Exhibit No.:
Issue: Weather Normalization; Customer
Annualization of Unit Sales
Witness: Albert R. Bass, Jr.
Type of Exhibit: Direct Testimony
Sponsoring Party: Kansas City Power & Light Company
Case No.: ER-2018-0145
Date Testimony Prepared: January 30, 2018

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO.: ER-2018-0145

DIRECT TESTIMONY

OF

ALBERT R. BASS, JR.

ON BEHALF OF

KANSAS CITY POWER & LIGHT COMPANY

Kansas City, Missouri
January 2018

DIRECT TESTIMONY

OF

ALBERT R. BASS, JR.

Case No. ER-2018-0145

1 Q: **Please state your name and business address.**

2 A: My name is Albert R. Bass, Jr. My business address is 1200 Main, Kansas City,

3   Missouri 64105.

4 Q: **By whom and in what capacity are you employed?**

5 A: I am employed by Kansas City Power & Light Company ("KCP&L" or "Company") as

6   Manager of Energy Forecasting and Analytics.

7 Q: **On whose behalf are you testifying?**

8 A: I am testifying on behalf of KCP&L.

9 Q: **What are your responsibilities?**

10 A: My responsibilities include supervising two employees with responsibility for short-term

11   electric load forecasting, long-term electric load forecasting, weather normalization, and

12   various other analytical tasks.

13 Q: **Please describe your education, experience and employment history.**

14 A: I received a Bachelor of Science in Business Administration degree with emphasis in

15   Marketing from Missouri Western State University in 1989. I earned a Master of

16   Business Administration degree from William Woods University in 1995.

17   Prior to joining KCP&L, I worked for APS Technologies developing product

18   forecast models and conducting market analysis. In June 1998, I joined KCP&L as a

19   Technical Professional. In this role, I conducted market analysis, developed market

1		options studies, and research. In May 2000, I assumed the responsibilities for short-term
2		budget forecasting, long-term load forecasting for the Integrated Resource Plan, monthly
3		kilowatt-hour ("kWh") sales and peak weather normalization, and weather normalization
4		for rate case filings. As part of these duties, I assisted with the creation of the weather
5		normalization testimony filed by KCP&L. In July 2013, I was promoted to Manager of
6		Market Assessment. In March 2017, I was promoted to my current position as Sr.
7		Manager of Energy Forecasting and Analytics.
8	Q:	**Have you previously testified in a proceeding before the Missouri Public Service**
9		**Commission ("Commission" or "MPSC") or before any other utility regulatory**
10		**agency?**
11	A:	Yes, I provided written testimony in KCP&L Greater Missouri Operation Company's rate
12		case (ER-2016-0156) and KCP&L's 2014 rate case (ER-2014-0370), KCP&L's 2016 rate
13		case (ER-2016-0285) and KCP&L's rate case before the Kansas Corporation
14		Commission (15-KCPE-116-RTS).
15	Q:	**What is the purpose of your testimony?**
16	A:	The purposes of my testimony is to sponsor Schedules ARB-1 through ARB-4, which
17		include weather normalization, customer growth, rate switching, and energy efficiency
18		adjustments of test year monthly kWh sales and peak loads. I recommend that the
19		Commission adopt these results in the current case.
20		**I. WEATHER NORMALIZATION, CUSTOMER GROWTH**
21	Q:	**What normalizations are you making to kWh sales and peak loads?**
22	A:	Both monthly and hourly kWh sales are adjusted to reflect normal weather conditions.
23		This is called a weather adjustment. The kWh sales are further adjusted for customer

1   growth that occurs between the test year and the true-up date of June 2018, and for

2   customers who were switched from one rate to another during or after the test year.

3   These customers are known as rate switchers. An additional adjustment to the kWh sales

4   is made for energy efficiency that occurs between the test year and two months prior to

5   the true-up date of June 2018.

6   **Q: What is the purpose of making a weather adjustment?**

7   A: Abnormal weather can increase or decrease a utility company's revenues, fuel costs and

8   rate of return. Therefore, revenues and expenses are typically adjusted to reflect normal

9   weather to determine a company's future electric rates. These adjustments are made by

10 first adjusting kWh sales and hourly loads and then using these results to adjust test-year

11 revenues and incremental costs (*i.e.*, fuel and purchased power).

