

## Distribution System Loss Factors AEP-Texas Central Company (TCC) and AEP-Texas North Company (TNC)

The AEP companies are submitting for use during calendar year 2013 Coefficients for use in determining the Settlement Interval Loss Factors as defined in the ERCOT Protocols for both AEP-TCC and AEP-TNC. The required coefficients are derived from loss analysis completed in October 2012 for the AEP TCC and AEP TNC transmission and distribution systems based on calendar year 2009 system operation. These analyses referred to as “Loss Studies” are applicable to the current TCC and TNC service areas respectively.

The AEP loss studies are used to develop energy expansion factors for selected system voltage levels that would be used to adjust metered energy deliveries to the generation level. The energy expansion factors are applicable to annual and monthly energy for cost allocation, rate design and billing purposes. These energy expansion factors are applicable to the average of all load intervals from the minimum to the maximum over the year. Thus the energy expansion factors represent the average distribution losses and are the basis of using the system loss studies to define the required SILF coefficients for the Protocols.

Since the energy loss studies are for the entire system including the transmission voltage level, the results are adjusted to be applicable to the distribution system only. This calculation is shown on Attachment A in column “d”. In addition, the loss factors as determined in the loss studies represent expansion factors to be applied to metered energy to determine energy at a higher level on the system. In column “e” the expansion factors are converted to average loss factors that are used for determining the losses for the respective service levels.

The coefficients submitted are calculated based on the allocated losses and voltage level deliveries (sales) used to determine the energy expansion factors in the loss studies. Attachment B shows the no-load and load portion of losses for the distribution system as shown in the loss studies. These amounts are summed for the distribution primary and distribution secondary systems and the ratio of no-load losses to total losses for the voltage level is determined. The proper determination of losses allocable to deliveries from a particular voltage level is performed in Attachment C. The simple ratio of no-load and load losses for the voltage level is adjusted to account for actual deliveries (sales) at the respective voltage level which results in a ratio applicable to the loss factor for the delivery voltage level. The resulting coefficients are calculated from the average loss factors and the loss ratios in Attachment A.

The coefficient  $F_1$  is based on the portion of losses that vary as the square of the distribution load. The coefficient  $F_3$  is based on the portion of losses that does not vary with the load level. The coefficient  $F_2$  is zero because there is not a portion of losses that can be identified as varying linearly with the load.

The resulting SILF equation coefficients are as follows:

		<u><math>F_1</math></u>	<u><math>F_2</math></u>	<u><math>F_3</math></u>
AEP-TCC	Secondary	0.02700	0	0.03189
	Primary	0.01998	0	0.00853
		<u><math>F_1</math></u>	<u><math>F_2</math></u>	<u><math>F_3</math></u>
AEP-TNC	Secondary	0.02118	0	0.03213
	Primary	0.00435	0	0.01094

The DLF codes that correspond to the generic rate classifications for the AEP DSP are as follows:

<u>DSP Rate Classification</u>	<u>DLF Code</u>
Residential	A
General Service < 10 kw	A
General Service > 10 kw	A
Lighting	A
Primary	B
Transmission	T

The classifications with a DLF code of A are for delivery voltages up to and including 2400 volt single or 3 phase delta and 2400Y/4160 volt 3 phase service. Delivery voltages higher than this but less than 69 kV are DLF code B. Delivery voltages of 69 kV or higher are DLF code T. Certain exceptions apply to delivery voltages of 2400 volt single or 3 phase delta and 2400Y/4160 volt 3 phase where the primary distribution system in the area is operated at these voltages. Service taken directly from the distribution line in these cases is considered primary and will have a DLF code of "B".

The coefficients for the SILF equation are applicable during calendar year 2013 and AEP will make another submittal in October 2013 to be consistent with the ERCOT Protocols at that time.

## Attachment A

## Summary of SILF equation coefficients- 2013

## Texas Central Company (AEP-TCC)

a	b	c	d	e	f	g	h	i	J
SERV LEVL CODE	DLF CODE	ENERGY SYSTEM LOSS FACTOR	ENERGY DISTRIB LOSS FACTOR	Average Dist Losses	Load Loss Factor	No-Load Loss Factor	F1	F2	F3
(Formula)		Divide by transmission loss		(d-1)/d	(Att C)	(Att C)	e*f		e*g
Secondary	A	1.087850	1.062571	0.058887	0.4584	0.5416	0.02700	0	0.03189
Primary	B	1.053840	1.029352	0.028515	0.7007	0.2993	0.01998	0	0.00853
Transmission	T	1.023790	1.000000						

## Texas North Company (AEP-TNC)

a	b	c	d	e	f	g	h	i	J
SERV LEVL CODE	DLF CODE	ENERGY SYSTEM LOSS FACTOR	ENERGY DISTRIB LOSS FACTOR	Average Dist Losses	Load Loss Factor	No-Load Loss Factor	F1	F2	F3
(Formula)				(d-1)/d	(Att C)	(Att C)	e*f		e*g
Secondary	A	1.096290	1.056309	0.053307	0.3973	0.6027	0.02118	0	0.03213
Primary	B	1.053960	1.015522	0.015285	0.2843	0.7157	0.00435	0	0.01094
Transmission	T	1.037850	1.000000						

