Exhibit No.
Issues: Weather Normalization,
DSM and Proposed Rates
Witness: Aaron J. Doll
Type of Exhibit: Direct Testimony
Sponsoring Party: Empire District Electric Co.
Case No. ER-2012-0345
Date Testimony Prepared: July 2012

Before the Public Service Commission of the State of Missouri

Direct Testimony

of

Aaron J. Doll

July 2012

SERVICES YOU COUNT ON

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DIRECT TESTIMONY OF
AARON J. DOLL
ON BEHALF OF
THE EMPIRE DISTRICT ELECTRIC COMPANY
BEFORE THE
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INTRODUCTION

Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.

A. Aaron J. Doll. I am a Planning & Energy Efficiency Analyst for The Empire District Electric Company ("Empire" or "Company"). My business address is 602 South Joplin Avenue, Joplin, Missouri.

Q. WOULD YOU PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE?

A. I graduated from Missouri State University in 2003 with a Bachelor of Science Degree in Psychology and a Minor in Philosophy. Additionally, I received my Masters of Business Administration from Missouri State University in 2008. I have worked for Empire for five and a half years in the Planning and Regulatory Department.

Q. WHAT ARE YOUR PRIMARY DUTIES AT EMPIRE?

A. During my tenure with Empire I have worked on planning related projects such as Empire's annual demand and energy forecast as well as Empire's annual sales and revenue forecast. I am also responsible for the annual sales and revenue forecast for The Empire District Gas Company, a wholly owned subsidiary. In addition, I participate in the development of data and perform various analyses for Empire's long-term load forecast, which is used in Empire's Integrated Resource Plan ("IRP") that is filed with the regulatory commissions in Missouri, Arkansas, and Oklahoma every three years. I testified on behalf of Empire on the topic of weather and rate normalization in Missouri Public Service Commission Case No. ER-2011-0004. I have testified before the Arkansas Public Service Commission on behalf of Empire in Docket No. 10-052-U on the topic of weather normalization and in Docket 07-076-TF on the topic of Empire's 2012 Energy Efficiency Cost Recovery ("EECR") Tariff. I have also testified on behalf of Empire in the state of Oklahoma in Cause No. PUD 201100082 on the topic of weather normalization. I have also testified on behalf of The Empire District Gas Company for the May 2009 case GR-2009-0434 on the topic of weather normalization. In November 2011, I assumed responsibilities for Empire's Demand Side Management ("DSM") analysis. Since that time I have worked on DSM tariff filings and annual reports in Arkansas and Oklahoma, completed, facilitated quarterly meetings with DSM stakeholders, and provided support for Empire's 2012 MEEIA filing.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY THIS CASE?

A. I will support the weather-normalized sales estimates, the annualized DSM amortization and proposed rate design for Empire in this case.

<u>WEATHER NORMALIZATION</u>

Q. WHAT IS WEATHER NORMALIZATION?

A. Weather Normalization is the process of determining how historical usage would have changed had normal weather conditions existed.

Q. PLEASE DESCRIBE THE WEATHER NORMALIZATION PROCESS.

A. The process for weather normalization involves using a statistical model to determine the variation in sales from what would have happened under normal weather conditions to what did happen under actual weather conditions. The fundamental equation used in the process is shown below.

$$NormalSales_{month} = \frac{ModelNormalSales_{month}}{ModelActualSales_{month}} \times ActualSales_{month}$$

In this equation, a factor is created dividing model predicted normal sales by model predicted actual sales and multiplying the factor by actual sales.

Q. HOW DO YOU OBTAIN MODEL PREDICTED ACTUAL SALES?

A. To obtain model predicted actual sales, a multivariate regression model was created using the Metrix ND regression software for each rate class and the model estimated actual sales by using actual weather data over the test period. Each regression model is developed using the class sample means created from load research data. Independent variables include: weather splines for heating and cooling responses, various daytype and holiday variables, and sunlight variables for the impact of sunlight on consumption. Weather splines were created to reflect the nonlinear interaction between consumption and weather.

Q. HOW DO YOU OBTAIN MODEL PREDICTED NORMAL SALES?

A. To obtain modeled predicted normal sales, I used the same multivariate regression model mentioned above and reforecasted the sales levels using normal weather data through the test period.

