

Exhibit No.
Issue: Weather Normalization
Witness: Mark Quan
Type of Exhibit: Surrebuttal Testimony
Sponsoring Party: Empire District Electric
Case No. ER-2014-0351
Date Testimony Prepared: March 2015

**Before the Public Service Commission
Of the State of Missouri**

Surrebuttal Testimony

of

Mark Quan

March 2015

**SURREBUTTAL TESTIMONY
OF
MARK QUAN
ON BEHALF OF
THE EMPIRE DISTRICT ELECTRIC COMPANY
BEFORE THE
MISSOURI PUBLIC SERVICE COMMISSION
ER-2014-0351**

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A. My name is Mark Quan. My business address is 12348 High Bluff Drive,
3 Suite 210, San Diego, California, 92130.

4 **Q. ARE YOU THE SAME MARK QUAN THAT PROVIDED REBUTTAL**
5 **TESTIMONY IN THIS CASE BEFORE THE MISSOURI PUBLIC SERVICE**
6 **COMMISSION (“COMMISSION”)?**

7 A. Yes, I am.

8 **Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?**

9 A. The purpose of my surrebuttal testimony is to address two issues raised in
10 the Rebuttal Testimony of Commission Staff (“Staff”) witness Dr. Won.

11 **Q. WHAT ISSUES ARE YOU ADDRESSING?**

12 A. The first issue is the normal temperature assignment discussed on page 5,
13 beginning at line 13, of Dr. Won’s Rebuttal Testimony. On this issue, Dr. Won
14 asserts that Empire witness Stephen C. Williams orders the normal daily
15 temperatures for each month in the test year from lowest to highest and then
16 assigns the normal temperatures to days of the month in calendar order.

17 The second issue is bias size and is discussed on page 7, beginning on line
18 15, of Dr. Won’s Rebuttal Testimony. On this issue, Dr. Won claims that

1 Empire's methodological errors likely result in a significant bias and states
2 that Empire's October 2013 residential weather normalization result is 17%
3 higher than Staff's result.

4 **Q. WITH REGARD TO THE FIRST ISSUE, NORMAL TEMPERATURE**
5 **ASSIGNMENT, IS DR. WON CORRECT THAT EMPIRE'S METHOD**
6 **ASSIGNS NORMAL TEMPERATURES FROM LOWEST TO HIGHEST?**

7 A. No. In Mr. Williams' Direct Testimony, he describes Empire's weather
8 normalization process. On page 7, beginning on line 7, of Mr. Williams' Direct
9 Testimony, he states:

10

11 *"The final step in this method is to map the ranked averages to the test year*
12 *actual weather. This allows for the assignment of the largest CDD for each*
13 *particular month in the 30 year historical database to be mapped to the*
14 *hottest day in the actual month of the test year."*

15

16 This statement explains that Empire's method does not assign normal
17 temperatures from lowest to highest in the test year calendar as Dr. Won
18 asserts. Instead, Dr. Won has identified an error in execution of Empire's
19 weather normalization procedure. I have corrected this error.

20 **Q. WHAT IS THE IMPACT OF CORRECTING THIS ERROR?**

21 A. In Figure 1, I have corrected the normal weather assignment error and
22 updated the weather normalization period to September 2013 through August
23 2014. Figure 1 shows the revenue cycle normalized energy.

