BEFORE THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS

In the Matter of the Application of The Empire District Electric Company to Make Certain Changes in Its Charges for Electric Service	**)** **)** **)** **)**	**Docket No. 19-EPDE-223-RTS**

DIRECT TESTIMONY

PREPARED BY

DARREN L. PRINCE

UTILITIES DIVISION

KANSAS CORPORATION COMMISSION

May 13, 2019

I. STATEMENT OF QUALIFICATIONS

Q. What is your name?

A. Darren L. Prince

Q. By whom and in what capacity are you employed?

A. I am employed by the Kansas Corporation Commission (KCC or Commission) as a Managing Economist.

Q. What is your business address?

A. 1500 SW Arrowhead Road, Topeka, KS, 66604-4027.

Q. What is your educational background and professional experience?

A. I hold a Bachelor of Arts and a Master of Arts degree in Economics from the University of Missouri-Kansas City. I have been employed by the KCC since May 16, 2016. Prior to my employment by the KCC, I was a Project Manager for Perfection Paper Hanging LLC.

Q. Have you previously submitted testimony before this Commission?

A. Yes, I filed testimony in Docket Nos. 16-KCPE-446-TAR, 16-KGSG-491-RTS, 18-WSEE-328-RTS, 18-KCPE-480-RTS, 18-KGSG-560-RTS, and 18-KG&E-303-CON. I have also participated in other Dockets as a member of KCC Staff (Staff).

II. INTRODUCTION

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to sponsor Staff's weather normalization revenue adjustment of $(81,713) and Staff's customer annualization revenue adjustment of $40,417 for a total adjustment of $(41,297).

Q. Are you sponsoring any exhibits?

A. Yes, I am sponsoring three exhibits. Exhibit DLP-1 is the regression analysis I performed for each customer class, Exhibit DLP-2 is the weather normalization adjustment, and Exhibit DLP-3 is the customer annualization adjustment.

Q. How is your testimony organized?

A. First, I will describe the purpose of normalizing revenue for weather. Then, I will describe the process Staff utilizes to develop its weather normalization adjustment, the results of Staff's analysis, and Staff's recommendation. Next, I will describe the purpose of normalizing revenue for customer counts. Then, I will describe how Staff developed its customer annualization adjustment, the results of Staff's analysis, and Staff's recommendation. Finally, I will conclude by recommending the Commission accept Staff's weather normalization adjustment and customer annualization adjustment.

III. ANALYSIS

WEATHER NORMALIZATION

Purpose of Weather Normalization

Q. What is the purpose of weather normalizing electricity usage?

A. The weather normalization adjustment is designed to minimize the effects of non-normal weather conditions on test year volumes and revenue collections. Some electricity uses, such as air conditioning, are sensitive to temperature—increasing when temperatures rise and decreasing when temperatures fall. Therefore, if the test year is warmer than normal, volumes and revenue will be higher than normal. Ultimately, this would result in rates being set too low for The Empire District

Electric Company (Empire) to collect its approved revenue requirement when weather is normal.

Like air conditioning, electricity usage for space heating is also affected by temperature. However, unlike air conditioning, which has a direct relationship with temperature; space heating usage has an inverse relationship with temperature. Thus, space heating usage increases when temperatures decrease and decreases when temperatures increase.

Because test-year revenue should reflect normal ongoing operations, the Commission sets rates based on normal weather customer usage. Through the weather normalization process, test year volumes and revenues are adjusted to reflect the difference between actual test year weather and normal weather. Hence, weather normalization adjustments are added or subtracted to test year volumes and revenue so the test year is reflective of normal weather.

Process

Q. Please provide a brief description of the weather normalization process.

A. The weather normalization process can be divided into the following four steps:

1) Selection of weather stations, the collection of weather data, and the collection of customer usage data;
2) Performance of regression analysis to determine customer-class-specific regression coefficients or weather sensitivity factors (WSFs);
3) Calculation of volumetric sales adjustments; and
4) Calculation of revenue adjustments.

Data Collection

Q. Who provided the customer usage and customer count data?

A. Empire provided Staff customer volumetric usage, customer count, and usage charge revenue for each of the customer classes.[1] With this data, Staff was able to calculate the per capita electric usage for each customer class and a monthly weighted kilowatt hour (kWh) charge.

Q. What is the source of weather data that Staff used for its analysis?

A. Staff collected weather data for the Springfield, MO, weather station[2] from the National Oceanic and Atmospheric Administration (NOAA). Staff collected daily maximum and minimum temperature data for the period of January 1988 through June 2018. Staff calculated Heating Degree Days (HDDs) and Cooling Degree Days (CDDs) with this data. In addition, Staff calculated 30-year normals (1988-2017).

Q. Please explain what "HDDs" and "CDDs" are.

A. HDDs and CDDs are weather variables that measure deviations from an established base temperature (in this case, 65 degrees).[3] HDDs cover colder weather and indicate how cool the average daily temperature was relative to the base temperature.[4] In terms of weather normalization for electricity use, HDDs indicate

[1] KCC DR 87, KCC DR 87 Supplemental Response, KCC DR 87 Supplemental Updated, and KCC DR 133.
[2] The Springfield, MO weather station is the closest First Order weather station to Empire's customers in Kansas.
[3] Degree days are weather variables based on the assumption that when the outside temperature is 65 degrees Fahrenheit, an average person will not require heating or cooling to be comfortable. https://www.weather.gov/key/climate_heat_cool
[4] Staff calculated HDD and CDD measures as follows.

$$HDD = \left(65 - \frac{Max + Min}{2}\right) \; if \; \frac{Max + Min}{2} < 65, otherwise \; HDD = 0$$

customer demand for space heating. CDDs cover warmer weather and indicate how warm the average daily temperature was relative to the base temperature. In terms of weather normalization, CDDs indicate customer demand for air conditioning.

Regression Estimation Process

Q. What is the purpose of performing a regression analysis on weather variables and electricity use?

A. The purpose of performing regression analysis is to determine the statistically significant WSFs for each customer class. The WSFs measure the relationship between customer usage (dependent variable) and weather (independent variables) for the different customer classes. The WSFs are the estimated parameters in the class regression equations for the HDD and CDD variables. The WSFs are then used to calculate volume adjustments to correct for temperature deviations from the 30-year norms for each customer class.

Q. What specifically were the customer usage and weather variables used in the regression analysis.

A. I performed a linear regression analysis with per capita customer usage as the dependent variable. The monthly HDDs and lagged HDDs (HDD-1), CDDs and lagged CDDs (CDD-1) were the independent variables. Because the data consists of weather-sensitive variables collected at regular intervals over an extended period of time, autocorrelation and seasonality was present in the data.[5] Autocorrelation

$$CDD = \left(\frac{Max + Min}{2} - 65\right) if \ \frac{Max + Min}{2} > 65, otherwise \ CDD = 0$$

[5] Autocorrelation is the correlation of a time series variable with earlier and later value of itself. For example, the best predictor of next period US Gross Domestic Product (GDP) is this period's GDP plus or minus a small percentage change because US GDP is autocorrelated. Seasonality in time series data are regular patterns in the data. Air conditioning usage increases in the spring through the summer and then decreases in the fall through the winter.

and seasonality result in distortionary time series behavior; parameters such as the mean and variance of the time series change over time.

