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Issues: Weather Normalized Sales
Witness: James A. Gray
Sponsoring Party: MO PSC Staff
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MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

DIRECT TESTIMONY

OF

JAMES A. GRAY

UNION ELECTRIC COMPANY d/b/a AMERENUE

CASE NO. GR-2007-0003

**Jefferson City, Missouri
December 2006**

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

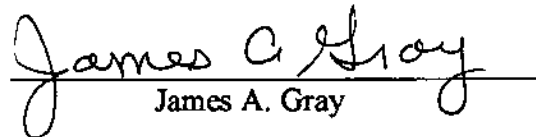
In the Matter of Union Electric Company)
d/b/a AmerenUE for Authority to File)
Tariffs Increasing Rates for Natural Gas)
Service Provided to Customers in the)
Company's Missouri Service Area.)

Case No. GR-2007-0003

AFFIDAVIT OF JAMES A. GRAY

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

James A. Gray, of lawful age, on his oath states: that he has participated in the preparation of the following Direct Testimony in question and answer form, consisting of 8 pages of Direct Testimony to be presented in the above case, that the answers in the following Direct Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true to the best of his knowledge and belief.


James A. Gray

Subscribed and sworn to before me this 13th day of December, 2006.



SUSAN L. SUNDERMEYER
My Commission Expires
September 21, 2010
Callaway County
Commission #06942086


Notary Public

My commission expires 9-21-10

Table of Contents

DIRECT TESTIMONY

OF

JAMES A. GRAY

UNION ELECTRIC COMPANY d/b/a AMERENUE

CASE NO. GR-2007-0003

EXECUTIVE SUMMARY.....	2
WEATHER-NORMALIZED SALES.....	3
WEATHER-NORMALIZED COINCIDENT PEAK DAY DEMAND.....	7

1
2
3
4
5
6
7
8
9
10
11
12

DIRECT TESTIMONY

OF

JAMES A. GRAY

UNION ELECTRIC COMPANY d/b/a AMERENUE

CASE NO. GR-2007-0003

13 Q. Please state your name and business address.

14 A. My name is James A. Gray. My business address is P. O. Box 360, Jefferson
15 City, Missouri 65102.

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

17 A. I am employed by the Missouri Public Service Commission (Commission) as a
18 Regulatory Economist in the Tariffs/Rate Design Section of the Commission's Energy
19 Department.

20 Q. How long have been employed by the Commission?

21 A. I have been employed with the Commission for more than twenty-six years.

22 Q. Please state your educational background.

23 A. I received a degree of Bachelor of Science in Psychology as well as one in
24 General Studies from Louisiana State University, and I received a degree of Master of Science
25 in Special Education from the University of Tennessee. Additionally, I completed several
26 courses in research and statistics at the University of Missouri - Columbia.

27 Q. Please state your professional qualifications.

28 A. Prior to being employed by the Commission, I was a Research Analyst for two
29 and a half years with the Missouri Department of Mental Health where I conducted statistical
analyses. In 1980, I began my employment with the Commission as a Statistician in the

1 Depreciation Department where I submitted testimony regarding depreciation rates, trended-
2 original cost, and trended-original cost less depreciation.

3 Beginning in 1989, in the Economic Analysis Department, I submitted
4 testimony on weather-normalized sales for natural gas, water, and electric utilities. I reviewed
5 residential electric load forecasts with associated detailed end-use studies and marketing
6 surveys in electric resource plans.

7 From December of 1997 through June of 2001, I was in the Tariffs/Rate
8 Design Section of the Commission's Gas Department. Since July of 2001, I have been in the
9 Tariffs/Rate Design Section of the Commission's Energy Department. I have reviewed tariffs
10 and applications of natural gas utilities. I have also submitted testimony concerning weather-
11 normalized sales, complaints, certificates of convenience and necessity, and recommended
12 minimum statistical sample sizes for natural gas residential customer billing reviews.

13 Q. Please list all the cases in which you have submitted prepared written
14 testimony before this Commission.

15 A. The cases in which I have submitted prepared, written testimony are
16 enumerated in Schedule 1, attached to my testimony.

17 **EXECUTIVE SUMMARY**

18 Q. What is the purpose of your testimony?

19 A. My testimony addresses the Commission Staff's (Staff) weather-normalization
20 of natural gas sales for the firm residential natural gas and the general service customers of
21 Union Electric Company d/b/a Ameren UE (AmerenUE or Company) for the test year ending
22 June 30, 2006. Then, I use the results of my weather-normalized sales studies to estimate
23 weather-normalized coincident peak day demand.

