

April 2, 2007



Mr. Roger Dickens
Texas- New Mexico Power Company
P.O. Box 896
Lewisville, TX 75067

Subject: **Calculation of Annual Distribution Loss Factors**

Dear Mr. Dickens,

We have completed the analysis required to calculate the Distribution Loss Factor Coefficients for Texas – New Mexico Power Company (TNMP). We acknowledge the efforts of the TNMP staff in the preparation of this analysis. The following is a summary of the assumptions, methodology, and results of our analysis.

Distribution Loss Factors (DLFs)

ERCOT Protocol – Section 13: Transmission and Distribution Losses – requires each Distribution Service Provider (DSP) to calculate and submit the Annual DLFs for each Settlement Interval based on their voltage levels and certification area. The DLFs are used to schedule the aggregate load and associated losses for settlement purposes.

In 2006, the method for calculating the DLFs was modified from the original ERCOT Protocol. The revised DLF equation is as follows:

EQ 1: **$SILFi = F_1 * (SIELi / AAL) + F_2 + F_3 / (SIELi / AAL)$**

where: i = Interval

SILFi = Settlement Interval Distribution Loss Factor

SIELi = Settlement Interval ERCOT System Load

AAL = Annual Interval Average ERCOT System Load

F₁, F₂, & F₃ = Coefficients determined by the Distribution Service Provider to allow calculations of its SILFi from ERCOT System Load

Based on the analysis summarized herein, the calculated DLF Coefficients for TNMP are summarized below:

Coefficient	Zone 1 & 2		Zone 6		Zone 8
	Rural	Urban	Rural	Urban	Rural
ID	A	B	C	D	E
F ₁	0.00650	0.00405	0.00650	0.00405	0.00650
F ₂	-0.01750	-0.00850	-0.01750	-0.00850	-0.01750
F ₃	0.11300	0.05780	0.11300	0.05780	0.11300

Assumptions

Settlement Interval – The settlement interval (i) was assumed to be 15 minutes.

ERCOT System Load – The most recent 15 minute interval, ERCOT system peak of 62,429.5 MW occurred on August 17, 2006 at 5pm.

TNMP System Load – The corresponding TNMP coincident system peak for the service area selected for the analysis was 346.8 MW.

Annual Interval Average ERCOT System Load – The total ERCOT energy usage from September 1, 2005 through August 31, 2006 was 308,141,760 MWh. The AAL was calculated based on the following equation:

$$\begin{aligned}
 \text{EQ 2: } \text{AAL} &= \text{Total System Load (MWh)} / \text{Number of Settlement Intervals} \\
 &= 308,141,760 \text{ MWh} / (365 \text{ days} * 24 \text{ hrs} * 4 \text{ intervals}) \\
 &= 8,793.84 \text{ MWh}
 \end{aligned}$$

Settlement Interval Estimated ERCOT System Load – The SIEL_i was assumed to be proportional to each of the TNMP load levels evaluated. As a result, the SIEL_i for each load level was calculated based on the ratio of the ERCOT to TNMP Annual Interval Average System Load (AAL) and the corresponding load for the selected service area (see EQ 3 below).

$$\begin{aligned}
 \text{EQ 3: } \text{SIEL}_i &= \text{TNMP Service Area Load} * [\text{ERCOT (AAL)} / \text{TNMP (AAL)}^1] \\
 &= \text{TNMP Service Area Load} * [8,793.84 / 48.85] \\
 &= \text{TNMP Service Area Load} * 180
 \end{aligned}$$

Notes: 1. Assumed based on the following:

$$\text{TNMP (AAL)} = \text{ERCOT (AAL)} * [\text{TNMP Coincident Peak} / \text{ERCOT Peak}]$$

Settlement Interval Distribution Loss Factor – The SILFi was calculated based on the “Methodology for System Loss Calculations” outlined below, and the derived DLF Coefficients for TNMP.

Methodology for System Loss Calculations

A representative sample was used for the TNMP system loss analysis. The selected service area was modeled by TNMP in Milsoft Integrated Solutions, Inc.'s Windmil version 7.1 software. The detailed engineering model included substation transformers, primary distribution overhead conductors and underground cables, distribution transformers, and customer meters.

Customer billing information was used to allocate the August 2006 coincident peak in the engineering model throughout the selected service area. System losses were extracted from the resulting load flow analysis at various load levels – at 5 % intervals ranging from 5 % to 100 % of the August 2006 coincident peak. Secondary and service line losses were estimated at the selected load levels based on the number of customers and allocated load from the engineering model.