Q. How did you resolve the autocorrelation and seasonality issues?

A. To correct for autocorrelation and seasonality, I applied autoregressive, seasonal autoregressive, moving average, and seasonal moving average terms.[6] Including these terms substantially improved the standard error and other metrics of the data analysis.

Volumetric Adjustment Process

Q. Please describe the process for calculating the volumetric sales adjustments.

A. To make the appropriate adjustment to the billing determinants, the actual monthly HDDs and CDDs for the test year were subtracted from the normal monthly HDDs and CDDs. The difference was multiplied by the WSFs and then finally multiplied by the class customer count for a given month of the test year. The result is the estimated effect on electricity usage, due to the deviation from normal weather.[7]

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[6] An AR(1) term is a first order autoregressive term and is defined as: $y_t = \rho_1 y_{t-1} + \varepsilon_t$. Notice that y_t is dependent upon the previous realization of y, y_{t-1}. The dependence y_t on y_{t-1} means that y_t is not only dependent on the current period error term but also on the previous period error term. The correlation of the error terms violates the classical regression assumption that the errors terms are uncorrelated. The use of the AR(1) term compensates for auto-correlated errors if the autocorrelation is of a first order autoregressive nature. An SAR(12) term is a seasonal autoregressive term with lag 12. It adds a polynomial with a lag of 12 to an existing AR specification. For example, an AR(1) and SAR(12) is defined as: $y_t = \rho_1 y_{t-1} + \varepsilon_t \; and \; \varphi_{12} y_{t-12} + \varepsilon_t$, and when combined, $y_t = \rho_1 y_{t-1} + \varphi_{12} y_{t-12} - \rho_1 \varphi_{12} \gamma_{t-13} + \varepsilon_t$. The multiplication of the regular (ρ) and the seasonal (φ) autoregressive terms for the parameter γ_{t-13} provides the non-linear effect.

An MA(1) term is a first order moving average term. It is defined as: $y_t = \varepsilon_t + \theta_1 \varepsilon_{t-1}$. Notice that y_t is dependent on both the current error term, ε_t, and the previous period error term, ε_{t-1}, thus the error terms are correlated. The MA(1) term compensates for the fact that the current period and previous period error terms are part of the equation. A SMA(12) term is a seasonal moving average term with lag 12. It adds a polynomial with lag of 12 to an existing MA specification. For example, an MA(1) and SMA(12) term is defined as: $y_t = \theta_1 \varepsilon_{t-1} + \varepsilon_t \; and \; y_t = \omega_{12} \varepsilon_{t-12} + \varepsilon_t$, and when combined, $y_t = \theta_1 \varepsilon_{t-1} + \omega_{12} \varepsilon_{t-12} + \theta_1 \omega_{12} \varepsilon_{t-13} + \varepsilon_t$. The non-linearity is the same as in the autoregressive process except for the change in sign from minus to plus.

[7] $\begin{pmatrix} Estimated \\ effect\ on\ usage \end{pmatrix} = \left[\left(\begin{pmatrix} Normal \\ HDD\ or\ CDD \end{pmatrix} - \begin{pmatrix} Actual \\ HDD\ or\ CDD \end{pmatrix} \right) (WSF) \right] * (Customer\ count)$

This calculation is done for each customer class, and the sum of all those adjustments is the total weather normalized volumetric sales adjustment.

Revenue Adjustment Process

Q. Please describe the process for calculating the revenue adjustment.

A. To calculate the revenue adjustments, the volumetric sales adjustments for each tariff class were multiplied by the appropriate rate for that customer class.[8] The result is the estimated revenue adjustment necessary to adjust test year revenues to reflect weather normalized volumetric sales. The sum of all those adjustments is the total weather-normalized revenue adjustment.

Results

Q. What were the results of Staff's weather normalization analysis?

A. Staff's weather normalization results in a volumetric adjustment of (4,174,223) kWh resulting in a revenue decrease of $(276,801). Empire's weather normalization resulted in a volumetric adjustment of (2,763,500) kWh, resulting in a revenue decrease of $(195,088). Staff is proposing an adjustment of $(81,713), the difference between Staff's and Empire's results. Staff's regression results are displayed in Exhibit DLP-1. Staff's weather normalization volumetric and revenue adjustments are illustrated in Exhibit DLP-2.

Recommendation

Q. Do you have a recommendation?

A. Yes. Since the weather experienced in Empire's service territory during the test year deviated from normal weather for that area, an adjustment is necessary to

[8] $\left(\begin{matrix}Estimated\\effect\ on\ revenue\ collection\end{matrix}\right) = \left(\begin{matrix}Volumetric\\Sales\ Adjustment\end{matrix}\right) * \left(\begin{matrix}Applicable\\Tariff\ Rate\end{matrix}\right)$

ensure test year revenue reflects Empire's normal ongoing operations. Because Staff utilized standard econometric techniques, corrected data errors, and assured usage matched the month it occurred in, I recommend the Commission accept Staff's weather normalization revenue adjustment of $(81,961).

CUSTOMER ANNUALIZATION

Purpose of Customer Annualization

Q. What is the purpose of annualizing customer counts?

A. Customer annualization adjusts test year revenues to reflect the number of customers for each customer class Empire was serving at the end of the test year. Thus, the adjustment represents the revenue Empire would have received if the number of customers at year-end had received service throughout the entire test year.

Process

Q. Please provide a brief description of the customer annualization process.

A. The customer annualization process can be divided into five steps:

1) Collection of customer counts by weather station per customer class;
2) Calculation of customer coefficients;
3) Adjust monthly customer counts;
4) Calculation of volumetric adjustment; and
5) Calculation of revenue adjustment.

Data Collection

Q. How did Staff obtain the customer counts per customer class and weather station?

A. Empire supplied monthly customer counts per rate class from July 2011 through June 2018.

Customer Coefficient Calculation

Q. What is a customer coefficient?

A. The customer coefficient represents the change in customers each month, assuming the change occurs at a constant rate throughout the test year.

Q. How did you calculate the customer coefficients?

A. Staff calculated customer coefficients by subtracting June 2018 customer counts from June 2017 customer counts for each rate class. This value was then divided by twelve to evenly spread the difference across the test-year months.[9]

Customer Count Adjustment Process

Q. Can you describe how the customer coefficients are used to calculate the annualized monthly customer counts?

A. Yes. Beginning in July of the test year, the customer coefficient is multiplied by 11.5 (August by 10.5, and so on) and continues until June, when actual customer count and annualized customer count are equal.

Q. Why did Staff annualize customer counts using this method?

A. By using this method two things are accomplished. First, it simulates the number of customers Empire was serving at the end of the test year were served throughout the test year. Second, by multiplying by 11.5 and so on, Staff is approximating the change in the number of bills resulting from the increase/decrease of customers joining at different times throughout the month instead of all at the beginning.

[9] $Customer\ Coefficient = \frac{June\ 2018\ Customer\ Count - June\ 2017\ Customer\ Count}{12}$

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Volumetric Adjustment Process

Q. How did you calculate the volume adjustment?

A. In order to derive annualized monthly volumes, Staff multiplied the difference between annualized customer count and actual customer count times the monthly weather normalized volumes per customer across each rate class and weather station.