12 During the test year, July 2016 through June 2017, there were 24% less heating

13 degree days and 8.5% more cooling degree days than normal at the Kansas City

14 International Airport. Thus, heating load was significantly lower than normal while

15 cooling load was slightly above normal. This results in a net positive weather adjustment

16 to kWh sales.

17 **Q: What method was used to weather-normalize kWh sales?**

18 A: The method was based on load research ("LR") data, which was derived by measuring

19 hourly loads for a sample of KCP&L's customers representing the Residential, Small

20 General Service ("GS"), Medium GS, Large GS, and Large Power classes. The hourly

21 loads were grossed up by the ratio of the number of customers for each of these classes

22 divided by the number sampled.

1   In the first step, the hourly loads for the sample were calibrated to the annual

2   billed sales of all customers in each class. The ratio of the billed sales divided by the sum

3   of the hourly loads was multiplied by the load in each hour.

4   In the second step, the hourly loads were estimated for lighting tariffs and the

5   loads for all tariffs, including sales for resale, were grossed up for losses and compared to

6   Net System Input ("NSI"). The difference between this sum and the NSI then was

7   allocated back to the LR data in proportion to the hourly precisions that were estimated

8   for the LR data.

9   In the third step, regression analysis was used to model the hourly loads for each

10   rate class. These models included a piecewise linear temperature response function of a

11   two-day weighted mean temperature.

12   In the fourth step, this temperature response function was used to compute daily

13   weather adjustments as the difference between loads predicted with normal weather and

14   loads predicted with actual weather. Normal weather was derived using spreadsheets

15   provided by the MPSC Staff. The normal weather represents average weather conditions

16   over the 1981-2010 time period.

17   In the fifth step, the daily weather adjustments were split into hourly adjustments

18   and these were added to NSI to weather-normalize that series.

19   In the sixth step, the daily weather adjustments were split into billing months

20   based on the percentage of sales on each billing cycle and the meter reading schedule for

21   the test year period. These weather adjustments then are used to create a weather factor

22   for each class for each month, which are multiplied by billed kWh sales to weather-

1		normalize monthly class billed kWh sales. The Large Power ("LP") tariff weather factor
2		is used to weather-normalize each individual customer within that class.
3	Q:	**What adjustment did you make for rate switchers?**
4	A:	Each year a small percentage of customers are switched from their current tariff to
5		another that is expected to reduce their electric bills. We adjusted kWh sales for the LP
6		tariff for customers that switched into or out of this tariff. There were three LP customers
7		who switched rates during the test year. The customer growth adjustment accounted for
8		rate switchers in the other tariffs.
9	Q:	**What adjustment did you make for customer growth?**
10	A:	For each month in the test year, the weather-normalized sales per customer were
11		multiplied by the number of customers projected for the true-up date June 2018. This
12		adjustment is made to weather-normalized sales to the Residential, Small GS, Medium
13		GS, and Large GS classes. When the numbers become available, I will revise this
14		adjustment using the actual number of customers as of the true-up date of June 2018.
15	Q:	**What adjustment did you make for LP?**
16		Sales to LP customers are adjusted by plotting each customer's monthly kWh sales and
17		looking for any changes in sales that appear to be or are known to be permanent resulting
18		in an annualization by account on an individual customer basis. If any such changes are
19		identified, sales during the test year are adjusted to reflect the change.
20		There were 61 customers in the LP class at the beginning of the test year. Two
21		customers ended service, three customers left the LP class, two customers switched rates
22		within the LP class and two new customers were added to the LP class. This results in 58
23		LP customers annualized for the test period. Customers that moved in or out of the LP

1		class with partial data during the test year are annualized for the full test year. The
2		adjustments for growth to LP sales will be revised using the most current data for the
3		true-up.