The following was used to calculate the TNMP system losses for the selected area:

- Substation transformer impedances and no-load losses, as well as the August 2006 coincident substation peak loads and corresponding power factor were provided by TNMP.
- Primary distribution overhead conductor and underground cable characteristics – such as impedance, capacity, diameter, and line configurations – were based on the information provided by TNMP.
- Distribution transformer impedances and no-load losses were provided by TNMP. Where insufficient transformer data was available, characteristics from similar rated transformers were used.
- Secondary and service line losses were estimated based on the number of “in-service” customers in the engineering model and the allocated loads for the load levels analyzed. An average load per customer was calculated for each of the following customer classifications. In addition, secondary and service line losses were based on the assumed service conductors and lengths shown in Table 1.

TABLE 1 TNMP Secondary Service Assumptions		
Customer	Service Length	Conductor
Residential (Rural)	150ft	#1/0 TPX
Residential (Urban)	100ft	#1/0 TPX
GS – Comm/Ind < 100 kW	100ft	#4/0 TPX
LGS – Comm/Ind > 100 kW	100ft	500 MCM AL

Calculation of DLF Coefficients

The calculated losses for each of the system components – Substation Transformers, Overhead and Underground Primary, Distribution Transformers, and Secondary and Services – were accumulated at each load level for the selected service area, and stated as a percent of the allocated system load.

The calculated percent system losses and the corresponding values for $SIEL_i$ were graphed for each load level evaluated. Adjustments were made to the DLF coefficients (F1, F2, and F3) to determine the appropriate values that would fit the DLF equation, given in EQ 1, to the calculated losses.

Both Rural and Urban service areas were included in the selected area evaluated. As a result, DLF coefficients were also calculated for both the Rural and Urban facilities in the selected area.

Results

The results of the DLF coefficient calculations were based on a selected service area. It was assumed, for the purposes of this analysis, that each Service Area (Rural & Urban) and Zone in the TNMP area of certification would be comparable to the area selected evaluated. Therefore, based on the analysis summarized herein, the calculated DLF Coefficients for TNMP are summarized below:

- Zone 1 & 2 – North TX, Central TX and Lewisville (North Dallas)
- Zone 6 – Gulf Coast
- Zone 8 – West Texas

Coefficient	Zone 1 & 2		Zone 6		Zone 8
	Rural	Urban	Rural	Urban	Rural
ID	A	B	C	D	E
F ₁	0.00650	0.00405	0.00650	0.00405	0.00650
F ₂	-0.01750	-0.00850	-0.01750	-0.00850	-0.01750
F ₃	0.11300	0.05780	0.11300	0.05780	0.11300

The results of the analysis are summarized in Attachment 1. Figure 1 below, illustrates the overall system losses for the selected area evaluated. The results indicate that the DLF Coefficients for TNMP provide an average difference of 0.94% between the calculated losses from the DLF equation to those generated by the loss analysis.