Q. HOW DID YOU DEVELOP NORMAL WEATHER CONDITIONS FOR THE SALES MODEL?

A. Normal weather conditions have been developed using a 30-year average of daily historical weather from 1982-1983 through 2011-2012 from the National Oceanic and Atmospheric Administration ("NOAA") statistics from Springfield, Missouri. The averages are obtained by a Rank and Average method. In this method, historical daily average temperatures are ranked from the highest value to the lowest value in each month. For each historical day, the corresponding heating degree day ("HDD") and cooling degree day ("CDD") values are calculated for multiple temperature reference points. For example, a CDD with a 65° F reference point would be calculated by subtracting 65° from the actual temperature on the condition that the actual temperature was above 65° F. For a HDD with a 65° F reference point, a calculation would be made that would subtract the actual temperature from 65° F. This procedure allows the model to check load response to different temperature reference points as well as create autonomous slopes for both heating and cooling conditions. Next, the normal HDD and CDD values are calculated as the average across the 30 historical years within a month. The final step in this method is to map the ranked averages to the test year actual weather. This allows for assignment the largest CDD for each particular month in the 30 year historical database to be mapped to the hottest day in the actual month of the test year.

Q. IS THERE ANY ADVANTAGE TO CREATING HDD/CDD PRIOR TO AVERAGING THE 30 YEARS OF HISTORICAL WEATHER?

A. Yes. Performing non-linearities before linearities allows for a more accurate portrayal of historical weather by precluding heating and cooling variables from canceling out their historical influence. For example, if the database consisted of a ranked day that displayed 15 years of daily 70° F temperature reads and 15 years of daily 60° F temperature reads, averaging the temperatures prior to assigning a HDD/CDD would fail to produce a single degree day even though historically the weather produced 15 years of 5 CDD (assuming a 65° F reference point) and 15 years of 5 HDD (assuming a 65° F reference point). [((15*70°)+(15*60°))/30 = 65°] If the HDD/CDD is calculated prior to averaging the temperatures, the historical signature in terms of HDD/CDD is not lost. [(15 x 5 CDD)/30 = 2.5 CDD] [(15 x 5 HDD)/30 = 2.5 HDD].

Q. WHICH RATE CLASSES WERE NORMALIZED IN THIS PROCESS?

A. Five rate classes were weather normalized: Residential (RG), Commercial (CB), General Power (GP), Small Heating (SH), and Total Electric Building (TEB).

Q. PLEASE DESCRIBE THE RESULTS OF EMPIRE'S WEATHER NORMALIZATION.

A. The normalized values I calculated are shown in Tables 1 through 5 for each class, after applying the aforementioned methodology.

Table 1: RG Normal Values

Month	Actual Billed Sales (kWh)	Normal Billed Sales (kWh)	Normal Calendar Sales (kWh)
Apr 2011	119,486,115	121,054,535	97,320,879
May 2011	103,427,667	101,357,703	100,750,670
Jun 2011	127,393,797	111,984,841	129,311,077
Jul 2011	174,868,369	144,744,564	166,937,532
Aug 2011	201,802,195	173,290,225	165,591,199
Sep 2011	159,270,377	151,910,548	112,789,488
Oct 2011	90,422,241	95,396,061	99,282,724
Nov 2011	95,853,206	97,484,557	125,715,192
Dec 2011	144,340,252	153,605,617	175,403,770
Jan 2012	176,017,384	190,656,953	184,568,696
Feb 2012	155,756,550	169,638,269	156,037,160
Mar 2012	132,173,816	151,806,939	137,951,883

Table 2: CB Normal Values

Month	Actual Billed Sales (kWh)	Normal Billed Sales (kWh)	Normal Calendar Sales (kWh)
Apr 2011	22,573,097	22,620,336	20,245,956
May 2011	21,694,425	21,677,966	22,466,151
Jun 2011	25,352,665	23,966,312	27,162,173
Jul 2011	31,098,572	27,687,210	30,133,247
Aug 2011	34,874,199	31,435,654	31,197,921
Sep 2011	30,239,919	29,468,913	23,453,117
Oct 2011	21,610,050	22,312,228	21,449,849
Nov 2011	20,289,121	20,440,165	22,703,544
Dec 2011	23,732,165	24,360,303	26,683,040
Jan 2012	26,751,037	27,671,644	27,289,058
Feb 2012	24,557,417	25,407,147	24,588,817
Mar 2012	23,737,130	24,710,800	24,230,917

Table 3: GP Normal Values

Month	Actual Billed Sales (kWh)	Normal Billed Sales (kWh)	Normal Calendar Sales (kWh)
Apr 2011	62,968,618	62,910,557	59,991,062
May 2011	64,640,323	64,590,656	66,712,915
Jun 2011	71,766,824	70,620,162	72,243,620
Jul 2011	79,320,569	76,433,882	77,560,450
Aug 2011	84,714,055	82,028,970	84,248,919
Sep 2011	79,666,290	79,191,211	71,214,971
Oct 2011	64,473,537	65,105,848	61,649,118
Nov 2011	58,160,938	58,258,848	60,514,516
Dec 2011	61,202,451	61,521,726	62,375,902
Jan 2012	64,440,054	64,899,439	65,347,130
Feb 2012	59,415,735	59,814,139	60,053,704
Mar 2012	60,373,320	60,709,707	62,068,512