4 Q: **Were any other adjustments made besides the adjustment for rate switchers and**
5   **customer growth?**

6 A: Yes, an additional adjustment is made to annualize the impact of the Company's energy

7   efficiency programs on test year sales.   During the test year, KCP&L invested

8   significantly on programs designed to help customers use energy more efficiently. The

9   result of this investment in energy efficiency programs is a decline in the sales made by

10   the Company relative to the level of sales that would be made absent the programs.

11   Because the Company programs generated customer savings during the test year and

12   true-up period, the impact of those efficiency measures installed during the test year

13   should be annualized to reflect the full impact of the measures on the Company's sales.

14 Q: **Do installed efficiency measures in the test year affect the test year sales and why is**
15   **it necessary to further adjust sales to fully reflect the impact of the programs?**

16 A: Yes, if a residential customer who is not participating in any Company energy efficiency

17   programs has an annual average usage of 10,500 kWh and then decided to participate in

18   the Company programs with four months left in the test year, which now reduces their

19   actual test year usage to 10,000 kWh, the Company would only see a reduction of 500

20   kWh in the test year. In this example on an annual basis going forward, however, the

21   customer's true annual average consumption is reduced by 1,500 kWh due to the energy

22   efficiency actions promoted by the Company. The reason is the change took place during

23   the test year, but the impacts of the installed measures are only reflected in one-third of

1		the test year load. The effect can be extreme when you start looking at all customer
2		participation rates and the fact that they sign up and participate in various programs
3		throughout the test year. Since the Company has documented participation rates and
4		measures installed in the test year, the annualized energy savings of those measures, and
5		the installation dates of the measures, it is appropriate to reflect the full energy impact of
6		the measures in the test year. This is a known and measurable change in the energy
7		consumption that occurred before the end of the test year, which will continue going
8		forward and should be annualized.
9	Q:	**What are the adjustments to annualize the impact of the Company's energy**
10		**efficiency programs on test year's sales?**
11	A:	Upon filing a rate case, the cumulative, annualized, normalized kWh and kilowatt ("kW")
12		savings will be included in the unit sales and sales revenues used in setting rates as of an
13		appropriate time (most likely two months prior to the true-up date) where actual results
14		are known prior to the true-up period, to reflect energy and demand savings in the billing
15		determinants and sales revenues used in setting the revenue requirements and tariffed
16		rates in the case.
17	Q:	**Describe how you calculated the energy efficiency adjustment.**
18	A:	The calculation of the energy efficiency adjustment is based on the stipulation in Case
19		No. EO-2015-0240[1]:
20		In the first step, KCP&L will take test period weather normalized kWh usage for
21		each customer class by billing month and adjust it by[2] adding back the monthly kWh

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[1] Non-Unanimous Stipulation and Agreement Resolving MEEIA Filings, Case No. EO-2015-0240, pp. 13-15.

1   energy savings by customer class incurred during the test period from all active Missouri

2   Energy Efficiency Investment Act ("MEEIA") programs, excluding Home Energy

3   Reports and Income-Eligible Home Energy Reports programs which have a one year

4   measure life, determined using the same methodology as described in Tariff Sheet 49

5   through 49P (KCP&L) except that calendar month load shape percentages by program by

6   month will be converted to reflect billing month load shape percentages by program,

7   calculated by computing a weighted average of the current and succeeding month

8   percentages.

9   In the second step, the adjusted test period sales from above will be annualized for

10   customers and additionally be adjusted further by subtracting the cumulative annual kWh

11   energy savings from the first month of the test period through the month ending where

12   actual results are available (most likely two months prior to the true-up date) by customer

13   class from all active MEEIA programs, excluding Home Energy Reports and Income-

14   Eligible Home Energy Reports, determined using the same methodology as described in

15   Tariff Sheet 49 through 49P (KCP&L) except that calendar month load shape percentages

16   by program by month are converted to reflect billing month load shape percentages by

17   program, calculated by computing a weighted average of the current and succeeding

18   month percentages.