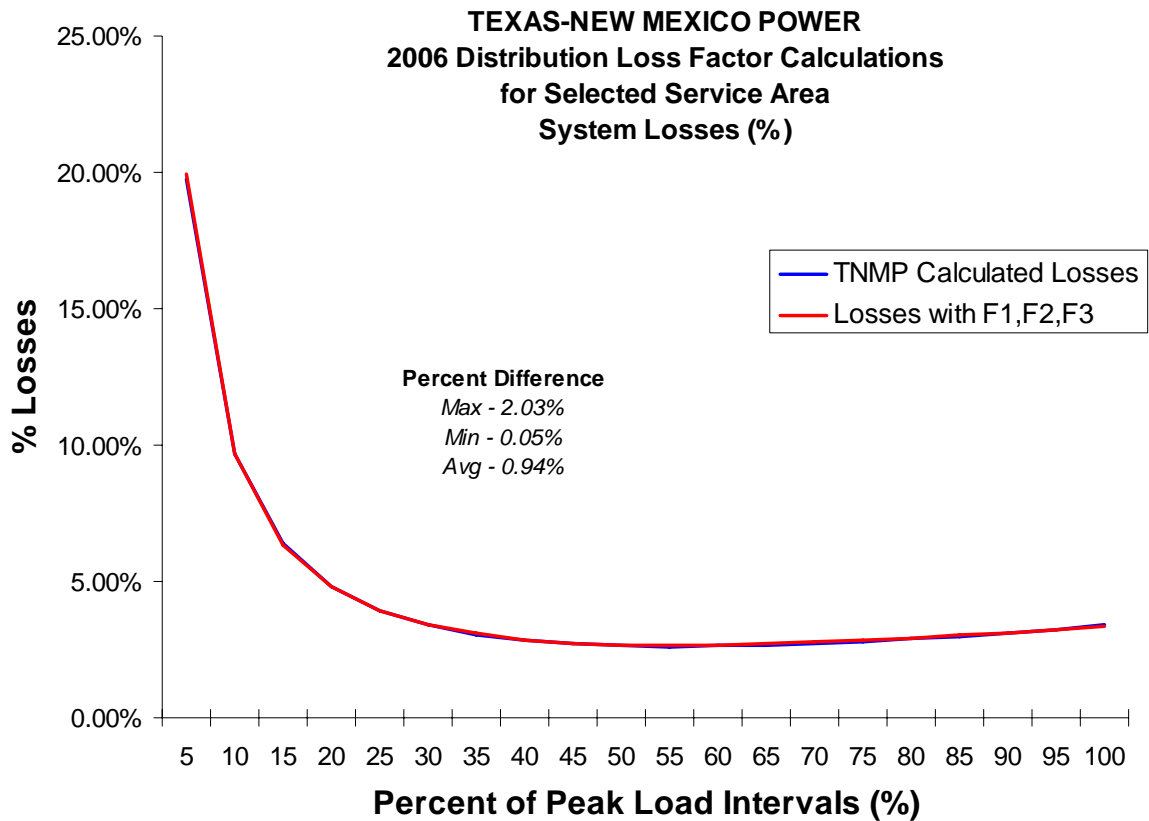


Figure 1: Percent System Losses from the 2006 DLF Calculations

Figure 2 below, illustrates the rural system losses for the selected area evaluated. The results indicate that the DLF Coefficients for TNMP provide an average difference of 0.81% between the calculated losses from the DLF equation to those generated by the loss analysis.

