

MAWC 26
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Witness: Gregory P. Roach
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Sponsoring Party: Missouri-American Water Company
Case No.: WR-2015-0301
SR-2015-0302
Date: February 11, 2016

MISSOURI PUBLIC SERVICE COMMISSION

**CASE NO. WR-2015-0301
CASE NO. SR-2015-0302**

REBUTTAL TESTIMONY

OF

GREGORY P. ROACH

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

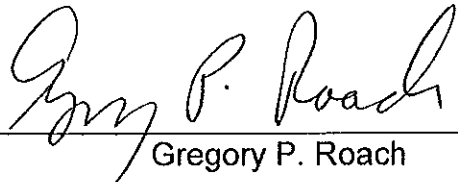
MAWC Exhibit No. 24
Date 3-21-16 Reporter JR
File No. WR-2015-0301

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

IN THE MATTER OF MISSOURI-AMERICAN)	
WATER COMPANY FOR AUTHORITY TO)	
FILE TARIFFS REFLECTING INCREASED)	CASE NO. WR-2015-0301
RATES FOR WATER AND SEWER)	CASE NO. SR-2015-0302
SERVICE)	


AFFIDAVIT OF GREGORY P. ROACH

Gregory P. Roach, being first duly sworn, deposes and says that he is the witness who sponsors the accompanying testimony entitled "Rebuttal Testimony of Gregory P. Roach"; that said testimony and schedules were prepared by him and/or under his direction and supervision; that if inquiries were made as to the facts in said testimony and schedules, he would respond as therein set forth; and that the aforesaid testimony and schedules are true and correct to the best of his knowledge.



Gregory P. Roach

State of New Jersey
County of Camden
SUBSCRIBED and sworn to
Before me this 10th day of FEBRUARY 2016.



Notary Public

My commission expires: 4/15/2020

ANN G. ALFANO
NOTARY PUBLIC OF NEW JERSEY
ID # 50014130
My Commission Expires 4/15/2020

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**REBUTTAL TESTIMONY
GREGORY P. ROACH
MISSOURI-AMERICAN WATER COMPANY
CASE NO. WR-2015-0301
CASE NO. SR-2015-0302**

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REBUTTAL TESTIMONY

Gregory P. Roach

I. INTRODUCTION

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

3 A. My name is Gregory P. Roach, and my business address is 555 E. County
4 Line Road, Suite 201, Greenwood, IN 46143.

5

6 **Q. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY IN THIS**
7 **PROCEEDING?**

8 A. Yes, I have submitted direct testimony in this proceeding on behalf of
9 Missouri-American Water Company ("MAWC").

10

11 **II. OVERVIEW**

12 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

13 A. My rebuttal testimony will address Commission Staff and OPC treatment of
14 Test Year revenue in their direct testimony in this proceeding. Further, I will
15 address certain Commission Staff ("Staff") and the Office for the Public
16 Counsel ("OPC") concerns with the MAWC Test Year usage data.

17

18 **Q. WHAT SUBJECTS WILL YOUR REBUTTAL TESTIMONY ADDRESS?**

19 A. My rebuttal testimony will explain how Commission Staff and OPC have
20 incorporated unusually warm weather into their 5 year averaging technique to

1 set Test Year sales volumes and revenues, resulting in a significant
2 overstatement of Test Year sales volumes and revenues under existing rates.
3 Additionally, I will address Commission Staff and OPC concerns related to
4 MAWC historic sales volumes and demonstrate that their concerns are
5 misplaced and illusory and have no impact on the analysis conducted by
6 MAWC to develop Test Year sales volumes and revenues.
7

8 **III. COMMISSION STAFF AND OPC TEST YEAR CONSUMPTION & REVENUE**

9 **Q. HOW DID COMMISSION STAFF AND OPC CALCULATE TEST YEAR** 10 **SALES VOLUMES?**

11 A. The Commission Staff and OPC used similar methods, albeit measured over
12 slightly different time periods, to calculate Test Year sales volumes and
13 resulting Test Year revenue. In setting Test Year sales volumes and
14 revenues, the Commission Staff and OPC used a simple 60 month averaging
15 technique that was not normalized for varying weather conditions, a declining
16 use trend or any other factor. It is a simple, discreet average by month of the
17 5 years defined by the period October 2010 through September 2015 (Staff)
18 and January through December 2014.
19