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[2]   Step 1. Begin with Weather Normalized kWh per class provided by Company. Step 2. Compute Monthly Savings kWh (MS) per program in the same manner as used for TD calculation. Step 3. Weather Normalized kWh before application of Energy Efficiency (EE) adjustment. Step 4. Cumulative Annual Savings kWh (CAS) per program computed in the same manner as TD calculation as of Rebase Date. Step 5. Monthly Load Shape percentage per program converted to billing month equivalent by using a weighted average calendar month Load Shape percentage based on billing cycle information of the rate case. Step 6. Monthly EE Rebase Adjustment. Step 7. Weather Normalized kWh rebased for EE.

Non-Unanimous Stipulation and Agreement Resolving MEEIA Filings, Case No. EO-2015-0240, -0241, p. 13.

1   In the third step, the test period kW demand for each customer class will be

2   adjusted by[3] adding back the monthly kW demand savings by customer class incurred

3   during the test period from all active MEEIA programs, excluding Home Energy Reports,

4   Income-Eligible Home Energy Reports and Demand Response Incentive programs,

5   determined using the same methodology as described for kWh savings in Tariff Sheet 49

6   through 49P (KCP&L) and then subtracting the cumulative annual kW demand savings

7   from the first month of the test period through the month ending where actual results are

8   available (most likely two months prior to the true-up date) by customer class from all

9   active MEEIA programs, excluding Home Energy Reports, Income-Eligible Home

10   Energy Reports and Demand Response Incentive programs, determined using the same

11   methodology as described for kWh savings in Tariff Sheet 49 through 49P (KCP&L).

12   In the fourth step, after the energy efficiency adjustment for kWh and kW has

13   been determined, weather normalized kWh and kW are rebased with the energy

14   efficiency adjustment. kWh sales are rebased by subtracting the energy efficiency

15   adjustment from the weather normalized kWh and kW (demand) is determined by taking

16   the monthly kWh and spreading it across an hourly load shape to determine the monthly

17   peak demand.

18   The impacts that are applied to the weather normalized and customer adjusted

19   kWh used to rebase the weather normalized sales are shown in Schedule ARB-2.

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[3]   Step 1. Begin with kW demand per class provided by Company. Step 2. Compute Monthly kW
demand per program in the same manner as used for TD calculation. Step 3. kW demand before
application of Energy Efficiency (EE) adjustment. Step 4. Cumulative Annual kW demand per
program computed in the same manner as TD calculation as of Rebase Date. Step 5. Monthly
Load Shape percentage per program converted to billing month equivalent by using a weighted
average calendar month Load Shape percentage based on billing cycle information of the rate
case. Step 6. Monthly EE Rebase Adjustment. Step 7. kW demand rebased for EE.
Non-Unanimous Stipulation and Agreement Resolving MEEIA Filings, Case No. EO-2015-0240, -0241, p. 13.

1 Q: **What are the results of these normalizations?**

2 A: Schedule ARB-1 shows the monthly adjustments for normalization on kWh sales.

3   Schedule ARB-2 shows the annualized kWh energy efficiency impact. Schedule ARB-3

4   shows weather-normalized customer annualized monthly peaks by class. Schedule

5   ARB-4 shows weather-normalized customer annualized loads by class at the time of the

6   monthly system peak load.

7 Q: **How are the results used?**

8 A: Weather-normalized, customer-annualized kWh sales are used to calculate test year

9   revenues and fuel costs.

10 Q: **Does that conclude your testimony?**

11 A: Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Kansas City Power & Light	)	
Company's Request for Authority to Implement	)	Case No. ER-2018-0145
A General Rate Increase for Electric Service	)	

AFFIDAVIT OF ALBERT R. BASS, JR.

STATE OF MISSOURI	)
	) ss
COUNTY OF JACKSON	)

Albert R. Bass, Jr., being first duly sworn on his oath, states:

1.   My name is Albert R. Bass, Jr. I work in Kansas City, Missouri, and I am employed by Kansas City Power & Light Company as Sr. Manager-Energy and Forecasting.

2.   Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of Kansas City Power & Light Company consisting of ___ten___ (10) pages, having been prepared in written form for introduction into evidence in the above-captioned docket.

3.   I have knowledge of the matters set forth therein. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded, including any attachments thereto, are true and accurate to the best of my knowledge, information and belief.
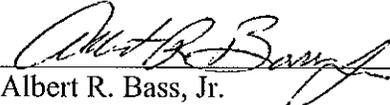
_____
Albert R. Bass, Jr.