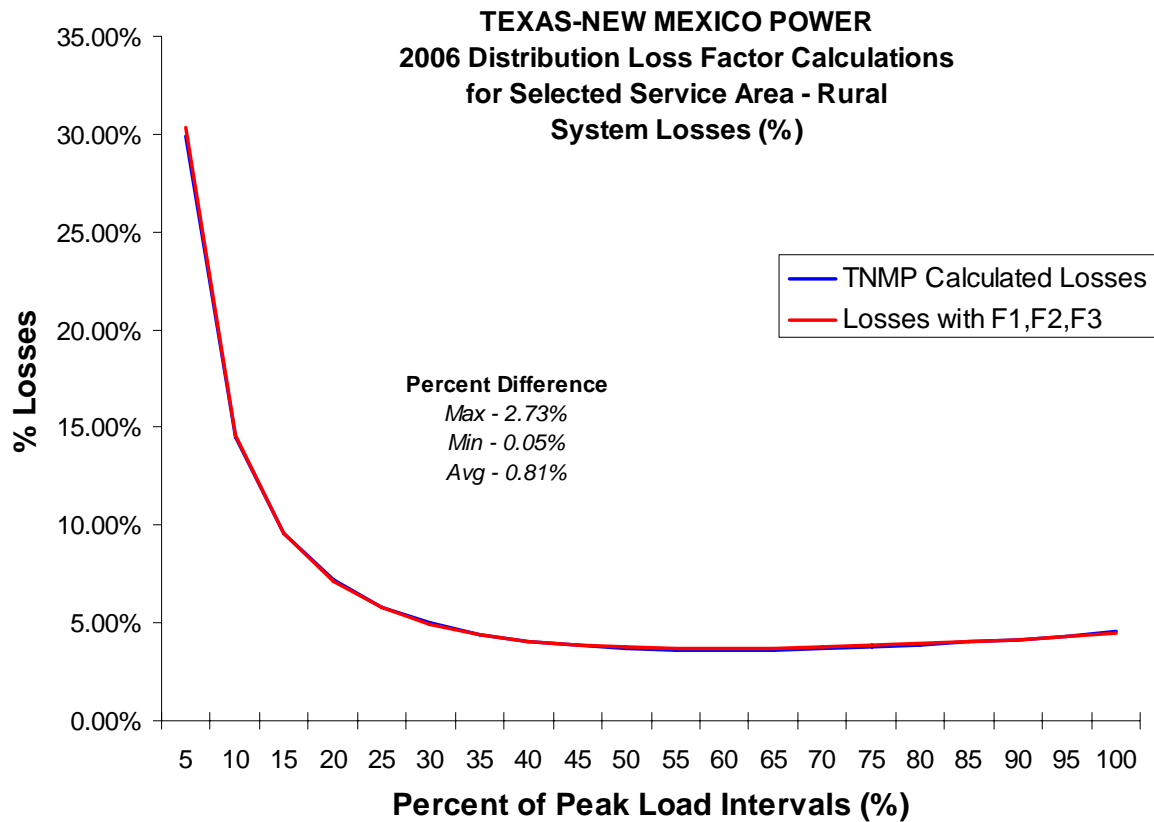


Figure 2: Percent Rural System Losses from the 2006 DLF Calculations

Figure 3 below, illustrates the urban system losses for the selected area evaluated. The results indicate that the DLF Coefficients for TNMP provide an average difference of 0.74% between the calculated losses from the DLF equation to those generated by the loss analysis.

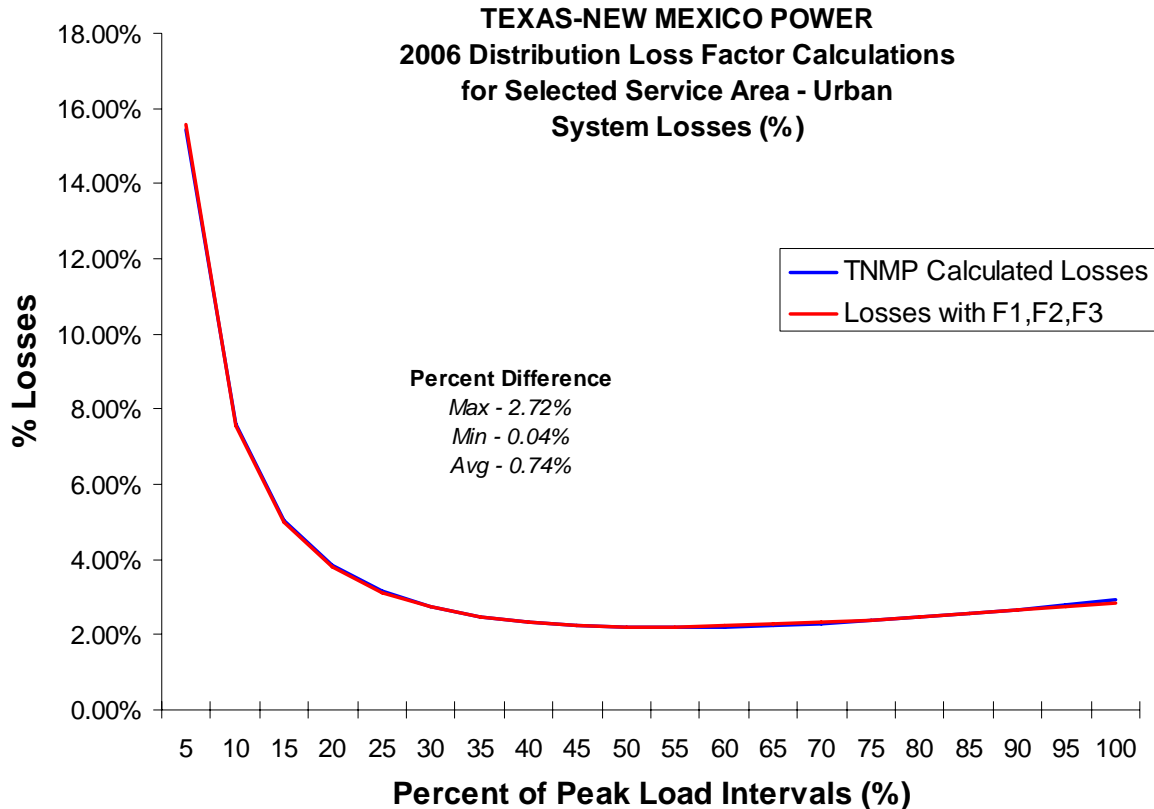


Figure 3: Percent Urban System Losses from the 2006 DLF Calculations

Thank you for the continued opportunity to provide our services to Texas-New Mexico Power Company.