20 **Q. WHAT ARE THE PRIMARY DEFICINCES THAT RESULT FROM SETTING** 21 **TEST YEAR SALES VOLUMES AND REVENUES BASED ON THE** 22 **METHOD EMPLOYED BY THE COMMISSION STAFF AND OPC?**

23 A. There are two primary deficiencies of employing the simple averaging
24 technique. First, the simple 5 year average technique employed the

1 Commission Staff and OPC to set Test Year sales volumes and revenues is
2 subject to weather sensitive usage overstatement linked to the period over
3 which the usage was averaged. That is, if the period averaged was warmer
4 than normal then sales/revenues would be overestimated for the Test Year
5 and set at a higher than weather normalized level. Conversely, if the period
6 averaged was cooler than normal then sales/revenues would be
7 underestimated for the Test Year and set at a lower than weather normalized
8 level. Second and as importantly, by taking a simple average and failing to
9 bifurcate (or identify) usage that is non-weather sensitive (base) as compared
10 to usage that is weather sensitive, the simple averaging technique employed
11 by the Commission Staff and OPC fails to identify the inherent declining
12 usage trend of residential and commercial non weather sensitive usage
13 (base).

14
15 **Q. IS THERE A SIMPLE WAY TO EXPLAIN THE DEFICIENCY IN THE USE**
16 **BY STAFF AND OPC OF AN AVERAGE NUMBER?**

17 A. Yes, there is. Although averaging can be useful, it can present a very
18 distorted picture if used inappropriately. Consider, for example a number set
19 representing a trend. For example 12, 11, 10, 9, 8. Given the trend, the next
20 number in the set would logically be 7. But, if one were to use a five year
21 average, such as that used by Staff and OPC, to determine likely sales, the
22 next number would be the average of the five previous numbers – i.e. 10.
23 Although this example might appear simplistic, it is, in fact, a clear exposition

1 of the inappropriateness of the use of a five year average in the face of a very
2 clear declining usage trend.

3

4 **Q. THE ANNUAL USAGE, HOWEVER, DOES NOT APPEAR TO PRESENT A**
5 **CLEAR TREND, DOES IT?**

6 A. In fact, it does, but the data needs to be adjusted for the effects of weather on
7 usage, which distorts the data from year to year because water usage is
8 sensitive to weather.

9

10 **Q. HAVE YOU PERFORMAED AN ANALYSIS OF THE WEATHER**
11 **EXPERIENCED DURING THE PERIOD USED BY THE COMMISSION**
12 **STAFF AND OPC AS COMPARED TO LONGER PERIODS OF TIME**

13 A. Yes, I have.

14

15 **Q. WHAT CLIMATIC DATA HAVE YOU ANALYZED IN ORDER TO**
16 **EVALUATE THE CLIMATIC CONDITIONS EXPERIENCED DURING THE**
17 **PERIOD USED BY THE COMMISSION STAFF AND OPC AS COMPARED**
18 **TO LONGER PERIODS OF TIME**

19 A. I have analyzed daily climatic observations from St. Louis International Airport
20 Lambert Field for the period of January 1976 to December 2015. I have
21 compared that entire 40 year period to the 60 months employed by the
22 Commission Staff and OPC to set Water Sales Volumes and Revenues in
23 their filing in this case.

24

1 Q. DID YOU ANALYZE ALL OF THE MONTHS OVER THE 40 YEARS AND
2 THE 60 MONTH PRO FORMA TEST YEAR PERIOD OR A SUBSET? IF A
3 SUBSET, WHY THAT SUBSET?

4 A. For this analytical exercise, I have chosen to include the months of May
5 through September (ie. Summer subset) exclusively in the analysis. As
6 discussed at length in my direct testimony in this proceeding, it is during the
7 summer months that MAWC experiences significant increases in its sales
8 volumes due to discretionary outdoor water usage which is weather
9 dependent. Hence it is during the summer period that the greatest variability
10 in sales volumes occurs from one year to the next and is generally dependent
11 on summer weather conditions.

12
13 Q. WHAT WERE THE STATISTICAL RESULTS OF YOUR ANALYSIS OF
14 WEATHER EXPERIENCED DURING THE 2010-2015 PERIOD AVERAGED
15 BY COMMISSION STAFF AND OPC TO ARRIVE AT PRO FORMA TEST
16 YEAR CURRENT WATER VOLUME SALES AND REVENUES AS
17 COMPARED TO A 40 YEAR AVERAGE?