Table 4: SH Normal Values

Month	Actual Billed Sales (kWh)	Normal Billed Sales (kWh)	Normal Calendar Sales (kWh)
Apr 2011	7,116,982	7,182,545	6,109,410
May 2011	6,191,890	6,190,448	6,209,469
Jun 2011	7,129,923	6,759,382	7,478,930
Jul 2011	8,708,335	7,906,587	8,428,646
Aug 2011	9,406,804	8,658,325	8,545,829
Sep 2011	8,465,113	8,323,681	6,947,382
Oct 2011	6,190,798	6,387,311	6,252,782
Nov 2011	5,709,919	5,775,565	6,859,477
Dec 2011	7,830,866	8,295,448	9,530,797
Jan 2012	9,213,166	9,910,996	10,121,636
Feb 2012	8,389,079	9,017,268	8,447,696
Mar 2012	7,505,368	8,229,669	7,784,530

Table 5: TEB Normal Values

Month	Actual Billed Sales (kWh)	Normal Billed Sales (kWh)	Normal Calendar Sales (kWh)
Apr 2011	29,345,895	29,558,004	25,836,250
May 2011	27,162,771	27,198,939	28,234,741
Jun 2011	30,967,551	29,486,454	32,419,058
Jul 2011	36,470,052	33,167,534	35,452,326
Aug 2011	39,713,384	36,508,032	35,785,966
Sep 2011	36,905,786	36,309,064	31,268,960
Oct 2011	28,918,410	29,780,364	29,652,511
Nov 2011	25,966,757	26,232,390	29,542,076
Dec 2011	31,347,472	32,975,601	34,810,796
Jan 2012	33,377,183	35,777,242	36,989,778
Feb 2012	28,432,235	30,402,302	28,879,083
Mar 2012	27,778,654	30,125,807	29,353,950

DEMAND-SIDE MANAGEMENT ("DSM") AMORTIZATION

Q. PLEASE LIST THE PROGRAMS IN EMPIRE'S MISSOURI DSM PORTFOLIO.

A. Empire's current Missouri electric DSM portfolio consists of five Residential and two Commercial & Industrial energy efficiency ("EE") programs. The five Residential programs are: Low-Income New Home, High Efficiency Residential Central Air Conditioning Rebate, Energy Star® New Homes, Home Performance with Energy Star, and Weatherization. The two Commercial & Industrial programs are the Commercial and Industrial Facility Rebate and the Building Operator Certification. In addition, Empire has an Interruptible Service Rider which is a demand response ("DR") program for Commercial and Industrial customers on rates with demand charge components. Empire also funds the Apogee HomeEnergy Suite which provides energy calculators and libraries and can be accessed on its website.

Q. PLEASE DESCRIBE EMPIRE'S DSM RELATED ADJUSTMENTS IN THIS CASE.

A. Empire's DSM rate base adjustment in this case is $735,192 as shown in Schedule AJD-1. This amount represents the difference between the estimated program expenditures during April 1, 2012 through December 31, 2012, less DSM amortization during that same period and the actual DSM deferred program costs at March 31, 2012, the end of the test year. The estimated net DSM investment at December 31, 2012, is $4,453,353.

In addition to the adjustment to rate base, Empire has adjusted or annualized the DSM amortization to reflect amortization DSM deferred cost balance at December 31,

2012. This results in a proposed DSM amortization expense adjustment of $340,403 as shown in Schedule AJD-1.

RATE DESIGN

Q. HOW DOES EMPIRE PROPOSE TO DISTRIBUTE THE PROPOSED PERMANENT RATE INCREASE TO THE VARIOUS CUSTOMER CLASSES?

A. Empire is proposing to distribute the 7.60% increase evenly to all customer classes. Empire is recommending a 7.60% across the board increase to all base tariff charges for all rate plans with the exception of the Residential (RG) and Commercial (CB) rate plans. In an effort to move closer to recovering the fixed costs associated with serving the customers in these classes without volumetric risk, Empire has proposed a 15.2% increase in the customer charge for the RG and CB rate plans. The remaining increase in base rate charges for these two customer classes (RG-6.76% & CB-6.66%) will be adjusted less than the overall average to result in a total 7.60% increase for each of these two classes. Although the proposed customer charges are still significantly below the figures produced from the class cost of service ("CCS") presented in Dr. Overcasts' Direct Testimony in Case No. ER-2011-0004, the increase is a step toward a rate design that provides the company a reasonable opportunity to recover its fixed costs.