Sincerely,

R. W. BECK, INC.

Keith Mullen
Project Manager

**Texas - New Mexico Power Co.
2006 Distribution Loss Factory Study**

TEXAS - NEW MEXICO POWER CO.

Evaluation of System Losses - ZONE 2

Summary of System Losses

<u>ERCOT</u>	<u>2006</u>
ERCOT peak (MW) ¹	62,429.50
Peak Interval (Peak/4)	15,607.38

Average Annual Load (AAL)

ERCOT Annual Total	
System MWH ²	308,136,141.91
Intervals per year ³	35,040
AAL value (MWH/Intervals)	
for 15 mins	<u>8,794</u>
for 1 hour	35,175

<u>TNMP</u>	<u>2006</u>		
	<u>Total</u>	<i>Rural</i>	<i>Urban</i>
TNMP peak (MW) ¹	346.80	104.2	242.6
Peak Interval (Peak/4)	86.70	26.05	60.65

<u>AAL for TNMP</u> ⁴	<u>Total</u>	<u>Rural</u>	<u>Urban</u>
for 15 mins	<u>48.85</u>	<u>14.68</u>	<u>34.17</u>
for 1 hour	195.4	58.7	136.7

NOTES:

- 1 (8/17/2006 at 17:00)
- 2 (for 9/1/2005 - 8/31/2006)
- 3 (365 days * 24 hrs * 4 intervals)
- 4 Assume AAL for TNMP is proportional to peak in a manner that is similar to ERCOT

SETTLEMENT INTERVAL DISTRIBUTION LOSS FACTOR (SILFi)

$$\text{SILFi} = F1 * (\text{SIELi}/\text{AAL}) + F2 + F3 / (\text{SIELi} / \text{AAL})$$

Where:

i = interval (15 minutes)

SILFi = Settlement Interval Distribution Loss Factor

SIELi = Settlement Interval estimated ERCOT System Load

AAL = Annual Interval Average ERCOT System Load

F1, F2, F3 = Coefficients determined by the Distribution Service Provider to allow calculations of its SILFi from ERCOT System Load