Revenue Adjustment Process

Q. How did you calculate the revenue adjustment?

A. In order to arrive at monthly adjusted revenues, Staff added the product of the annualized monthly volumes, determined in the previous calculation, and the corresponding kWh charge and the product of the annualized customer count and the corresponding basic service charge. The final test year adjustment is the sum of adjusted revenues across all months in the test year associated with the customer annualization according to customer class and weather station.

Results

Q. What customer annualization adjustment are you recommending?

A. Staff's calculation results in a revenue increase of $40,417. Empire calculated a customer annualization adjustment, but did not include it in their final schedules. Therefore, Staff is proposing an adjustment of $40,417, the difference between Staff and Empire's filed adjustments. Staff's customer annualization results are displayed in Exhibit DLP – 3.

Recommendation

Q. Do you have a recommendation?

A. Yes. Weather normalized volumes are an input into the customer annualization adjustment, and for the reasons mentioned above, Staff believes its weather

normalization process correctly transforms the idiosyncratic customer volumes of the test year into weather-neutral customer volumes, and are thus reflective of normal weather during the test year. In addition, Staff utilized standard customer annualization methodology. Therefore, I am recommending the Commission accept Staff's customer annualization adjustment of $40,417.

IV. CONCLUSION

Q. Please summarize the recommendations discussed in your testimony.

A. The Commission should accept Staff's proposed weather normalization revenue adjustment of $(81,713) and customer annualization adjustment of $40,417 because Staff utilized standard techniques, corrected data errors, and assured volumetric usage matched the month it occurred in to calculate the weather normalization and customer annualization adjustments.

Q. Does this conclude your testimony?

A. Yes. Thank you.

EXHIBIT DLP – 1

19-EPDE-223-RTS

REGRESSION RESULTS

Residential_General

Dependent Variable: RG_AVG_USAGE
Method: ARMA Maximum Likelihood (BFGS)
Date: 04/23/19 Time: 11:26
Sample: 2011M08 2018M06
Included observations: 83
Convergence achieved after 6 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	351.4274	32.87894	10.68853	0
SPRG_MO_CDD	0.885755	0.084082	10.53443	0
SPRG_MO_CDD(-1)	1.542861	0.118871	12.97931	0
SPRG_MO_HDD	0.342694	0.049325	6.947713	0
SPRG_MO_HDD(-1)	0.451276	0.060806	7.421541	0
AR(12)	0.482009	0.107662	4.47707	0
SIGMASQ	3338.6	613.2803	5.443841	0

R-squared	0.950802	Mean dependent var	944.1133
Adjusted R-squared	0.946918	S.D. dependent var	262.0846
S.E. of regression	60.38297	Akaike info criterion	11.15808
Sum squared resid	277103.8	Schwarz criterion	11.36208
Log likelihood	-456.0605	Hannan-Quinn criter.	11.24004
F-statistic	244.7975	Durbin-Watson stat	2.21141
Prob(F-statistic)	0		

Inverted AR Roots	0.94	.81+.47i	.81-.47i	.47+.81i
	.47-.81i	.00-.94i	-.00+.94i	-.47-.81i
	-.47+.81i	-.81+.47i	-.81-.47i	-0.94

Residential_Water Heating

Dependent Variable: RG_WH_AVG_USAGE_2
Method: ARMA Maximum Likelihood (BFGS)
Date: 04/26/19 Time: 13:01
Sample: 2011M08 2018M06
Included observations: 83
Convergence achieved after 5 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	487.1142	36.8186	13.23011	0
SPRG_MO_CDD	0.888065	0.09977	8.9011	0
SPRG_MO_CDD(-1)	1.673902	0.134052	12.48699	0
SPRG_MO_HDD	0.399778	0.052559	7.606306	0
SPRG_MO_HDD(-1)	0.633881	0.069547	9.114386	0
AR(12)	0.407342	0.121286	3.358526	0.0012
SIGMASQ	4192.128	731.0562	5.734345	0

R-squared	0.944441	Mean dependent var		1182.477
Adjusted R-squared	0.940055	S.D. dependent var		276.3575
S.E. of regression	67.66273	Akaike info criterion		11.37375
Sum squared resid	347946.7	Schwarz criterion		11.57775
Log likelihood	-465.0105	Hannan-Quinn criter.		11.4557
F-statistic	215.3182	Durbin-Watson stat		2.214367
Prob(F-statistic)	0			

Inverted AR Roots	0.93	.80+.46i	.80-.46i	.46+.80i
	.46-.80i	.00+.93i	-.00-.93i	-.46+.80i
	-.46-.80i	-.80-.46i	-.80+.46i	-0.93

Residential_Total Electric

Dependent Variable: RH_AVG_USAGE
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 04/23/19 Time: 11:13
Sample: 2011M08 2018M06
Included observations: 83
Convergence achieved after 13 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	348.7872	60.45709	5.76917	0
SPRG_MO_CDD	1.096615	0.264368	4.148062	0.0001
SPRG_MO_CDD(-1)	1.894473	0.239601	7.906781	0
SPRG_MO_HDD	0.886422	0.093873	9.442745	0
SPRG_MO_HDD(-1)	1.369244	0.097735	14.0098	0
AR(12)	0.327011	0.106053	3.083459	0.0029
SIGMASQ	13414.76	1959.056	6.847564	0

R-squared	0.947529	Mean dependent var	1534.212
Adjusted R-squared	0.943386	S.D. dependent var	508.7002
S.E. of regression	121.0385	Akaike info criterion	12.52701
Sum squared resid	1113425	Schwarz criterion	12.73101
Log likelihood	-512.8711	Hannan-Quinn criter.	12.60897
F-statistic	228.7343	Durbin-Watson stat	2.263272
Prob(F-statistic)	0		

Inverted AR Roots	0.91	.79+.46i	.79-.46i	.46+.79i
	.46-.79i	.00+.91i	.00-.91i	-.46-.79i
	-.46+.79i	-.79+.46i	-.79-.46i	-0.91

Commercial

Dependent Variable: CB_AVG_USAGE
Method: ARMA Maximum Likelihood (BFGS)
Date: 04/26/19 Time: 15:16
Sample: 2011M08 2018M06
Included observations: 83
Convergence achieved after 5 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	798.7503	31.84211	25.08472	0
SPRG_MO_CDD	0.524136	0.087133	6.015361	0
SPRG_MO_CDD(-1)	1.651005	0.079078	20.87818	0
SPRG_MO_HDD	0.183548	0.053407	3.436754	0.001
SPRG_MO_HDD(-1)	0.389699	0.051265	7.60165	0
AR(3)	0.263449	0.119645	2.201924	0.0307
SAR(12)	0.361119	0.116478	3.100305	0.0027
SIGMASQ	3714.763	692.0682	5.367626	0

R-squared	0.937875	Mean dependent var		1288.606
Adjusted R-squared	0.932077	S.D. dependent var		246.0174
S.E. of regression	64.11712	Akaike info criterion		11.27365
Sum squared resid	308325.4	Schwarz criterion		11.50679
Log likelihood	-459.8563	Hannan-Quinn criter.		11.36731
F-statistic	161.7501	Durbin-Watson stat		1.9935
Prob(F-statistic)	0			

Inverted AR Roots	0.92	.80+.46i	.80-.46i	0.64
	.46+.80i	.46-.80i	.00+.92i	.00-.92i
	-.32+.56i	-.32-.56i	-.46+.80i	-.46-.80i
	-.80-.46i	-.80+.46i	-0.92	