Subscribed and sworn before me this _29th_ day of January, 2018.
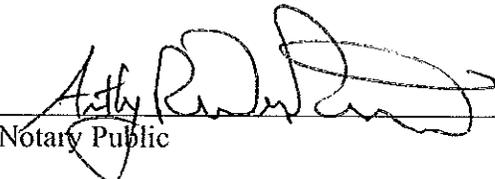
_____
Notary Public

My commission expires: ___4/26/2021___

ANTHONY R WESTENKIRCHNER
Notary Public, Notary Seal
State of Missouri
Platte County
Commission # 17279952
My Commission Expires April 26, 2021
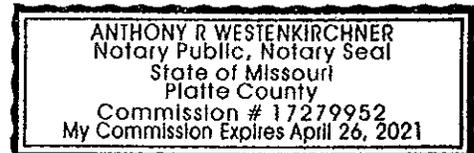
WEATHER ADJUSTMENTS TO MONTHLY BILLED SALES OF KCP&L

NORMALIZATIONS TO MONTHLY MWH SALES

State	Tariff	Weather Adjustments to Monthly Billed Sales												
		Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Test Year
KS	Residential	30,723	-5,617	10,754	11,358	-5,316	-10,220	-6,460	-25,521	-19,098	-6,907	-722	3,667	-23,357
KS	Small GS	1,559	-259	559	787	95	-432	-324	-1,204	-799	-254	-66	171	-167
KS	Medium GS	2,889	-446	1,182	2,140	930	-552	-515	-1,844	-1,044	-226	-78	197	2,634
KS	Large GS	6,299	-708	2,243	4,577	2,217	-2,231	-1,731	-6,338	-3,755	-1,100	-351	320	-556
	Total	41,470	-7,030	14,738	18,861	-2,073	-13,435	-9,029	-34,906	-24,696	-8,486	-1,216	4,356	-21,446
MO	Residential	30,828	-3,530	9,586	10,022	-7,370	-11,547	-5,221	-23,257	-19,574	-7,671	-1,146	3,909	-24,971
MO	Small GS	1,960	-238	671	919	-261	-828	-363	-1,687	-1,439	-510	-49	209	-1,615
MO	Medium GS	4,394	-671	1,399	2,623	1,066	-1,517	-839	-3,776	-2,724	-746	-133	358	-567
MO	Large GS	6,273	-954	1,705	3,399	832	-3,312	-1,737	-7,618	-5,367	-1,751	-373	367	-8,537
MO	Large Power	1,752	-346	1,475	2,382	1,988	255	-384	-434	408	534	-73	306	7,861
	Total	45,207	-5,739	14,836	19,345	-3,745	-16,950	-8,544	-36,772	-28,697	-10,144	-1,773	5,148	-27,829

ANNUALIZED ENERGY EFFICIENCY IMPACTS FOR KCP&L

ENERGY EFFICIENCY ADJUSTMENT TO MONTHLY MWH SALES

State	Tariff	Energy Efficiency Adjustments to Monthly Billed Sales												
		Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Test Year
KS	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0
KS	Small GS	0	0	0	0	0	0	0	0	0	0	0	0	0
KS	Medium GS	0	0	0	0	0	0	0	0	0	0	0	0	0
KS	Large GS	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
MO	Residential	-5,235	-5,454	-4,599	-3,688	-3,228	-3,180	-3,159	-2,826	-2,526	-2,363	-2,389	-2,533	-41,178
MO	Small GS	-2,342	-2,399	-2,298	-2,216	-2,176	-2,047	-2,024	-1,880	-1,702	-1,500	-1,357	-1,364	-23,305
MO	Medium GS	-4,373	-4,467	-4,250	-4,044	-3,943	-3,775	-3,671	-3,317	-2,752	-1,976	-1,580	-1,545	-39,693
MO	Large GS	-5,407	-5,530	-5,135	-4,775	-4,673	-4,488	-4,535	-4,318	-4,014	-3,258	-2,606	-2,556	-51,297
MO	Large Power	-2,078	-2,126	-2,072	-2,064	-2,073	-2,019	-2,066	-2,006	-1,965	-1,891	-1,803	-1,806	-23,970
	Total	-19,435	-19,977	-18,354	-16,787	-16,093	-15,509	-15,456	-14,348	-12,959	-10,988	-9,734	-9,804	-179,444