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Rural

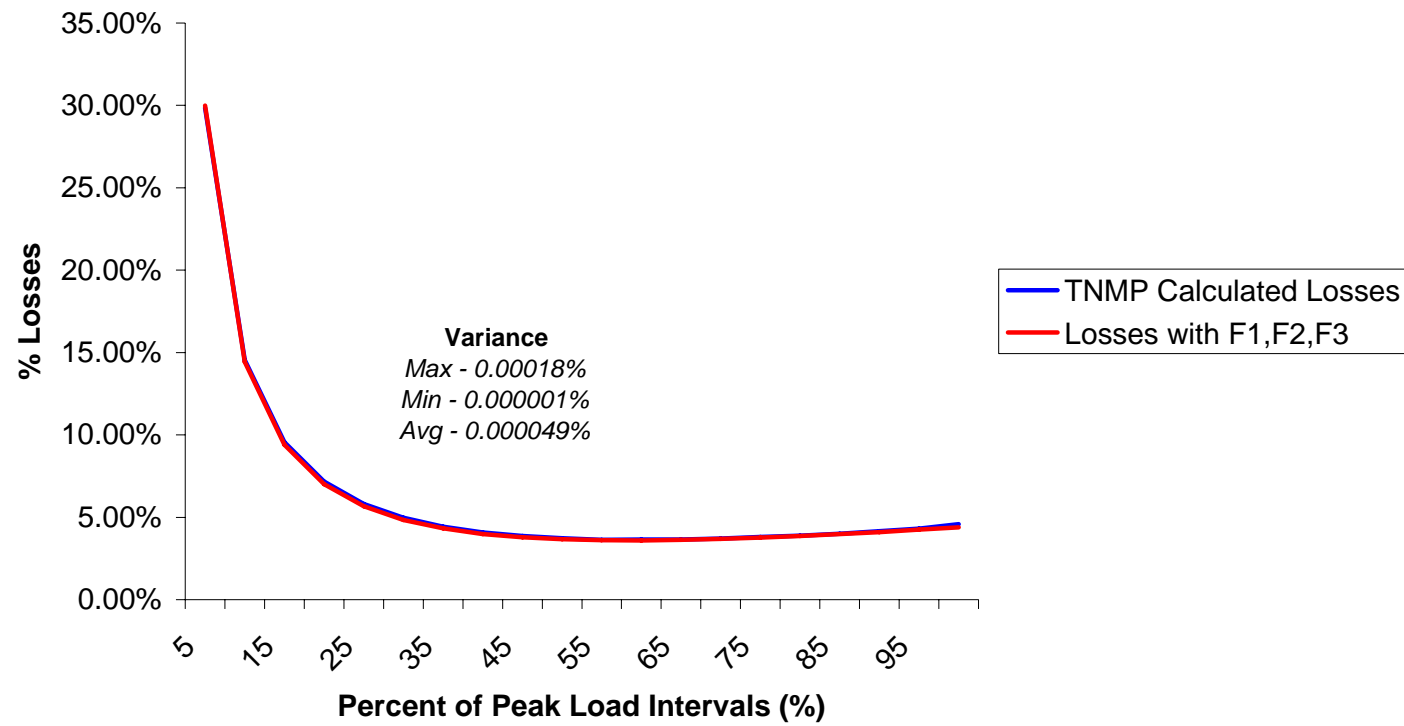
	ERCOT 15	ERCOT 1	TNMP Input to	Substation	Distribution	Distribution	Service and	Total	Total	Calculated
% of Peak	Minute Load (SIEL) (MW)	Hour Load (MW)	Substation Transformers (MW)	Transformer Losses (MW)	Line Losses (MW)	Transformer Losses (MW)	Secondary Line Losses (MW)	Losses (MW)	Losses %	Losses with F1,F2, F3 %
5	780	3121	5.21	0.33736	0.58437	0.63373	0.000343	1.555803	29.86%	29.98%
10	1561	6243	10.42	0.33371	0.54636	0.63372	0.001372	1.515162	14.54%	14.44%
15	2341	9364	15.63	0.3312	0.52621	0.63412	0.003088	1.494618	9.56%	9.41%
20	3121	12486	20.84	0.33019	0.52327	0.63492	0.005490	1.49387	7.17%	7.01%
25	3902	15607	26.05	0.3303	0.53844	0.6362	0.008578	1.513518	5.81%	5.66%
30	4682	18728	31.26	0.33196	0.57238	0.63821	0.012352	1.554902	4.97%	4.84%
35	5462	21850	36.47	0.33507	0.62539	0.64093	0.016812	1.618202	4.44%	4.32%
40	6243	24971	41.68	0.33944	0.69695	0.64435	0.021959	1.702699	4.09%	3.99%
45	7023	28093	46.89	0.35578	0.78452	0.64449	0.027791	1.812581	3.87%	3.78%
50	7804	31214	52.10	0.36319	0.89746	0.64464	0.034310	1.9396	3.72%	3.66%
55	8584	34336	57.31	0.36248	1.03435	0.64478	0.041515	2.083125	3.63%	3.61%
60	9364	37457	62.52	0.3735	1.18904	0.66812	0.049407	2.280067	3.65%	3.60%
65	10145	40578	67.73	0.38615	1.36659	0.65987	0.057984	2.470594	3.65%	3.63%
70	10925	43700	72.94	0.40073	1.56997	0.6693	0.067248	2.707248	3.71%	3.68%
75	11705	46821	78.15	0.41736	1.78312	0.6963	0.077198	2.973978	3.81%	3.76%
80	12486	49943	83.36	0.43563	2.00353	0.70671	0.087834	3.233704	3.88%	3.86%
85	13266	53064	88.57	0.45645	2.27447	0.71683	0.099156	3.546906	4.00%	3.98%
90	14046	56185	93.78	0.4794	2.57368	0.73185	0.111165	3.896095	4.15%	4.11%
95	14827	59307	98.99	0.50514	2.89574	0.7464	0.123860	4.27114	4.31%	4.24%
100	15607	62428	104.20	0.63266	3.24241	0.7612	0.137241	4.77355	4.58%	4.39%

Rural Coefficients

F1 =	0.026000	right
F2 =	-0.018000	middle
F3 =	0.028000	left

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2006 TNMP Distribution Loss Factor (%)
Rural - Zone 2