Q. IN LEIU OF INCREASING THE CUSTOMER CHARGE FOR THE RG AND CB RATE CLASSES BY 15.2%, ARE THERE ALTERNATE RATE DESIGNS THAT WOULD PROVIDE THE COMPANY AN OPPORTUNITY TO RECOVER ITS FIXED COSTS?

A. Yes. At a rate design seminar in Jefferson City, Missouri, on March 20, 2012, Dr. Michael Schmidt reviewed various rate designs used in the industry that allow a company to cover its fixed costs. Two of the rate designs Dr. Schmidt discussed that ensured fixed cost recovery were straight-fixed variable ("SFV") rates, as well as revenue decoupling.

Q. PLEASE DISCUSS IN GREATER DETAIL STRAIGHT-FIXED VARIABLE ("SFV") RATE DESIGN.

A. SFV, which is often used in rate design for natural gas utilities, allows the utility to recover the fixed costs associating with serving the customer through fixed charges, while the variable costs the utility incurs are passed through separately. The lack of fixed costs in the variable rate structure creates a significantly lower energy charge and a significantly higher customer charge. The SFV rate design prevents over or under recovery as a result of sales volumes that fluctuate due to weather, energy efficiency/conservation, and changing use-per-customer ("UPC"). Although the SFV rate design better reflects the characteristics of a utility's true costs of serving the customer, it decreases the marginal price of additional consumption, which lowers the incentive for customer conservation or investment in energy efficiency.

Q. IS EMPIRE RECOMMENDING SFV AS A PREFERRED METHOD OF RATE DESIGN IN THIS CASE?

A. No.

Q. PLEASE DISCUSS IN GREATER DETAIL THE REVENUE DECOUPLING RATE DESIGN PRESENTED AT THE SEMINAR IN JEFFERSON CITY.

A. Revenue decoupling is a rate design method that is currently being used in various states for this industry and eliminates the constraints associated with rate design objectives. Although there are several different approaches with respect to the actual mechanics of revenue decoupling, the fundamental premise is the recovery of fixed costs independent of changes in sales volumes. Revenue decoupling is similar to SFV in that it allows the company to recover its fixed costs and avoid over or under earning due to sales fluctuations; however, it does so without eliminating price signals or discouraging energy efficiency/conservation efforts.

Q. WHY DOESN'T REVENUE DECOUPLING DIMINISH PRICE SIGNALS AND DISCOURAGE CONSERVATION/ENERGY EFFICIENCY EFFORTS?

A. Utilities incur a certain level of fixed costs to provide service to their customers, and much of the fixed costs are often placed in a volumetric rate charge. As a result, the opportunity to recover fixed costs becomes jeopardized due to fluctuation in sales. Inverted block rates, for example, are designed to reflect incremental increases in production cost but are high risk for fixed cost recovery. Since revenue decoupling eliminates that throughput risk, the utility would be neutral to rate designs such as inverted block rates that encourage conservation and/or energy efficiency by using volumetric price signals.

Q. DOES REVENUE DECOUPLING UNFAIRLY SHIFT THE RISK BURDEN FROM THE SHAREHOLDERS TO THE CUSTOMERS?

A. No. Revenue decoupling does mitigate certain risk in volumetric rates; however, it does so for both the utility and the consumer, providing a mutual benefit.

Q. PLEASE EXPLAIN.

A. Volumetric rates have a degree of risk to both customers and the utility. If the actual volumes sold vary from the normalized volumes agreed to in the rate case, then the revenue the utility receives also varies. Actual sales volumes can exceed normalized volumes due to extreme weather, increased use-per-customer, customer growth, etc. As a result, the rates will produce more revenue than the rate design intended. Sales volumes can also decrease from the normalized levels due to the effects of mild weather, conservation, energy efficiency, etc., which would cause the rates to produce less revenue than the rate design intended. In fact, the risk symbiosis between the utility and the consumer can be leveraged with revenue decoupling to provide mutual benefits.

Q. DOES REVENUE DECOUPLING PROVIDE ANY OTHER ADDITIONAL BENEFITS THAT POSITIVELY IMPACT THE CUSTOMER?

A. Yes. Over time the revenue stability gained through revenue decoupling could lower the number of rate cases required, which would lower regulatory costs. The lower regulatory costs would mean lower bills for the customers.