WEATHER-NORMALIZED SALES

Q. Why is it important to adjust test-year natural gas sales to normal weather?

A. Since rates are based on natural gas usage during the test year, it is important to remove the influence of abnormal weather. Staff's weather-normalized adjustments to the amount of natural gas sales correct for deviations from normal weather conditions during the test year.

Q. Why are natural gas sales dependent upon weather conditions?

A. The predominant use of natural gas in Missouri is for space heating. Therefore, AmerenUE's natural gas sales are very dependant on the duration and intensity of colder weather.

Q. How do Staff's analyses adjust test-year natural gas sales if the test year is warmer than normal?

A. Staff's studies would probably increase test year natural gas sales to adjust sales to the level that would be expected to occur under normal (colder) weather.

Q. How do Staff's analyses adjust test-year natural gas sales if the test year is colder than normal?

A. Staff's studies would probably decrease test year natural gas sales to adjust sales to the level that would be expected to occur under normal (warmer) weather.

Q. What firm sales customer classes were studied?

A. They were the residential and general service customer classes of AmerenUE.

Q. Were AmerenUE's billing records for the residential and general service classes subdivided further for the studies?

1 A. Yes, AmerenUE's Missouri billing records were subdivided into three
2 geographic regions. First, the service area formerly served under Aquila's Eastern System
3 Tariffs. Next, the service area mainly supplied by the Panhandle Eastern Pipe Line Company
4 (PEP) that supplies AmerenUE's central and eastern Missouri communities, including
5 Columbia, Jefferson City, Eldon, Mexico, Moberly, Louisiana, and Wentzville.

6 The Natural Gas Pipeline Company of America (Natural Gas Pipeline or NGPL) and
7 Texas Eastern Transmission Corporation (Texas Eastern or TET) supply southeastern
8 Missouri communities, including Fisk, Dexter, and Cape Girardeau. I combined AmerenUE's
9 Texas Eastern service area and Natural Gas Pipeline service area into one area for my
10 analyses.

11 Q. Please identify the Staff witness who relies upon the results of the weather-
12 normalization studies.

13 A. Staff witness Greg Meyer of the Commission's Auditing Department relies on
14 my results for the Staff's customer growth annualization and revenue calculations, as well as
15 on Staff witness Henry E. Warren, PhD of the Commission's Energy Tariffs/Rate Design
16 Department, for the Staff's allocation of the weather-normalized sales to the block rates of the
17 general service classes. (AmerenUE's general service class has different unit charges for
18 natural gas volumes falling within blocks of consumption.)

19 Q. What was your source for the billed natural gas usage data?

20 A. AmerenUE provided Staff with monthly natural gas sales expressed in
21 hundreds of cubic feet (Ccf), and monthly numbers of customers for each billing cycle by
22 firm customer class and geographic region for the test year.

23 Q. What are billing cycles?

1 A. The Company schedules groups of natural gas accounts into billing cycles that
2 are to be read throughout a month. Next, the Company bills the accounts based on the meter
3 reading. Since there are approximately twenty-one working days in a month, customers'
4 accounts are usually grouped into one of the approximately twenty-one billing cycles.
5 Staggering the billing of customers' accounts over the billing month spreads the amount of
6 work necessary to bill AmerenUE's customers.

7 Q. How did Staff analyze space heating natural gas volumes?

8 A. Staff performed an analysis for each of the residential and general service
9 customer groups in the three geographic regions. Staff calculated two sets of twelve billing
10 month averages by customer class. One set of these averages was the daily average natural
11 gas usage in Ccf and another set was the daily average heating degree days (HDD). For each
12 billing month, these billing month averages were calculated by customer class from the data
13 on numbers of customers, natural gas usage in Ccf, and summed HDD from approximately
14 twenty-one billing cycles.

15 Q. Were the twelve billing month HDD customer-weighted averages weighted to
16 reflect different customer levels among the different billing cycles?

17 A. Yes, each billing month's daily average HDD in each billing cycle was
18 weighted by the percentage of customers in that billing cycle. Thus, the billing cycles with
19 the most customers are given more weight in computing the billing month daily average
20 HDD.