**Texas - New Mexico Power Co.
2006 Distribution Loss Factory Study**

Urban

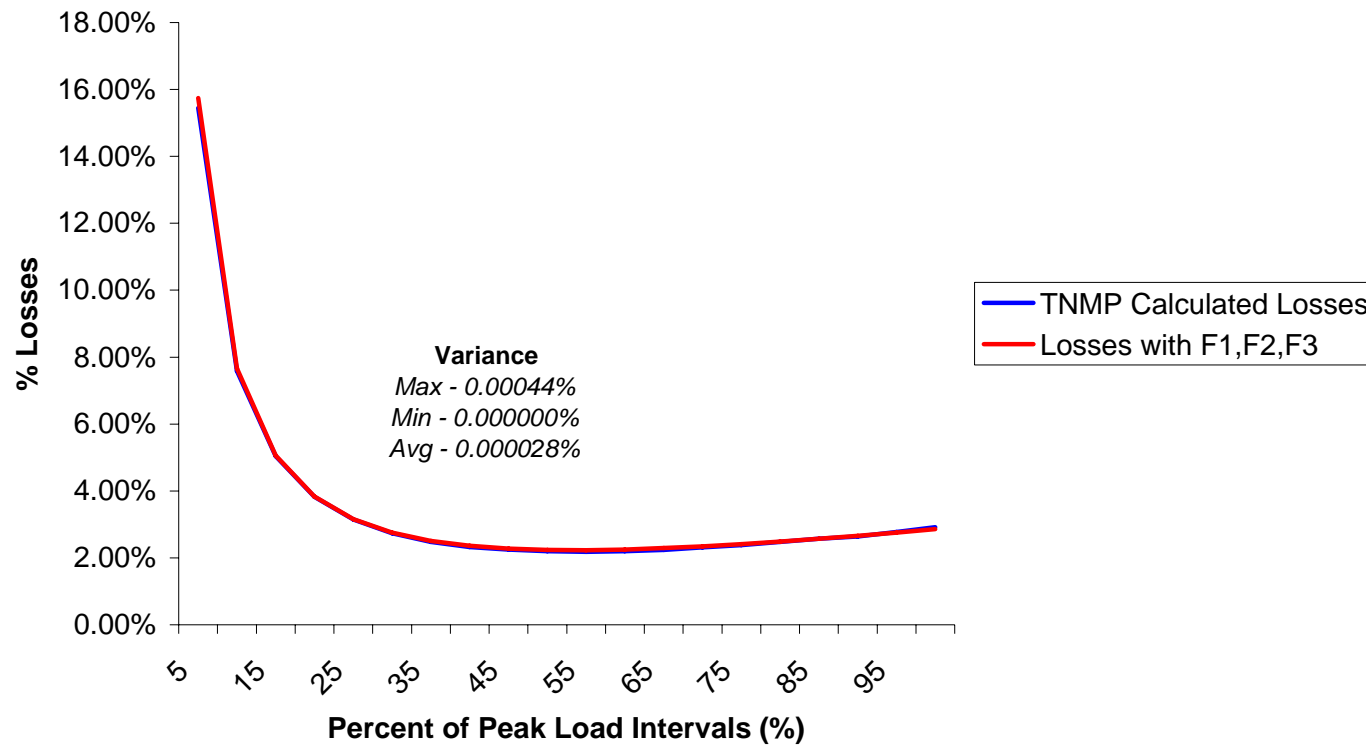
% of Peak	ERCOT 15 Minute Load (SIEL) (MW)	ERCOT 1 Hour Load (MW)	TNMP Input to Substation Transformers (MW)	Substation Transformer Losses (MW)	Distribution Line Losses (MW)	Distribution Transformer Losses (MW)	Service and Secondary Line Losses (MW)	Total Losses (MW)	Total Losses %	Calculated Losses with F1,F2, F3 %
5	780	3121	12.13	0.39076	0.60169	0.87995	0.001180	1.87	15.45%	15.74%
10	1561	6243	24.26	0.38353	0.57172	0.88025	0.004720	1.84	7.59%	7.66%
15	2341	9364	36.39	0.38024	0.56105	0.88177	0.010621	1.83	5.04%	5.06%
20	3121	12486	48.52	0.38048	0.57151	0.88505	0.018881	1.86	3.83%	3.84%
25	3902	15607	60.65	0.38425	0.60134	0.89059	0.029502	1.91	3.14%	3.16%
30	4682	18729	72.78	0.39335	0.65798	0.89817	0.042483	1.99	2.74%	2.75%
35	5463	21850	84.91	0.40561	0.73507	0.90866	0.057824	2.11	2.48%	2.51%
40	6243	24972	97.04	0.42286	0.83766	0.9209	0.075525	2.26	2.33%	2.36%
45	7023	28093	109.17	0.44407	0.97313	0.93781	0.095586	2.45	2.24%	2.27%
50	7804	31215	121.30	0.47041	1.1295	0.95473	0.118007	2.67	2.20%	2.24%
55	8584	34336	133.43	0.50104	1.29938	0.97164	0.142789	2.91	2.18%	2.23%
60	9364	37458	145.56	0.53702	1.50315	0.993	0.169930	3.20	2.20%	2.25%
65	10145	40579	157.69	0.57779	1.74071	1.01766	0.199432	3.54	2.24%	2.29%
70	10925	43701	169.82	0.62407	2.0245	1.04469	0.231294	3.92	2.31%	2.35%
75	11706	46822	181.95	0.67657	2.3241	1.07338	0.265516	4.34	2.39%	2.41%
80	12486	49944	194.08	0.73499	2.66657	1.1025	0.302099	4.81	2.48%	2.49%
85	13266	53065	206.21	0.78914	3.03034	1.13514	0.341041	5.30	2.57%	2.57%
90	14047	56187	218.34	0.85972	3.4433	1.07155	0.382344	5.76	2.64%	2.66%
95	14827	59308	230.47	0.96011	3.90552	1.11125	0.426006	6.40	2.78%	2.76%
100	15607	62430	242.60	1.03312	4.42143	1.15411	0.472029	7.08	2.92%	2.86%