18 A. The results of my analysis are detailed in Schedule GPR-1R. That schedule
19 is summarized in table GPR-1R below. Table GPR-1R reports the percentage
20 difference between the 40 year temperature data for the summer subset as
21 compared to the 60 month summer subset temperature data which was
22 experienced during the period used by Commission Staff and OPC to set Test
23 Year water sales volumes and revenue. The table illustrates that the 60
24 month summer subset period used by Commission Staff and OPC was 13.1%

1 warmer than the 40 year average as compared by Cooling Degree Days.
 2 Further this warmer-than-the-40-year-average experienced during the 60
 3 month summer subset period used by Staff and OPC is reflected in higher: 1)
 4 Maximum Monthly temperature, 2) Minimum Monthly temperature, 3) Mean
 5 Maximum Daily Temperature, 4) Mean Minimum Daily Temperature and 5)
 6 Mean Average Daily Temperature. In every significant temperature
 7 measurement series, the 60 month summer subset period employed by Staff
 8 and OPC was warmer than the 40 year mean for the same summer months.
 9

Table GPR-1R
Missouri American Water Company
Comparison of 40 Year Weather to 2010-2015
Summer Season (May - Sept)

Time Period Measured	Cooling Degree Days	Maximum Monthly Temperature	Minimum Monthly Temperature	Mean Maximum Daily Temperature	Mean Minimum Daily Temperature	Mean Average Daily Temperature
Mean % Change Staff to 40 Years	13.1%	2.7%	2.9%	1.6%	2.3%	1.9%
S. Dev % Change Staff to 40 Years	-1.3%	2.6%	1.6%	-0.5%	-5.0%	-2.7%

10
11

12 **Q. WHAT ARE THE IMPLICATIONS OF THOSE STATISTICAL RESULTS AS**
 13 **THEY APPLY TO THE COMMISSION STAFF AND OPC USING THE 60**
 14 **MONTH PERIOD THEY APPLIED IN SETTING PRO FORMA TEST YEAR**
 15 **WATER SALES VOLUMES AND REVENUE?**

16 **A.** The statistics paint a very clear picture related to the climatic conditions
 17 during the period chosen by the Commission Staff and OPC to set Pro Forma
 18 volumes and revenues. First, that the 60 month time period was significantly
 19 warmer overall as measured by cooling degree days as compared to the 40

1 year data. Specifically, the cooling degree day data illustrate a prolonged
2 period of warmer temperatures over the 60 months as compared to the 40
3 year data. Second, the discreet daily average temperature comparisons
4 (Mean Max, Mean Min and Mean Average) all indicate that each day is
5 warmer by approximately 2% and that the Standard Deviation of each
6 temperature series is shrinking indicating that the summer days were warmer
7 during the 60 month period and that the number of cooler days was less.
8 This lends additional support to the trend observed with the Cooling Degree
9 Days during the 60 month period.

10

11 **Q. WHAT ARE THE TEST YEAR PRO FORMA IMPLICATIONS FOR SALES**
12 **VOLUMES AND REVENUES USING A 60 MONTH PERIOD THAT IS**
13 **WARMER THEN THE 40 YEAR AVERAGE?**

14 **A.** The effect of the Commission Staff using a warmer than normal period to
15 produce Pro Forma Test Year sales volumes and revenues is to overstate
16 current rate volumes and sales, thereby understating MAWC's need for rate
17 relief in this proceeding. In effect, it sets a sales volume and revenue level for
18 the Pro Forma Test Year that MAWC would NEVER be able to achieve under
19 the 40 year average weather conditions.

20

21 **Q. WHAT ARE THE TEST YEAR PRO FORMA IMPLICATIONS FOR**
22 **INCORPORATION OF THE NON DISCRETIONARY INDOOR USAGE**
23 **DECLING USAGE TRENDS USING A 60 MONTH PERIOD THAT IS**
24 **WARMER THEN THE 40 YEAR AVERAGE?**

1 A. As neither Commission Staff, nor OPC, incorporated a normalization for
2 weather effects of the discretionary outdoor summer water usage, the effect
3 of the 60 month averaging produces Test Year sales volumes that are
4 completely dependent on the warmer than normal weather experienced
5 during the period and are equally incapable of distinguishing or incorporating
6 the effects of declining customer usage of indoor nondiscretionary water
7 usage for the Test Year.