21 Q. How did Staff average billing month usage in Ccf?

Direct Testimony of
James A. Gray

1 A. Staff calculated twelve simple monthly average-usage-per-customer amounts
2 across the approximately twenty-one billing cycles to calculate one month's daily average
3 usage in Ccf.

4 Q. How did Staff quantify the relationship of natural gas sales to HDD?

5 A. Staff's studies estimate the change in usage in Ccf related to a change in HDD
6 based on the two sets of twelve monthly billing month averages; *i.e.*, average daily usage in
7 Ccf per customer, and the customer-weighted average daily HDD. These two sets of billing
8 month averages (usage and weather) were used to study the relationship between space-
9 heating natural gas usage in Ccf and colder weather.

10 Staff used regression analysis to estimate the relationship for each of the
11 residential and general service customers in the three geographic regions.

12 Q. What are the advantages of using regression?

13 A. The regression equation develops quantitative measures that describe the
14 relationship between daily space-heating sales per customer in Ccf to the daily HDD. The
15 regression equation estimates a change in the daily natural gas usage per customer whenever
16 the daily average weather changes one HDD.

17 Q. What were the results of Staff's weather-normalized sales studies for the test
18 year?

19 A. Staff's analyses resulted in increases to natural gas sales because the weather
20 during the test year was warmer than normal. Staff's analyses resulted in an approximate 13.1
21 percent increase from actual natural gas sales for the residential customer class and an
22 approximate 10.5 percent increase for the general service class. These increases do not
23 include the Staff's customer growth annualization.

1 Q. What results were provided to Staff witness Meyer for Staff's customer growth
2 annualization and revenue calculations?

3 A. First, Staff provided monthly, normalized natural gas usage in Ccf per
4 customer for each of the two customer classes for AmerenUE's three geographic regions.
5 These results are contained in Schedule 2, attached to my testimony. Schedule 2
6 demonstrates the higher natural gas usage per customer in the colder, winter months because
7 of space heating requirements.

8 Second, to enable the calculation of weather-normalized revenue, Staff witness
9 Meyer was provided monthly weather-normalized volumes for the same firm classes and
10 geographic regions. Schedule 3, attached to my testimony, contains those monthly weather-
11 normalized volumes.

12 **WEATHER-NORMALIZED COINCIDENT PEAK DAY DEMAND**

13 Q. What are estimates of weather-normalized coincident peak day demand by
14 customer class?

15 A. Briefly, it is the estimated usage per customer by firm customer class on Staff
16 witness Wells' normally occurring coldest days. The peak day is the highest daily load or
17 draw of natural gas on a system, and the demand is the rate or amount of natural gas used on
18 that day. My estimates of residential and general service customers' natural gas peak usage
19 are at the time (coincident) of a utility's system peak day.

20 Q. Why are estimates of weather-normalized coincident peak day demands
21 important?

22 A. These estimates of weather-normalized coincident peak day demands quantify
23 the relative contributions towards that estimated single-day system peak by the residential and

Direct Testimony of
James A. Gray

1 | general service customers. For cost-of-service studies, it is important to determine each class'
2 | contribution to the peak day responsibility.

3 | Q. Please identify the Staff witness who relies upon the results of the weather-
4 | normalization studies.

5 | A. Schedule 4, attached to this testimony, shows the estimated weather-
6 | normalized coincident peak day natural gas usage in Ccf per customer by billing month and
7 | customer class for AmerenUE's three geographic regions. This information was provided to
8 | Staff witness Daniel I. Beck of the Commission's Energy Engineering Analysis department
9 | for his calculation of total peak day demand across AmerenUE's firm customer classes.

10 | Q. Would you please summarize Staff's recommendations?

11 | A. I recommend that the Commission utilize the results of Staff's weather-
12 | normalized usage per customer shown in Schedule 2 and weather-normalized total sales
13 | volumes shown in Schedule 3, attached to this testimony.

14 | Q. Does this conclude your direct testimony?

15 | A. Yes, it does.