1 **Figure 1: Updated Empire Revenue Cycle Weather Normalized Energy**

Revenue Cycle Normalized Energy		Res (kWh)	CB (kWh)	GP (kWh)	SH (kWh)	TEB (kWh)	Total (kWh)
2013	Sep	147,702,693	29,054,491	79,912,329	7,388,687	33,418,838	297,477,037
2013	Oct	102,257,637	23,045,259	69,882,221	5,723,283	26,926,053	227,834,453
2013	Nov	100,652,512	20,779,954	63,399,825	5,666,769	26,328,801	216,827,860
2013	Dec	161,619,580	25,599,048	68,778,995	8,071,234	32,417,268	296,486,124
2014	Jan	207,438,602	29,816,510	71,999,694	10,785,260	37,298,889	357,338,955
2014	Feb	191,055,160	28,687,850	66,646,268	10,514,983	33,793,325	330,697,587
2014	Mar	155,477,525	26,151,857	65,157,689	8,520,683	30,049,337	285,357,091
2014	Apr	114,821,418	22,470,609	62,091,760	6,576,818	27,251,221	233,211,826
2014	May	94,206,732	21,273,166	65,510,373	5,630,562	25,160,240	211,781,072
2014	Jun	106,975,391	24,359,759	70,637,618	6,123,679	28,231,597	236,328,044
2014	Jul	151,690,396	30,181,705	78,884,637	7,505,217	33,130,916	301,392,871
2014	Aug	148,722,871	29,890,607	78,648,125	7,559,764	33,775,280	298,596,646
Total		1,682,620,517	311,310,815	841,549,533	90,066,938	367,781,764	3,293,329,567

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3 **Q. HOW DOES THE WEATHER NORMALIZED ENERGY COMPARE WITH**
 4 **THE ANALYSIS OF STAFF’S WEATHER NORMALIZED ENERGY**
 5 **CONTAINED IN YOUR REBUTTAL TESTIMONY?**

6 **A.** Figure 2 compares Empire’s updated normalized energy with recalculated
 7 Staff normalized energy. The “Staff Corrected” and “Staff Revision” weather
 8 normalized energy values are from my Rebuttal Testimony, page 8, Figure 4.
 9 The difference between the annual weather normalization results are 0.33%.
 10 In spite of the differences in method, Staff’s and Empire’s weather
 11 normalization processes produce similar results.

1 **Figure 2: Revenue Cycle Weather Normalized Energy Comparison**

Class	Empire Update 9/13-8/14	Staff Corrected 9/13-8/14	Staff Revision 9/13-8/14
Res	1,682,620,517	1,675,077,118	1,675,093,208
CB	311,310,815	313,674,092	313,675,937
GP	841,549,533		
GP Primary		112,557,474	112,556,486
GP Secondary		721,919,069	721,919,441
SH	90,066,938	90,925,107	90,925,451
TEB	367,781,764	368,294,870	368,296,268
Total	3,293,329,567	3,282,447,730	3,282,466,791

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3 **Q. WITH REGARD TO THE SECOND ISSUE, BIAS SIZE, IS 17% A PROPER**
4 **CHARACTERIZATION OF THE METHODOLOGICAL DIFFERENCES?**

5 A. No. Dr. Won asserts that Empire's October 2013 revenue cycle weather
6 normalization energy is 17% higher than Staff's energy. Based on Staff's
7 response to Empire Data Request 231, this comparison is based on Dr.
8 Won's originally filed revenue month normalized sales. This comparison is
9 incorrect because Dr. Won revised his weather normalization values to
10 correct for the calculation error I describe in my Rebuttal Testimony. Using
11 Dr. Won's Rebuttal Testimony workpapers, the correct October 2013
12 difference for the residential class is 1.6%. Dr. Won has mischaracterized the
13 methodological differences by including Staff's known calculation error into
14 the 17% difference. The real difference between methods is 0.33% on an
15 annual basis.

16 **Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?**

17 A. Yes, at this time.

AFFIDAVIT OF MARK QUAN

STATE OF CALIFORNIA)
) ss
COUNTY OF SAN DIEGO)

On the 20th day of March, 2015, before me appeared Mark Quan, to me personally known, who, being by me first duly sworn, states that he is a Principal Consultant for Itron's Forecasting Solution Group 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.

Mark Quan
Mark Quan

Subscribed and sworn to before me this 20th day of March, 2015.

Stephen G. Varns
Notary Public

My commission expires: 4/25/2017