WEATHER NORMALIZED MONTHLY PEAK LOADS (MW) for KCP&L

WEATHER NORMALIZED MONTHLY PEAK LOADS WITH CUSTOMER GROWTH THROUGH June 2018 (MW) & EE Impact

State	Tariff	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Test Year
KS	Residential	1,052	1,050	775	560	568	724	614	644	486	550	758	878	1,052
KS	Small GS	104	104	90	71	69	77	83	79	74	70	87	88	104
KS	Medium GS	199	194	167	145	128	146	149	146	131	161	163	180	199
KS	Large GS	466	488	459	385	369	429	436	431	404	417	410	449	488
KS	Street Lights	3	3	3	3	3	3	1	1	1	1	1	1	3
KS	Traffic Signals	0	0	0	0	0	0	0	0	0	0	0	0	0
KS	Area Lights	1	1	1	1	1	1	1	1	1	1	1	1	1
KS	Off Peak Lightin	10	10	10	10	10	10	11	11	11	11	11	11	11
MO	Residential	883	847	634	378	445	575	535	429	354	337	528	734	883
MO	Small GS	103	103	94	68	68	88	85	77	69	67	78	89	103
MO	Medium GS	282	291	272	227	197	235	239	220	211	230	246	278	291
MO	Large GS	385	398	403	318	299	359	348	365	347	335	364	394	403
MO	Large Power	299	305	283	262	246	240	241	245	246	245	266	288	305
MO	Street Lights	17	17	17	17	17	17	17	17	17	17	17	17	17
MO	Traffic Signals	0	0	0	0	0	0	0	0	0	0	0	0	0
MO	Area Lights	3	3	3	3	3	3	3	3	3	3	3	3	3

Note: These numbers include losses.

WEATHER NORMALIZED MONTHLY COINCIDENT PEAK LOADS (MW) for KCP&L

WEATHER NORMALIZED MONTHLY COINCIDENT PEAK LOADS WITH CUSTOMER GROWTH THROUGH June 2018 (MW) & EE Imp

State	Tariff	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Test Year
KS	Residential	1,019	1,017	737	415	496	619	543	585	404	500	736	834	1,019
KS	Small GS	93	98	86	71	56	74	75	68	61	68	69	79	98
KS	Medium GS	182	183	154	137	102	142	139	137	115	142	140	175	183
KS	Large GS	446	463	427	371	339	421	436	431	395	394	366	423	463
KS	Street Lights	0	0	0	0	3	0	0	0	0	0	0	0	3
KS	Traffic Signals	0	0	0	0	0	0	0	0	0	0	0	0	0
KS	Area Lights	0	0	0	0	1	0	0	0	0	0	0	0	1
KS	Off Peak Lightin	0	0	0	0	10	1	2	0	0	0	0	0	10
	Total Retail	1,741	1,762	1,404	994	1,006	1,258	1,195	1,221	976	1,105	1,312	1,510	1,762
MO	Residential	838	821	601	299	426	471	486	399	343	277	508	669	838
MO	Small GS	96	96	86	68	58	83	80	66	64	63	63	80	96
MO	Medium GS	260	271	243	218	171	227	231	202	199	203	213	272	272
MO	Large GS	351	383	359	309	280	337	347	363	325	302	323	352	383
MO	Large Power	278	288	269	258	227	232	222	233	226	227	250	277	288
MO	Street Lights	0	0	0	0	17	2	3	0	0	0	0	0	17
MO	Traffic Signals	0	0	0	0	0	0	0	0	0	0	0	0	0
MO	Area Lights	0	0	0	0	3	0	1	0	0	0	0	0	3
		1,823	1,859	1,558	1,152	1,183	1,352	1,369	1,262	1,157	1,072	1,357	1,650	1,859

Note: These numbers include losses.