General Power

Dependent Variable: GP_AVG_USAGE
Method: ARMA Conditional Least Squares (BFGS / Marquardt steps)
Date: 04/17/19 Time: 11:33
Sample (adjusted): 2012M09 2018M06
Included observations: 70 after adjustments
Convergence achieved after 28 iterations
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)
MA Backcast: 2011M08 2012M08

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	25386.84	631.9817	40.17022	0
SPRG_MO_CDD(-1)	21.47222	1.766962	12.15206	0
SPRG_MO_HDD	1.821109	0.840756	2.166038	0.0341
AR(1)	0.786778	0.09676	8.131256	0
SAR(12)	-0.282704	0.106474	-2.65515	0.01
MA(1)	-0.70473	0.123608	-5.701338	0
SMA(12)	0.875155	0.029989	29.18286	0

R-squared	0.869328	Mean dependent var	28602.46
Adjusted R-squared	0.856883	S.D. dependent var	3214.23
S.E. of regression	1215.97	Akaike info criterion	17.13911
Sum squared resid	93150777	Schwarz criterion	17.36396
Log likelihood	-592.8689	Hannan-Quinn criter.	17.22842
F-statistic	69.85367	Durbin-Watson stat	2.324849
Prob(F-statistic)	0		

Inverted AR Roots	.87-.23i	.87+.23i	0.79	.64+.64i
	.64-.64i	.23-.87i	.23+.87i	-.23+.87i
	-.23-.87i	-.64-.64i	-.64-.64i	-.87-.23i
	-.87+.23i			
Inverted MA Roots	.96+.26i	.96-.26i	0.7	.70+.70i
	.70-.70i	.26+.96i	.26-.96i	-.26-.96i
	-.26+.96i	-.70-.70i	-.70-.70i	-.96-.26i
	-.96+.26i			

Space Heating

Dependent Variable: SH_AVG_USAGE
Method: ARMA Maximum Likelihood (BFGS)
Date: 04/17/19 Time: 13:39
Sample: 2011M08 2018M06
Included observations: 83
Convergence achieved after 5 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	866.57	66.4465	13.04162	0
SPRG_MO_CDD	1.274429	0.305881	4.166421	0.0001
SPRG_MO_CDD(-1)	2.229023	0.249429	8.936519	0
SPRG_MO_HDD	0.645039	0.115862	5.567279	0
SPRG_MO_HDD(-1)	1.613741	0.112171	14.38647	0
AR(1)	-0.314807	0.117721	-2.674171	0.0092
SAR(12)	0.456289	0.108187	4.21761	0.0001
SIGMASQ	21324.86	3125.679	6.822473	0

R-squared	0.920533	Mean dependent var		2116.625
Adjusted R-squared	0.913116	S.D. dependent var		521.1717
S.E. of regression	153.6213	Akaike info criterion		13.03329
Sum squared resid	1769963	Schwarz criterion		13.26643
Log likelihood	-532.8814	Hannan-Quinn criter.		13.12695
F-statistic	124.112	Durbin-Watson stat		1.990317
Prob(F-statistic)	0			

Inverted AR Roots	0.94	.81+.47i	.81-.47i	.47+.81i
	.47-.81i	.00-.94i	.00+.94i	-0.31
	-.47-.81i	-.47+.81i	-.81-.47i	-.81+.47i
	-0.94			

Total Electric Building

Dependent Variable: TEB_AVG_USAGE
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 04/17/19 Time: 11:35
Sample (adjusted): 2012M09 2018M06
Included observations: 70 after adjustments
Convergence achieved after 6 iterations
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11171.22	873.2591	12.79256	0
SPRG_MO_CDD(-1)	22.00696	2.641466	8.331342	0
SPRG_MO_HDD	3.386453	0.931931	3.633804	0.0006
SPRG_MO_HDD(-1)	11.46111	1.222091	9.378277	0
TEB_DUMMY	-9261.831	521.2008	-17.77018	0
AR(1)	0.328476	0.090485	3.630182	0.0006
SAR(12)	0.242041	0.068236	3.547129	0.0007

R-squared	0.864414	Mean dependent var	18872.61
Adjusted R-squared	0.851501	S.D. dependent var	4059.347
S.E. of regression	1564.292	Akaike info criterion	17.64289
Sum squared resid	1.54E+08	Schwarz criterion	17.86774
Log likelihood	-610.5013	Hannan-Quinn criter.	17.73221
F-statistic	66.94166	Durbin-Watson stat	1.997298
Prob(F-statistic)	0		

Inverted AR Roots	0.89	.77+.44i	.77-.44i	.44-.77i
	.44+.77i	0.33	.00+.89i	.00-.89i
	-.44+.77i	-.44-.77i	-.77-.44i	-.77+.44i
	-0.89			

EXHIBIT DLP - 2

19-EPDE-223-RTS

WEATHER NORMALIZATION ADJUSTMENTS

Weather Normalization Summary				
Customer Classification		Staff's Volumetric Adjustment		Staff's Revenue Adjustment
RG	RG	(2,346,077)	$	(152,747)
RG-WH	RG-WH	(306,044)	$	(19,003)
RH	RH	(687,076)	$	(39,322)
CB	CB	(410,818)	$	(35,191)
GP	GP	(312,723)	$	(22,652)
SH	SH	(52,293)	$	(3,780)
TEB	TEB	(59,194)	$	(4,107)
Total		(4,174,223)	$	(276,801)

Residential General

Weather Station	Customer Classification	TY: 201707 - 201806 Month	Customer Count	Usage	Average Usage	Basic Service	kWh Usage Rate	Current Month HDD Actual	Current Month HDD Normal	Previous Month HDD Actual	Previous Month HDD Normal	Current Month CDD Actual	Current Month CDD Normal	Previous Month CDD Actual	Previous Month CDD Normal	Change in Usage due to HDD	Change in Usage due to CDD	Total Adjustment	Revenue Adjustment
SPRG		June	5,536						0.342694		0.451276		0.885755		1.542861				
	RG	July	5,538	6,649,942	1200.78	$ 14.00	$ 0.0643	0.0	0.6	0.0	7.3	457.0	412.1	263.5	277.5	3.50	(18.13)	(81,032)	$ (5,209)
		August	5,537	7,119,677	1285.84	$ 14.00	$ 0.0641	0.0	1.5	0.0	0.6	268.0	391.4	457.0	412.1	0.79	39.97	225,695	$ 14,468
		September	5,539	5,499,767	992.92	$ 14.00	$ 0.0648	8.5	47.1	0.0	1.5	211.0	171.3	268.0	391.4	13.91	155.14	936,411	$ 60,717
		October	5,534	4,443,856	803.01	$ 14.00	$ 0.0655	237.5	250.1	8.5	47.1	84.0	32.4	211.0	171.3	21.73	(107.04)	(472,093)	$ (30,927)
		November	5,540	3,878,852	700.15	$ 14.00	$ 0.0659	453.0	552.2	237.5	250.1	3.5	1.6	84.0	32.4	39.66	(81.32)	(230,754)	$ (15,200)
		December	5,553	4,618,257	831.67	$ 14.00	$ 0.0652	878.0	896.0	453.0	552.2	0.0	0.1	3.5	1.6	50.91	(2.84)	266,970	$ 17,414
		January	5,547	7,038,685	1268.92	$ 14.00	$ 0.0640	1031.5	963.8	878.0	896.0	0.0	0.0	0.0	0.1	(15.07)	0.08	(83,175)	$ (5,321)
		February	5,562	5,849,480	1051.69	$ 14.00	$ 0.0645	720.5	772.3	1031.5	963.8	0.5	0.3	0.0	0.0	(12.80)	(0.15)	(72,004)	$ (4,641)
		March	5,559	4,541,451	816.95	$ 14.00	$ 0.0652	546.0	566.3	720.5	772.3	0.0	4.6	0.5	0.3	30.31	3.79	189,539	$ 12,362
		April	5,537	4,054,152	732.19	$ 14.00	$ 0.0656	433.5	279.0	546.0	566.3	12.0	24.7	0.0	4.6	(43.81)	18.32	(141,134)	$ (9,257)
		May	5,530	3,916,243	708.18	$ 14.00	$ 0.0659	5.5	99.7	433.5	279.0	263.5	99.1	12.0	24.7	(37.45)	(126.02)	(903,959)	$ (59,544)
		June	5,554	6,225,912	1120.98	$ 14.00	$ 0.0644	0.0	7.3	5.5	99.7	444.5	277.5	263.5	99.1	45.02	(401.62)	(1,980,542)	$ (127,609)
		Total	5,544	63,836,274														(2,346,077)	$ (152,747)