Union Electric Company d/b/a AmerenUE

CASE NO. GR-2007-0003

Testimonies Submitted by James A. Gray

<u>COMPANY</u>	<u>CASE NO.</u>
Missouri Public Service Company	GR-81-312
Missouri Public Service Company	ER-82-39
Missouri Public Service Company	GR-82-194
Laclede Gas Company	GR-82-200
St. Louis County Water Company	WR-82-249
Missouri Public Service Company	ER-83-40
Kansas City Power & Light Company	ER-83-49
Osage Natural Gas Company	GR-83-156
Missouri Public Service Company	GR-83-186
The Gas Service Company	GR-83-225
Laclede Gas Company	GR-83-233
Missouri Water Company	WR-83-352
Missouri Cities Water Company	WR-84-51
Le-Ru Telephone Company	TR-84-132
Union Electric Company	ER-84-168
Union Electric Company	EO-85-17
Kansas City Power & Light Company	ER-85-128
Great River Gas Company	GR-85-136

Missouri Cities Water Company	WR-85-157	
Missouri Cities Water Company	SR-85-158	
United Telephone Company of Missouri	TR-85-179	
Osage Natural Gas Company	GR-85-183	
Kansas City Power & Light Company	EO-85-185	
ALLTEL Missouri, Inc.	TR-86-14	
Sho-Me Power Corporation	ER-86-27	
Missouri-American Water Company, Inc.	WR-89-265	**
The Empire District Electric Company	ER-90-138	**
Associated Natural Gas Company	GR-90-152	
Missouri-American Water Company, Inc.	WR-91-211	**
United Cities Gas Company	GR-91-249	**
Laclede Gas Company	GR-92-165	**
St. Joseph Light & Power Company	GR-93-42	**
United Cities Gas Company	GR-93-47	**
Missouri Public Service Company	GR-93-172	**
Western Resources, Inc.	GR-93-240	**
Laclede Gas Company	GR-94-220	**
United Cities Gas Company	GR-95-160	**
The Empire District Electric Company	ER-95-279	**
Laclede Gas Company	GR-96-193	**
Missouri Gas Energy	GR-96-285	**
Associated Natural Gas Company	GR-97-272	**

Union Electric Company	GR-97-393	**
Missouri Gas Energy	GR-98-140	**
Laclede Gas Company	GR-98-374	**
St. Joseph Light & Power Company	GR-99-42	**
AmerenUE	GA-99-107	
Laclede Gas Company	GA-99-236	
Laclede Gas Company	GR-99-315	**
AmerenUE	GR-2000-512	**
Missouri Gas Energy	GR-2001-292	**
Gateway Pipeline Company, Inc., et al.	GM-2001-585	
Missouri Gas Energy, et al	GC-2001-593	
Laclede Gas Company	GR-2002-356	**
Laclede Gas Company	GA-2002-429	
Southern Missouri Gas Company, L.P.	GT-2003-0031	
Laclede Gas Company	GT-2003-0032	
Missouri Gas Energy	GT-2003-0033	
AmerenUE	GT-2003-0034	
Fidelity Natural Gas, Inc.	GT-2003-0036	
Atmos Energy Corporation	GT-2003-0037	
Aquila Networks- L&P	GT-2003-0038	
Aquila Networks- MPS	GT-2003-0039	
AmerenUE	GR-2003-0517	**
Aquila Networks – MPS and L&P	GR-2004-0072	**

Missouri Gas Energy

GR-2004-0209 **

Atmos Energy Corporation

GR-2006-0387 **

Missouri Gas Energy

GR-2006-0422 **

Union Electric Company d/b/a AmerenUE
Case No. GR-2007-0003

Weather Normalized Billing Month Usage in Ccf per Customer
For the Test Year of July 1, 2005 - June 30, 2006

Service Area Served by Panhandle Eastern Pipe Line Company

	Residential Service Customers	General Service Customers
Jul '05	15.1733	99.7757
Aug	13.2422	90.1711
Sep	14.7661	103.6767
Oct	21.5698	129.3092
Nov	39.7229	192.1298
Dec	88.8464	390.1114
Jan	146.8238	634.8393
Feb	126.1170	531.3192
Mar	100.2094	431.1299
Apr	68.9261	311.4124
May	32.5455	164.1349
Jun '06	19.6000	120.9765
Annual	696.7271	3,227.1651

Service Areas Served by Texas Eastern Transmission and Natural Gas Pipeline Company of America

	Residential Service Customers	General Service Customers
Jul '05	13.6495	83.7829
Aug	12.3460	76.9840
Sep	13.1328	94.2851
Oct	18.4286	119.9939
Nov	33.7521	139.6389
Dec	78.2146	298.3003
Jan	132.0130	537.6588
Feb	107.9376	435.0053
Mar	82.5350	352.4582
Apr	51.9986	227.1753
May	23.8637	131.6193
Jun '06	15.7286	89.1639
Annual	587.4094	2,599.9938

