NODE 704		41.83	-55.14	72.40	-163.25	71.47	50.54	AMP/DG
<704 > LOSS= .970:		(.158)		(.421)		(.391)		kW

- **R A D I A L P O W E R F L O W** --- DATE: 6-24-2004 AT 16:23:38 HOURS ---
SUBSTATION: IEEE 37; FEEDER: IEEE 37

NODE	VALUE	PHASE A-B (LINE A)		PHASE B-C (LINE B)		PHASE C-A (LINE C)		UNT O/L< 60.%
NODE: 704	VOLTS:	1.022	-.17	1.004	-120.61	1.006	120.46	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	CAP:		.00		.00		.00	kVR
FROM NODE 713		41.84	-55.17	72.40	-163.27	71.48	50.53	AMP/DG
<704 > LOSS= .970:		(.158)		(.421)		(.391)		kW
TO NODE 714		23.88	-25.32	26.67	163.65	4.83	34.06	AMP/DG
<714 > LOSS= .031:		(.014)		(.017)		(.000)		kW
TO NODE 720		24.24	-84.53	52.13	-147.06	66.86	51.70	AMP/DG
<720 > LOSS= .964:		(.087)		(.336)		(.542)		kW
NODE: 714	VOLTS:	1.021	-.17	1.004	-120.60	1.006	120.46	MAG/ANG
	D-LD:	17.36	8.17	21.09	10.04	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 704		23.88	-25.33	26.67	163.64	4.83	34.04	AMP/DG
<714 > LOSS= .031:		(.014)		(.017)		(.000)		kW
TO NODE 718		19.97	-25.32	19.95	154.66	.02	.00	AMP/DG
<718 > LOSS= .124:		(.062)		(.062)		(.000)		kW
NODE: 718	VOLTS:	1.020	-.16	1.004	-120.57	1.006	120.42	MAG/ANG
	D-LD:	88.45	41.62	.00	.00	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 714		19.96	-25.36	19.96	154.64	.00	.00	AMP/DG
<718 > LOSS= .124:		(.062)		(.062)		(.000)		kW
NODE: 720	VOLTS:	1.020	-.21	1.001	-120.66	1.004	120.53	MAG/ANG
	D-LD:	.00	.00	.00	.00	85.00	40.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 704		24.26	-84.57	52.13	-147.09	66.88	51.68	AMP/DG
<720 > LOSS= .964:		(.087)		(.336)		(.542)		kW
TO NODE 706		.03	.00	9.78	-147.03	9.75	32.88	AMP/DG
<706 > LOSS= .018:		(.000)		(.009)		(.009)		kW
TO NODE 707		4.80	-84.39	42.35	-147.11	44.75	38.36	AMP/DG
<707 > LOSS= 1.054:		(.009)		(.496)		(.549)		kW
NODE: 706	VOLTS:	1.020	-.22	1.001	-120.66	1.004	120.54	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	CAP:		.00		.00		.00	kVR
FROM NODE 720		.01	.00	9.78	-147.17	9.77	32.81	AMP/DG
<706 > LOSS= .018:		(.000)		(.009)		(.009)		kW
TO NODE 725		.01	.00	9.78	-147.17	9.77	32.81	AMP/DG
<725 > LOSS= .016:		(.000)		(.008)		(.008)		kW

- **R A D I A L P O W E R F L O W** --- DATE: 6-24-2004 AT 16:23:38 HOURS ---
SUBSTATION: IEEE 37; FEEDER: IEEE 37

NODE	VALUE	PHASE A-B (LINE A)		PHASE B-C (LINE B)		PHASE C-A (LINE C)		UNT O/L< 60.%
NODE: 725	VOLTS:	1.020	-.23	1.000	-120.65	1.004	120.55	MAG/ANG
	D-LD:	.00	.00	42.00	21.00	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 706	.....:	.00	.00	9.78	-147.22	9.78	32.78	AMP/DG
<725 > LOSS=	.016:	(.000)		(.008)		(.008)		kW
NODE: 707	VOLTS:	1.019	-.30	.996	-120.62	1.003	120.67	MAG/ANG
	-LD:	.00	.00	.00	.00	.00	.00	kW/kVR
kVll 4.800	CAP:		.00		.00		.00	kVR
FROM NODE 720	.....:	4.82	-84.59	42.34	-147.15	44.77	38.34	AMP/DG
<707 > LOSS=	1.054:	(.009)		(.496)		(.549)		kW
TO NODE 722	.....:	4.84	-84.76	32.61	-147.18	35.11	39.84	AMP/DG
<722 > LOSS=	.083:	(.001)		(.038)		(.044)		kW
TO NODE 724	.....:	.02	.00	9.74	-147.04	9.71	32.90	AMP/DG
<724 > LOSS=	.043:	(.000)		(.022)		(.021)		kW
NODE: 722	VOLTS:	1.018	-.30	.995	-120.62	1.002	120.68	MAG/ANG
	D-LD:	.00	.00	139.36	69.68	21.05	10.02	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 707	.....:	4.85	-84.78	32.61	-147.19	35.12	39.84	AMP/DG
<722 > LOSS=	.083:	(.001)		(.038)		(.044)		kW
NODE: 724	VOLTS:	1.018	-.32	.995	-120.61	1.002	120.69	MAG/ANG
	D-LD:	.00	.00	41.58	20.79	.00	.00	kW/kVR
kVll 4.800	Y CAP:		.00		.00		.00	kVR
FROM NODE 707	.....:	.00	.00	9.73	-147.18	9.73	32.82	AMP/DG
<724 > LOSS=	.043:	(.000)		(.022)		(.021)		kW