## Attachment B

### Calculation of AEP TCC Electric Distribution Loss Factors- 2013 Ratio of No-Load and Load losses on primary and secondary systems

	Energy Losses, MWh		
	Load	No-Load	Total
Dist. Substation	55,223	143,861	199,084
Primary Feeders	281,584	0	281,584
Line Transformers	34,015	328,691	362,706
Residential Sec. Lines	68,722	13,391	82,113
Total Primary & Sec	439,544	485,943	925,487

#### Distribution System

Primary	336,807	143,861	480,668
Secondary	102,737	342,082	444,819
Total Primary & Sec	439,544	485,943	925,487

Primary ratio	0.70071	0.29929
Secondary ratio	0.23096	0.76904

### Calculation of AEP TNC Electric Distribution Loss Factors- 2013 Ratio of No-Load and Load losses on primary and secondary systems

	Energy Losses, MWh		
	Load	No-Load	Total
Dist. Substation	14,685	33,279	47,964
Primary Feeders	79,198	0	79,198
Line Transformers	5,192	87,972	93,164
Residential Sec. Lines	16,198	3,235	19,433
Total Primary & Sec	115,273	124,486	239,759

#### Distribution System

Primary	93,883	33,279	127,162
Secondary	21,390	91,207	112,597
Total Primary & Sec	115,273	124,486	239,759

Primary ratio	0.73829	0.26171
Secondary ratio	0.18997	0.81003

**AEP ERCOT SILF for use in 2013**

**Attachment C**

**AEP TCC - Calculation of Electric Distribution Loss Factors - 2013**  
Portion of Loss Factor Not Sensitive to Load

Voltage Level	At	Input Reqmt. Responsibility Factor	Energy Loss Fraction		Energy, kWh			
			Load	No-Load	Sales	Load Losses	No-Load Losses	Total
Secondary	Sec. Sales @ Meter	<b>1.032272</b>			15,897,010,000			
	Input to Sec. Level				16,410,045,480			
	Losses due to Sec. Sales		0.2310	0.7690		118,492,524	394,542,956	513,035,480
Primary	Output (=Sec. Input)	<b>1.029352</b>			16,410,045,480			
	Input to Pri. Level due to Sec.				16,891,708,581			
	Losses due to Sec. Sales		0.7007	0.2993		337,504,274	144,158,828	481,663,101
	Pri. Sales	<b>1.029352</b>			2,618,702,000			
	Losses due to Pri. Sales		0.7007	0.2993	2,695,565,414	53,858,663	23,004,751	76,863,414
	Total Input				19,587,273,996			

**Distribution System**

Losses due to:	Losses, kWh		
	Load	No-Load	Total
Secondary Sales	455,996,798	538,701,784	994,698,581
Primary Sales	53,858,663	23,004,751	76,863,414
Total	509,855,461	561,706,535	1,071,561,996

**Distribution System**

	Fraction of Total Loss	
	Load	No-Load
Secondary Sales	<b>0.4584</b>	<b>0.5416</b>
Primary Sales	<b>0.7007</b>	<b>0.2993</b>

# AEP ERCOT SILF for use in 2013

## AEP TNC - Calculation of Electric Distribution Loss Factors - 2013 Portion of Loss Factor Not Sensitive to Load

Voltage Level	At	Input Reqmt. Responsibility Factor	Energy Loss Fraction		Energy, kWh			
			Load	No-Load	Sales	Load Losses	No-Load Losses	Total
Secondary	Sec. Sales @ Meter Input to Sec. Level Losses due to Sec. Sales	<b>1.040163</b>	0.7383	0.2617	3,598,455,000 3,742,979,081	106,701,328	37,822,753	144,524,081
Primary	Output (=Sec. Input) Input to Pri. Level due to Sec. Losses due to Sec. Sales Pri. Sales	<b>1.015522</b>	0.1900	0.8100	3,742,979,081 3,801,079,378	11,037,286	47,063,010	58,100,297
	Losses due to Pri. Sales Total Input	<b>1.015522</b>	0.1900	0.8100	2,687,139,000 2,728,850,046 6,529,929,424	7,923,828	33,787,218	41,711,046

### Distribution System

Losses due to:	Losses, kWh		
	Load	No-Load	Total
Secondary Sales	117,738,615	84,885,763	202,624,378
Primary Sales	7,923,828	33,787,218	41,711,046
Total	125,662,443	118,672,981	244,335,424

### Distribution System

	Fraction of Total Loss	
	Load	No-Load
Secondary Sales	<b>0.5811</b>	<b>0.4189</b>
Primary Sales	<b>0.1900</b>	<b>0.8100</b>