Residential Water Heating

Weather Station	Customer Classification	TY: 201707 - 201806 Month	Customer Count	Usage	Average Usage	Basic Service	Commodity Rate	Current Month HDD Actual	Current Month HDD Normal	Previous Month HDD Actual	Previous Month HDD Normal	Current Month CDD Actual	Current Month CDD Normal	Previous Month CDD Actual	Previous Month CDD Normal	Change in Usage due to HDD	Change in Usage due to CDD	Total Adjustment	Revenue Adjustment
SPRG																			
		June	765						0.399778		0.633881		0.888065		1.673902				
	RG-WH	July	770	1,035,706	1345.07	$ 14.00	$ 0.0619	0.0	0.6	0.0	7.3	457.0	412.1	263.5	277.5	4.87	(16.40)	(8,876)	$ (549)
		August	768	1,137,109	1480.61	$ 14.00	$ 0.0618	0.0	1.5	0.0	0.6	268.0	391.4	457.0	412.1	0.98	34.37	27,152	$ 1,679
		September	766	902,628	1178.37	$ 14.00	$ 0.0620	8.5	47.1	0.0	1.5	211.0	171.3	268.0	391.4	16.40	171.22	143,713	$ 8,911
		October	762	745,574	978.44	$ 14.00	$ 0.0622	237.5	250.1	8.5	47.1	84.0	32.4	211.0	171.3	29.49	(112.36)	(63,146)	$ (3,925)
		November	766	699,314	912.94	$ 14.00	$ 0.0622	453.0	552.2	237.5	250.1	3.5	1.6	84.0	32.4	47.62	(88.09)	(30,994)	$ (1,928)
		December	766	840,251	1096.93	$ 14.00	$ 0.0620	878.0	896.0	453.0	552.2	0.0	0.1	3.5	1.6	70.05	(3.08)	51,295	$ 3,182
		January	762	1,260,147	1653.74	$ 14.00	$ 0.0618	1031.5	963.8	878.0	896.0	0.0	0.0	0.0	0.1	(15.65)	0.08	(11,860)	$ (733)
		February	761	1,084,828	1425.53	$ 14.00	$ 0.0618	720.5	772.3	1031.5	963.8	0.5	0.3	0.0	0.0	(22.20)	(0.15)	(17,008)	$ (1,052)
		March	766	851,489	1111.60	$ 14.00	$ 0.0620	546.0	566.3	720.5	772.3	0.0	4.6	0.5	0.3	40.92	3.78	34,238	$ 2,123
		April	759	738,443	972.92	$ 14.00	$ 0.0621	433.5	279.0	546.0	566.3	12.0	24.7	0.0	4.6	(48.94)	18.95	(22,758)	$ (1,414)
		May	745	695,303	933.29	$ 14.00	$ 0.0622	5.5	99.7	433.5	279.0	263.5	99.1	12.0	24.7	(60.29)	(124.73)	(137,835)	$ (8,574)
		June	748	940,759	1257.70	$ 14.00	$ 0.0620	0.0	7.3	5.5	99.7	444.5	277.5	263.5	99.1	62.64	(423.55)	(269,964)	$ (16,725)
		Total	762	10,931,551														(306,044)	$ (19,003)

Residential Total Electric

Weather Station	Customer Classification	TY: 201707 - 201806 Month	Customer Count	Usage	Average Usage	Basic Service	Commodity Rate	Current Month HDD Actual	Current Month HDD Normal	Previous Month HDD Actual	Previous Month HDD Normal	Current Month CDD Actual	Current Month CDD Normal	Previous Month CDD Actual	Previous Month CDD Normal	Change in Usage due to HDD	Change in Usage due to CDD	Total Adjustment	Revenue Adjustment
SPRG																			
		June	1,857						0.886422		1.369244		1.096615		1.894473				
	RH	July	1,855	2,561,730	1380.99	$ 14.00	$ 0.0572	0.0	0.6	0.0	7.3	457.0	412.1	263.5	277.5	10.54	(22.67)	(22,511)	$ (1,288)
		August	1,862	2,733,690	1468.15	$ 14.00	$ 0.0572	0.0	1.5	0.0	0.6	268.0	391.4	457.0	412.1	2.16	50.19	97,476	$ 5,579
		September	1,860	2,252,828	1211.20	$ 14.00	$ 0.0572	8.5	47.1	0.0	1.5	211.0	171.3	268.0	391.4	36.30	190.14	421,184	$ 24,104
		October	1,868	1,899,621	1016.93	$ 14.00	$ 0.0572	237.5	250.1	8.5	47.1	84.0	32.4	211.0	171.3	64.00	(131.90)	(126,831)	$ (7,259)
		November	1,865	2,241,550	1201.90	$ 14.00	$ 0.0572	453.0	552.2	237.5	250.1	3.5	1.6	84.0	32.4	105.14	(99.86)	9,840	$ 563
		December	1,871	2,892,370	1545.90	$ 14.00	$ 0.0572	878.0	896.0	453.0	552.2	0.0	0.1	3.5	1.6	151.72	(3.48)	277,347	$ 15,873
		January	1,868	5,297,095	2835.70	$ 14.00	$ 0.0572	1031.5	963.8	878.0	896.0	0.0	0.0	0.0	0.1	(35.35)	0.09	(65,856)	$ (3,769)
		February	1,873	4,394,934	2346.47	$ 14.00	$ 0.0572	720.5	772.3	1031.5	963.8	0.5	0.3	0.0	0.0	(46.77)	(0.18)	(87,948)	$ (5,033)
		March	1,873	3,191,208	1703.79	$ 14.00	$ 0.0572	546.0	566.3	720.5	772.3	0.0	4.6	0.5	0.3	88.85	4.69	175,212	$ 10,027
		April	1,866	2,657,124	1423.97	$ 14.00	$ 0.0572	433.5	279.0	546.0	566.3	12.0	24.7	0.0	4.6	(109.24)	22.61	(161,642)	$ (9,251)
		May	1,869	2,102,807	1125.10	$ 14.00	$ 0.0572	5.5	99.7	433.5	279.0	263.5	99.1	12.0	24.7	(128.07)	(156.22)	(531,330)	$ (30,408)
		June	1,871	2,394,743	1279.93	$ 14.00	$ 0.0572	0.0	7.3	5.5	99.7	444.5	277.5	263.5	99.1	135.47	(494.64)	(672,018)	$ (38,460)
		Total	1,867	34,619,700														(687,076)	$ (39,322)