Service Area Formerly Served Under Aquila's Eastern System Tariffs

	Residential Service Customers	General Service Customers
Jul '05	11.4277	115.2503
Aug	9.6187	93.2421
Sep	10.2047	98.7173
Oct	16.6550	138.3013
Nov	29.0014	155.7390
Dec	68.3657	306.2711
Jan	115.8480	544.9930
Feb	109.8194	543.3246
Mar	84.0468	444.9524
Apr	58.7048	313.2796
May	29.8636	196.2291
Jun '06	15.7956	133.6825
Annual	573.0850	3,108.8410

Weather Normalized Billing Month Usage in Ccf
For the Test Year of July 1, 2005 - June 30, 2006

Service Area Served by Panhandle Eastern Pipe Line Company

	Residential Service Customers	General Service Customers
Jul '05	1,294,300	920,631
Aug	1,129,881	829,935
Sep	1,269,605	955,588
Oct	1,866,043	1,196,110
Nov	3,488,660	1,796,029
Dec	7,935,760	3,704,108
Jan	13,186,101	6,075,413
Feb	11,359,110	5,104,915
Mar	9,038,088	4,148,332
Apr	6,198,798	2,989,248
May	2,891,867	1,566,011
Jun '06	1,727,798	1,147,462
Total	61,386,010	30,433,781

Service Areas Served by Texas Eastern Transmission and Natural Gas Pipeline Company of America

	Residential Service Customers	General Service Customers
Jul '05	245,432	228,727
Aug	221,758	209,474
Sep	235,589	256,267
Oct	330,517	326,863
Nov	608,989	382,611
Dec	1,427,964	825,099
Jan	2,418,610	1,496,304
Feb	1,975,365	1,214,970
Mar	1,509,234	984,063
Apr	948,298	632,910
May	431,288	364,191
Jun '06	281,904	246,271
Total	10,634,950	7,167,749

Service Area Formerly Served Under Aquila's Eastern System Tariffs

	Residential Service Customers	General Service Customers
Jul '05	37,083	54,398
Aug	31,116	44,197
Sep	32,808	46,693
Oct	54,245	65,417
Nov	96,807	73,976
Dec	235,520	148,235
Jan	402,688	267,047
Feb	382,391	266,229
Mar	291,895	218,472
Apr	202,179	152,880
May	99,356	95,564
Jun '06	50,451	64,836
Total	1,916,540	1,497,943

**Weather Normalized Coincident Peak Day Demand in Ccf per Customer
For the Test Year of July 1, 2005 - June 30, 2006**

Service Area Served by Panhandle Eastern Pipe Line Company

	Residential Service Customers	General Service Customers
Jul '05	7.4613	30.6086
Aug	6.9506	28.6084
Sep	5.3692	22.4157
Oct	3.5820	15.4170
Nov	2.2020	10.0125
Dec	1.0334	5.4363
Jan	0.4628	3.2017
Feb	0.6037	3.7537
Mar	2.1383	9.7632
Apr	3.3737	14.6012
May	5.1028	21.3725
Jun '06	7.2429	29.7533
Annual	7.4613	30.6086

Service Areas Served by Texas Eastern Transmission and Natural Gas Pipeline Company of America

	Residential Service Customers	General Service Customers
Jul '05	6.7613	26.0795
Aug	6.0432	23.4372
Sep	4.6627	18.3578
Oct	3.1938	12.9526
Nov	1.7517	7.6462
Dec	0.5955	3.3920
Jan	0.3313	2.4197
Feb	0.3970	2.6616
Mar	1.7037	7.4696
Apr	2.9832	12.1779
May	4.4100	17.4278
Jun '06	6.2805	24.3106
Annual	6.7613	26.0795

Service Area Formerly Served Under Aquila's Eastern System Tariffs

	Residential Service Customers	General Service Customers
Jul '05	6.1714	28.5630
Aug	5.7467	26.7224
Sep	4.4318	21.0239
Oct	2.9457	14.5837
Nov	1.7981	9.6106
Dec	0.8264	5.3996
Jan	0.3519	3.3433
Feb	0.4691	3.8513
Mar	1.7452	9.3812
Apr	2.7725	13.8331
May	4.2102	20.0640
Jun '06	5.9898	27.7759
Annual	6.1714	28.5630