Urban Coefficients

F1 =	0.016300	right
F2 =	-0.008550	middle
F3 =	0.014600	left

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2006 TNMP Distribution Loss Factor (%)
Urban - Zone 2



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Total										
	ERCOT 15 Minute Load (SIEL) (MW)	ERCOT 1 Hour Load (MW)	TNMP Input to Substation Transformers (MW)	Substation Transformer Losses (MW)	Distribution Line Losses (MW)	Distribution Transformer Losses (MW)	Service and Secondary Line Losses (MW)	Total Losses (MW)	Total Losses %	Calculated Losses with F1,F2, F3 %
% of Peak										
5	780	3121	17.34	0.73	1.19	1.51	0.001523	3.43	19.78%	20.08%
10	1561	6243	34.68	0.72	1.12	1.51	0.006093	3.36	9.68%	9.67%
15	2341	9364	52.02	0.71	1.09	1.52	0.013709	3.33	6.40%	6.32%
20	3121	12486	69.36	0.71	1.09	1.52	0.024371	3.35	4.83%	4.73%
25	3902	15607	86.70	0.71	1.14	1.53	0.038079	3.42	3.94%	3.85%
30	4682	18729	104.04	0.73	1.23	1.54	0.054834	3.55	3.41%	3.33%
35	5463	21850	121.38	0.74	1.36	1.55	0.074636	3.73	3.07%	3.01%
40	6243	24972	138.72	0.76	1.53	1.57	0.097483	3.96	2.85%	2.81%
45	7023	28093	156.06	0.80	1.76	1.58	0.123377	4.26	2.73%	2.70%
50	7804	31215	173.40	0.83	2.03	1.60	0.152317	4.61	2.66%	2.64%
55	8584	34336	190.74	0.86	2.33	1.62	0.184304	5.00	2.62%	2.63%
60	9364	37458	208.08	0.91	2.69	1.66	0.219337	5.48	2.64%	2.65%
65	10145	40579	225.42	0.96	3.11	1.68	0.257417	6.01	2.66%	2.70%
70	10925	43701	242.76	1.02	3.59	1.71	0.298542	6.63	2.73%	2.76%
75	11706	46822	260.10	1.09	4.11	1.77	0.342714	7.31	2.81%	2.84%
80	12486	49944	277.44	1.17	4.67	1.81	0.389933	8.04	2.90%	2.94%
85	13266	53065	294.78	1.25	5.30	1.85	0.440198	8.84	3.00%	3.04%
90	14047	56187	312.12	1.34	6.02	1.80	0.493509	9.65	3.09%	3.15%
95	14827	59308	329.46	1.47	6.80	1.86	0.549866	10.67	3.24%	3.27%
100	15607	62429	346.80	1.67	7.66	1.92	0.609270	11.85	3.42%	3.40%

Total Coefficients

F1 = 0.020450 right
F2 = -0.012900 middle
F3 = 0.018800 left

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2006 TNMP Distribution Loss Factor (%)
Total - Zone 2