Commercial

Weather Station	Customer Classification	TY: 201707 - 201806 Month	Customer Count	Usage	Average Usage	Basic Service	Commodity Rate	Current Month HDD Actual	Current Month HDD Normal	Previous Month HDD Actual	Previous Month HDD Normal	Current Month CDD Actual	Current Month CDD Normal	Previous Month CDD Actual	Previous Month CDD Normal	Change in Usage due to HDD	Change in Usage due to CDD	Total Adjustment	Revenue Adjustment
SPRG																			
		June	1,187						0.183548		0.389699		0.524136		1.651005				
	CB	July	1,191	1,710,904	1436.53	$ 19.00	$ 0.0853	0.0	0.6	0.0	7.3	457.0	412.1	263.5	277.5	2.96	(0.37)	3,079	$ 263
		August	1,188	1,914,908	1611.88	$ 19.00	$ 0.0851	0.0	1.5	0.0	0.6	268.0	391.4	457.0	412.1	0.51	(9.50)	(10,678)	$ (909)
		September	1,187	1,738,104	1464.28	$ 19.00	$ 0.0852	8.5	47.1	0.0	1.5	211.0	171.3	268.0	391.4	7.68	182.85	226,162	$ 19,279
		October	1,184	1,485,993	1255.06	$ 19.00	$ 0.0856	237.5	250.1	8.5	47.1	84.0	32.4	211.0	171.3	17.35	(92.66)	(89,172)	$ (7,632)
		November	1,184	1,244,588	1051.17	$ 19.00	$ 0.0861	453.0	552.2	237.5	250.1	3.5	1.6	84.0	32.4	23.11	(86.23)	(74,730)	$ (6,432)
		December	1,182	1,418,549	1200.13	$ 19.00	$ 0.0857	878.0	896.0	453.0	552.2	0.0	0.1	3.5	1.6	41.94	(3.06)	45,964	$ 3,940
		January	1,184	1,555,313	1313.61	$ 19.00	$ 0.0857	1031.5	963.8	878.0	896.0	0.0	0.0	0.0	0.1	(5.41)	0.08	(6,306)	$ (541)
		February	1,181	1,670,255	1414.27	$ 19.00	$ 0.0853	720.5	772.3	1031.5	963.8	0.5	0.3	0.0	0.0	(16.87)	(0.09)	(20,028)	$ (1,709)
		March	1,181	1,246,764	1055.69	$ 19.00	$ 0.0863	546.0	566.3	720.5	772.3	0.0	4.6	0.5	0.3	23.90	2.12	30,724	$ 2,653
		April	1,181	1,224,556	1036.88	$ 19.00	$ 0.0862	433.5	279.0	546.0	566.3	12.0	24.7	0.0	4.6	(20.47)	14.21	(7,389)	$ (637)
		May	1,188	1,337,589	1125.92	$ 19.00	$ 0.0858	5.5	99.7	433.5	279.0	263.5	99.1	12.0	24.7	(42.92)	(65.17)	(128,418)	$ (11,024)
		June	1,184	1,635,311	1381.17	$ 19.00	$ 0.0854	0.0	7.3	5.5	99.7	444.5	277.5	263.5	99.1	38.05	(359.02)	(380,027)	$ (32,442)
		Total	1,185	18,182,834														(410,818)	$ (35,191)

General Power

Weather Station	Customer Classification	TY: 201707 - 201806 Month	Customer Count	Usage	Average Usage	Basic Service	Commodity Rate	Current Month HDD Actual	Current Month HDD Normal	Previous Month HDD Actual	Previous Month HDD Normal	Current Month CDD Actual	Current Month CDD Normal	Previous Month CDD Actual	Previous Month CDD Normal	Change in Usage due to HDD	Change in Usage due to CDD	Total Adjustment	Revenue Adjustment
SPRG																			
		June	104						1.821109		0		0		21.47222				
	GP	July	105	3,300,387	31432.26	$ -	$ 0.0718	0.0	0.6	0.0	7.3	457.0	412.1	263.5	277.5	1.06	301.33	31,751	$ 2,280
		August	105	3,578,020	34076.38	$ -	$ 0.0700	0.0	1.5	0.0	0.6	268.0	391.4	457.0	412.1	2.79	(964.46)	(100,975)	$ (7,068)
		September	106	3,630,302	34248.13	$ -	$ 0.0699	8.5	47.1	0.0	1.5	211.0	171.3	268.0	391.4	70.26	2,648.96	288,237	$ 20,148
		October	106	3,188,348	30078.75	$ -	$ 0.0746	237.5	250.1	8.5	47.1	84.0	32.4	211.0	171.3	22.95	(853.16)	(88,003)	$ (6,564)
		November	106	3,042,124	28699.28	$ -	$ 0.0744	453.0	552.2	237.5	250.1	3.5	1.6	84.0	32.4	180.56	(1,108.68)	(98,381)	$ (7,316)
		December	106	2,855,219	26936.03	$ -	$ 0.0754	878.0	896.0	453.0	552.2	0.0	0.1	3.5	1.6	32.78	(40.08)	(774)	$ (58)
		January	106	3,164,409	29852.92	$ -	$ 0.0728	1031.5	963.8	878.0	896.0	0.0	0.0	0.0	0.1	(123.26)	1.07	(12,952)	$ (943)
		February	106	2,868,968	27065.74	$ -	$ 0.0732	720.5	772.3	1031.5	963.8	0.5	0.3	0.0	0.0	94.30	-	9,996	$ 731
		March	106	2,788,196	26303.74	$ -	$ 0.0744	546.0	566.3	720.5	772.3	0.0	4.6	0.5	0.3	36.88	(3.58)	3,530	$ 263
		April	106	2,608,320	24606.79	$ -	$ 0.0763	433.5	279.0	546.0	566.3	12.0	24.7	0.0	4.6	(281.39)	98.06	(19,434)	$ (1,483)
		May	106	2,884,387	27211.20	$ -	$ 0.0756	5.5	99.7	433.5	279.0	263.5	99.1	12.0	24.7	171.55	273.41	47,166	$ 3,565
		June	106	3,427,680	32336.60	$ -	$ 0.0703	0.0	7.3	5.5	99.7	444.5	277.5	263.5	99.1	13.32	(3,531.11)	(372,885)	$ (26,206)
		Total	106	37,336,360														(312,723)	$ (22,652)