Q. DOES THE COMPANY RECOMMEND REVENUE DECOUPLING AS THE PREFERRED METHOD OF RATE DESIGN FOR THIS CASE?

A. No, not at this time.

Q. IN CONCLUSION, WHAT RATE DESIGN IS EMPIRE REQUESTING?

A. Empire is proposing an across the board increase in revenue for all customer classes. In the RG and CB classes, Empire has proposed an increase in customer charges that is in percentage terms twice as high as the overall class percentage with correspondingly lower volumetric charges so that rates are moved towards "cost of service". The revenue impact by rate class of this proposal as both a percentage and a dollar figure are provided in the Table 6 below.

TABLE 6: Base Rate Increase by Rate Plan

Rate Plan	Increase %	Increase ($000)
RG	7.60%	$ 14,239
CB	7.60%	$ 2,868
SH	7.60%	$ 741
GP	7.60%	$ 5,928
SC-P	7.60%	$ 246
TEB	7.60%	$ 2,598
PFM	7.60%	$ 4
LP	7.60%	$ 3,608
MS	7.60%	$ 1
LS	7.60%	$ 9
SPL	7.60%	$ 151
PL	7.60%	$ 322
Total	7.60%	$ 30,717

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

DSM Expense Adjustment

	Program Expenditures for 10 Year Amortization						
	2005-2006	2007	2008	2009	2010	2011	2012
Reg Asset	$ 126,000	$ (58,011)	$ 571,927	$ 716,700	$ 1,139,387	$ 719,483	

	Program Expenditures for 6 Year Amortization						
	2005-2006	2007	2008	2009	2010	2011	2012
Reg Asset						$ 772,989	$ 355,056

		Theoretical Amortization Schedule								
		2005-2006	2007	2008	2009	2010	2011	2012	Amortized to Date	Balance
2005-2006	$ 126,000		$ (12,600)	$ (12,600)	$ (12,600)	$ (12,600)	$ (12,600)	$ (3,150)	$ (66,150)	$ 59,850
2007	$ (58,011)			$ 5,801	$ 5,801	$ 5,801	$ 5,801	$ 1,450	$ 24,655	$ (33,356)
2008	$ 571,927				$ (57,193)	$ (57,193)	$ (57,193)	$ (14,298)	$ (185,876)	$ 386,051
2009	$ 716,700					$ (71,670)	$ (71,670)	$ (17,918)	$ (161,258)	$ 555,443
2010	$ 1,139,387						$ (113,939)	$ (28,485)	$ (142,423)	$ 996,964
2011	$ 719,483							$ (17,987)	$ (17,987)	$ 701,496
2011	$ 772,989							$ (32,208)	$ (32,208)	$ 740,781
Theoretical Balance 3/31/2012			$ (12,600)	$ (6,799)	$ (63,992)	$ (135,662)	$ (249,600)	$ (112,595)	$ (581,247)	$ 3,407,227
GL Balance 3/31/2012			$ (12,600)	$ (6,799)	$ (63,991)	$ (135,662)	$ (296,325)	$ (109,992)	$ (625,370)	**$ 3,363,105**

A	Program Expenditures as of 3/31/2012	$ 4,343,531
B	Amortized as of 3/31/2012	$ (625,370)
D	Est 2012 Program Expenditures (Apr - Dec)	$ 1,065,169
E	Est 2012 Amortization (Apr - Dec)	$ (329,977)
F = A+B+C+D	Est Net DSM Balance As of 12/31/2012	$ 4,453,353
G = F/6	Normalize Amortization	$ 633,123
H	MEEIA Costs	$ 51,198
I	Current Annual Amort (4/1/2011 - 3/31/2012)	$ (343,918)
	DSM Expense Adjustment	**$ 340,403**

AFFIDAVIT OF AARON J. DOLL

STATE OF MISSOURI)
) ss
COUNTY OF JASPER)

On the __2nd__ day of July, 2012, before me appeared Aaron J. Doll, to me personally known, who, being by me first duly sworn, states that he is a Planning and Energy Efficiency Analyst of The Empire District Electric Company and acknowledges that he has read the above and foregoing document and believes that the statements therein are true and correct to the best of his information, knowledge and belief.

Aaron J. Doll

Subscribed and sworn to before me this __2nd___ day of July, 2012.

ANGELA M. CLOVEN
Notary Public - Notary Seal
State of Missouri
Commissioned for Jasper County
My Commission Expires: November 01, 2015
Commission Number: 11262659

Notary Public

My commission expires: 11/01/2015.