Space Heating

Weather Station	Customer Classification	TY: 201707 - 201806 Month	Customer Count	Usage	Average Usage	Basic Service	Commodity Rate	Current Month HDD Actual	Current Month HDD Normal	Previous Month HDD Actual	Previous Month HDD Normal	Current Month CDD Actual	Current Month CDD Normal	Previous Month CDD Actual	Previous Month CDD Normal	Change in Usage due to HDD	Change in Usage due to CDD	Total Adjustment	Revenue Adjustment
SPRG																			
		June	110						0.645039		1.613741		1.274429		2.229023				
	SH	July	109	243,165	2230.87	$ 19.00	$ 0.0725	0.0	0.6	0.0	7.3	457.0	412.1	263.5	277.5	12.18	(25.96)	(1,502)	$ (109)
		August	110	230,398	2094.53	$ 19.00	$ 0.0727	0.0	1.5	0.0	0.6	268.0	391.4	457.0	412.1	1.93	57.10	6,494	$ 472
		September	110	210,731	1915.74	$ 19.00	$ 0.0729	8.5	47.1	0.0	1.5	211.0	171.3	268.0	391.4	27.36	224.35	27,688	$ 2,019
		October	110	179,771	1634.28	$ 19.00	$ 0.0733	237.5	250.1	8.5	47.1	84.0	32.4	211.0	171.3	70.39	(154.37)	(9,238)	$ (677)
		November	110	174,712	1588.29	$ 19.00	$ 0.0735	453.0	552.2	237.5	250.1	3.5	1.6	84.0	32.4	84.29	(117.47)	(3,650)	$ (268)
		December	109	211,027	1936.03	$ 19.00	$ 0.0730	878.0	896.0	453.0	552.2	0.0	0.1	3.5	1.6	171.61	(4.10)	18,259	$ 1,334
		January	109	338,183	3102.60	$ 19.00	$ 0.0719	1031.5	963.8	878.0	896.0	0.0	0.0	0.0	0.1	(14.61)	0.11	(1,580)	$ (114)
		February	110	316,848	2880.44	$ 19.00	$ 0.0721	720.5	772.3	1031.5	963.8	0.5	0.3	0.0	0.0	(75.82)	(0.21)	(8,364)	$ (603)
		March	110	230,202	2092.75	$ 19.00	$ 0.0729	546.0	566.3	720.5	772.3	0.0	4.6	0.5	0.3	96.63	5.45	11,228	$ 819
		April	110	207,257	1884.15	$ 19.00	$ 0.0735	433.5	279.0	546.0	566.3	12.0	24.7	0.0	4.6	(66.99)	26.41	(4,464)	$ (328)
		May	110	270,808	2461.89	$ 19.00	$ 0.0722	5.5	99.7	433.5	279.0	263.5	99.1	12.0	24.7	(188.59)	(181.20)	(40,676)	$ (2,935)
		June	110	210,616	1914.69	$ 19.00	$ 0.0729	0.0	7.3	5.5	99.7	444.5	277.5	263.5	99.1	156.73	(579.35)	(46,488)	$ (3,389)
		Total	110	2,823,718														(52,293)	$ (3,780)

Total Electric Building																			
Weather Station	Customer Classification	TY: 201707 - 201806 Month	Customer Count	Usage	Avg Usage	Basic Service	Commodity Rate	Current Month HDD Actual	Current Month HDD Normal	Previous Month HDD Actual	Previous Month HDD Normal	Current Month CDD Actual	Current Month CDD Normal	Previous Month CDD Actual	Previous Month CDD Normal	Change in Usage due to HDD	Change in Usage due to CDD	Total Adjustment	Revenue Adjustment
SPRG																			
		June	39						3.386453		11.46111		0		22.00696				
	TEB	July	39	724,582	18579.03	$ -	$ 0.0710	0.0	0.6	0.0	7.3	457.0	412.1	263.5	277.5	85.83	308.83	15,392	$ 1,094
		August	39	828,185	21235.51	$ -	$ 0.0698	0.0	1.5	0.0	0.6	268.0	391.4	457.0	412.1	11.88	(988.48)	(38,087)	$ (2,659)
		September	39	774,232	19852.10	$ -	$ 0.0704	8.5	47.1	0.0	1.5	211.0	171.3	268.0	391.4	148.23	2,714.93	111,663	$ 7,864
		October	39	728,596	18681.95	$ -	$ 0.0706	237.5	250.1	8.5	47.1	84.0	32.4	211.0	171.3	484.88	(874.41)	(15,192)	$ (1,072)
		November	39	628,377	16112.23	$ -	$ 0.0722	453.0	552.2	237.5	250.1	3.5	1.6	84.0	32.4	480.18	(1,136.29)	(25,589)	$ (1,847)
		December	40	711,019	17775.48	$ -	$ 0.0709	878.0	896.0	453.0	552.2	0.0	0.1	3.5	1.6	1,197.33	(41.08)	46,250	$ 3,280
		January	40	1,041,092	26027.30	$ -	$ 0.0678	1031.5	963.8	878.0	896.0	0.0	0.0	0.0	0.1	(22.91)	1.10	(872)	$ (59)
		February	40	1,054,332	26358.30	$ -	$ 0.0675	720.5	772.3	1031.5	963.8	0.5	0.3	0.0	0.0	(600.36)	-	(24,015)	$ (1,620)
		March	40	816,305	20407.63	$ -	$ 0.0695	546.0	566.3	720.5	772.3	0.0	4.6	0.5	0.3	662.07	(3.67)	26,336	$ 1,831
		April	40	702,877	17571.93	$ -	$ 0.0706	433.5	279.0	546.0	566.3	12.0	24.7	0.0	4.6	(291.18)	100.50	(7,627)	$ (538)
		May	40	685,777	17144.43	$ -	$ 0.0705	5.5	99.7	433.5	279.0	263.5	99.1	12.0	24.7	(1,451.93)	280.22	(46,868)	$ (3,304)
		June	40	740,732	18518.30	$ -	$ 0.0703	0.0	7.3	5.5	99.7	444.5	277.5	263.5	99.1	1,104.41	(3,619.04)	(100,585)	$ (7,076)
		Total	40	9,436,106														(59,194)	$ (4,107)

EXHIBIT DLP – 3

19-EPDE-223-RTS

CUSTOMER ANNUALIZATION ADJUSTMENT

Customer Annualization Summary			
Customer Classification		Staff's Volumetric Adjustment	Staff's Revenue Adjustment
RG	RG	$ 109,323	$ 8,584
RG-WH	RG-WH	$ (126,439)	$ (9,262)
RH	RH	$ 129,037	$ 8,561
CB	CB	$ (24,124)	$ (2,404)
GP	GP	$ 365,108	$ 26,473
SH	SH	$ -	$ -
TEB	TEB	$ 120,772	$ 8,465
		$ 573,676.43	$ 40,416.56

Residential General					
Customer Coefficient	Annualized Customer Count	Total Volumetric Adjustment	Volumetric Revenue Adjustment	Customer Charge Revenue Adjustment	Total Revenue Adjustment
1.50	17	20,461	$ 1,315	$ 242	$ 1,557
1.50	16	20,894	$ 1,339	$ 221	$ 1,560
1.50	14	16,558	$ 1,074	$ 200	$ 1,273
1.50	13	9,151	$ 599	$ 179	$ 778
1.50	11	7,408	$ 488	$ 158	$ 645
1.50	10	8,578	$ 559	$ 137	$ 696
1.50	8	10,345	$ 662	$ 116	$ 777
1.50	7	7,012	$ 452	$ 95	$ 546
1.50	5	4,468	$ 291	$ 74	$ 365
1.50	4	2,650	$ 174	$ 53	$ 226
1.50	2	1,226	$ 81	$ 32	$ 112
1.50	1	573	$ 37	$ 11	$ 47
	9	109,323			$ 8,584

Residential Water Heating					
Customer Coefficient	Annualized Customer Count	Total Volumetric Adjustment	Volumetric Revenue Adjustment	Customer Charge Revenue Adjustment	Total Revenue Adjustment
(1)	(16)	(21,726)	$ (1,345)	$ (228)	$ (1,573)
(1)	(15)	(22,550)	$ (1,394)	$ (208)	$ (1,603)
(1)	(13)	(18,384)	$ (1,140)	$ (188)	$ (1,328)
(1)	(12)	(10,784)	$ (670)	$ (169)	$ (839)
(1)	(11)	(9,270)	$ (577)	$ (149)	$ (725)
(1)	(9)	(10,718)	$ (665)	$ (129)	$ (794)
(1)	(8)	(12,764)	$ (788)	$ (109)	$ (897)
(1)	(6)	(8,945)	$ (553)	$ (89)	$ (642)
(1)	(5)	(5,733)	$ (356)	$ (69)	$ (425)
(1)	(4)	(3,340)	$ (207)	$ (50)	$ (257)
(1)	(2)	(1,590)	$ (99)	$ (30)	$ (129)
(1)	(1)	(635)	$ (39)	$ (10)	$ (49)
	(9)	(126,439)			$ (9,262)

Residential Total Electric					
Customer Coefficient	Annualized Customer Count	Total Volumetric Adjustment	Volumetric Revenue Adjustment	Customer Charge Revenue Adjustment	Total Revenue Adjustment
1.17	13	18,365	$ 1,051	$ 188	$ 1,239
1.17	12	18,626	$ 1,066	$ 172	$ 1,237
1.17	11	15,934	$ 912	$ 155	$ 1,067
1.17	10	9,411	$ 539	$ 139	$ 677
1.17	9	10,563	$ 605	$ 123	$ 727
1.17	8	12,847	$ 735	$ 106	$ 841
1.17	6	17,970	$ 1,028	$ 90	$ 1,118
1.17	5	12,072	$ 691	$ 74	$ 764
1.17	4	7,339	$ 420	$ 57	$ 477
1.17	3	3,901	$ 223	$ 41	$ 264
1.17	2	1,471	$ 84	$ 25	$ 109
1.17	1	537	$ 31	$ 8	$ 39
	7	129,037			$ 8,561

Commercial					
Customer Coefficient	Annualized Customer Count	Total Volumetric Adjustment	Volumetric Revenue Adjustment	Customer Charge Revenue Adjustment	Total Revenue Adjustment
(0)	(3)	(4,137)	$ (353)	$ (55)	$ (408)
(0)	(3)	(4,208)	$ (358)	$ (50)	$ (408)
(0)	(2)	(3,930)	$ (335)	$ (45)	$ (380)
(0)	(2)	(2,507)	$ (215)	$ (40)	$ (255)
(0)	(2)	(1,853)	$ (159)	$ (36)	$ (195)
(0)	(2)	(2,013)	$ (173)	$ (31)	$ (203)
(0)	(1)	(1,799)	$ (154)	$ (26)	$ (180)
(0)	(1)	(1,572)	$ (134)	$ (21)	$ (156)
(0)	(1)	(946)	$ (82)	$ (17)	$ (98)
(0)	(1)	(644)	$ (56)	$ (12)	$ (67)
(0)	(0)	(382)	$ (33)	$ (7)	$ (40)
(0)	(0)	(133)	$ (11)	$ (2)	$ (14)
	(2)	(24,124)			$ (2,404)

General Power					
Customer Coefficient	Annualized Customer Count	Total Volumetric Adjustment	Volumetric Revenue Adjustment	Customer Charge Revenue Adjustment	Total Revenue Adjustment
0.17	2	60,825	$ 4,367	$ -	$ 4,367
0.17	2	57,951	$ 4,056	$ -	$ 4,056
0.17	2	58,532	$ 4,091	$ -	$ 4,091
0.17	1	41,435	$ 3,091	$ -	$ 3,091
0.17	1	34,714	$ 2,582	$ -	$ 2,582
0.17	1	29,173	$ 2,200	$ -	$ 2,200
0.17	1	27,253	$ 1,984	$ -	$ 1,984
0.17	1	20,370	$ 1,490	$ -	$ 1,490
0.17	1	15,363	$ 1,143	$ -	$ 1,143
0.17	0	10,176	$ 777	$ -	$ 777
0.17	0	6,914	$ 523	$ -	$ 523
0.17	0	2,402	$ 169	$ -	$ 169
	1	365,108			$ 26,473

Space Heating					
Customer Coefficient	Annualized Customer Count	Total Volumetric Adjustment	Volumetric Revenue Adjustment	Customer Charge Revenue Adjustment	Total Revenue Adjustment
0.00	0	0	$ -	$ -	$ -
0.00	0	0	$ -	$ -	$ -
0.00	0	0	$ -	$ -	$ -
0.00	0	0	$ -	$ -	$ -
0.00	0	0	$ -	$ -	$ -
0.00	0	0	$ -	$ -	$ -
0.00	0	0	$ -	$ -	$ -
0.00	0	0	$ -	$ -	$ -
0.00	0	0	$ -	$ -	$ -
0.00	0	0	$ -	$ -	$ -
0.00	0	0	$ -	$ -	$ -
0.00	0	0	$ -	$ -	$ -
	0	0			$ -

Total Electric Building					
Customer Coefficient	Annualized Customer Count	Total Volumetric Adjustment	Volumetric Revenue Adjustment	Customer Charge Revenue Adjustment	Total Revenue Adjustment
0.08	1	18,183	$ 1,292	$ -	$ 1,292
0.08	1	17,727	$ 1,238	$ -	$ 1,238
0.08	1	17,983	$ 1,267	$ -	$ 1,267
0.08	1	12,957	$ 915	$ -	$ 915
0.08	1	9,660	$ 697	$ -	$ 697
0.08	1	10,255	$ 727	$ -	$ 727
0.08	0	11,919	$ 808	$ -	$ 808
0.08	0	9,659	$ 652	$ -	$ 652
0.08	0	6,144	$ 427	$ -	$ 427
0.08	0	3,621	$ 256	$ -	$ 256
0.08	0	1,997	$ 141	$ -	$ 141
0.08	0	667	$ 47	$ -	$ 47
	1	120,772	8,465		$ 8,465

STATE OF KANSAS)
) ss.
COUNTY OF SHAWNEE)

VERIFICATION

Darren L. Prince, being duly sworn upon his oath deposes and states that he is a Managing Economist for the Utilities Division of the Kansas Corporation Commission of the State of Kansas, that he has read and is familiar with the foregoing *Direct Testimony*, and attests that the statements contained therein are true and correct to the best of his knowledge, information and belief.

Darren L. Prince
Managing Economist
State Corporation Commission of the
State of Kansas

Subscribed and sworn to before me this 13th day of May, 2019.

VICKI D. JACOBSEN
Notary Public - State of Kansas
My Appt. Expires 6-30-22

Vicki D. Jacobsen
Notary Public

My Appointment Expires: 6-30-22

CERTIFICATE OF SERVICE

19-EPDE-223-RTS

I, the undersigned, certify that a true and correct copy of the above and foregoing Direct Testimony was served via electronic service this 13th day of May, 2019, to the following:

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CERTIFICATE OF SERVICE

19-EPDE-223-RTS

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/s/ Vicki Jacobsen
Vicki Jacobsen