8

9 **Q. WHAT IS YOUR RECOMMENDATION RELATED TO THE COMMISSION**
10 **STAFF AND OPC APPROACHES TO SETTING PRO FORMA TEST YEAR**
11 **SALES VOLUMES AND REVENUES?**

12 A. Where weather influences sales, it is axiomatic that ratemaking should set
13 revenue forecasts based on normal weather. Here, the Commission should
14 reject both the Commission Staff and OPC's methods for setting Test Year
15 sales volumes and revenues because the method used by both Commission
16 Staff and OPC is heavily influenced by selection of a period for averaging
17 which is warmer than the 40 year average and results in Pro Forma sales
18 volumes and revenues that MAWC could never achieve under the 40 year
19 average weather conditions.

20

21 **Q. IS THE FAILURE TO NORMALIZE FOR SUMMER TEMPERATURES THE**
22 **ONLY VULNERABILITY IN THE APPROACH OF STAFF AND OPC?**

23 A. No. Additionally, because the Commission Staff and OPC method does not
24 normalize for weather during the period averaged, their method is completely

1 incapable of identifying, and hence incorporating, the effects of customer
2 usage declines for nondiscretionary indoor water usage which have been
3 experienced for over a decade on the MAWC system and which, as I have
4 illustrated in my direct testimony are nearly certain to continue going forward
5 into the far future. As a result, the Commission Staff and OPC averaging
6 techniques for Pro Forma Test Year sales volumes and revenues are biased
7 due to the abnormally warm weather experienced during the period averaged
8 and the failure of the method to measure declining use per customer due to
9 their respective failures to employ weather normalization to remove the
10 weather fluctuations in order to identify the declining use trend.

11

12 **Q. DOES THE STAFF IMPLICITLY RECOGNIZE THESE INHERENT**
13 **WEAKNESSES IN THEIR APPROACH?**

14 A. Yes, implicitly, they do. Staff concedes, at page 54 of the Staff Report that
15 '[m]any factors, such as more efficient appliances, conservation, and lawn
16 sprinkling/irrigation, impact water usage.' Staff further acknowledges that
17 '[t]hese factors change over time...' The introduction of efficient appliances,
18 as well as conservation and the use of low flow fixtures, produces a
19 conservation trend that reduces consumption over time. My approach, as I
20 stated, accounts for this clear trend, while Staff's and OPC's does not. Staff
21 also concedes that lawn sprinkling and irrigation affect water usage. These
22 activities are highly weather dependent but, again, neither Staff nor OPC
23 adjust for the clear effects of weather. In other words, although Staff clearly
24 recognizes the influence of conservation, water efficiency and weather on

1 revenue, Staff's approach ignores these things completely. Consequently, it
2 should be obvious that the use of a five year average, unadjusted for either
3 weather or the conservation trend, is inappropriate and will significantly
4 overstate the revenue that would be earned in a year of normal weather with
5 the additional time-effect of the conservation trend.

6
7 **IV. COMMISSION STAFF AND OPC CONCERNS- MAWC USAGE DATA**

8 **Q. THE COMMISSION STAFF AND OPC CITED VARIABILITY OF THE MAWC**
9 **SYSTEMWIDE MONTHLY USAGE PER CUSTOMER DATA SERIES AS A**
10 **ROOT CAUSE FOR EMPLOYING THE 60 MONTH AVERAGING**
11 **TECHNIQUE THEY USED TO SET TEST YEAR WATER SALES VOLUMES**
12 **AND REVENUES. WHAT IS THE MAIN CAUSE OF THAT MONTHLY**
13 **VARIABILITY?**

14 **A.** The greatest factor contributing to monthly variations of system-wide water
15 usage per customer, particularly in the summer period of May through
16 September are variations in weather. I have extensively reported on
17 customer water usage variations and their link to weather variability above. In
18 addition to weather variations, usage per customer can be affected by
19 cancel/rebills moving water sales from one billing period to another.
20 Averaged over a period of several months, the effect of cancel/rebills is
21 mitigated on usage per customer trends. All things being equal, the variability
22 of monthly usage per customer are typically due to changes in climatic
23 conditions and the effects of cancel/rebills is mitigated over time thus not
24 impacting long term usage trends.

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Q. THE COMMISSION STAFF AND OPC SPECIFICALLY CITED A SUPPOSEDLY “ERRONEOUS” RESIDENTIAL USAGE PER CUSTOMER VALUE FOR JUNE 2013 AS BEING “SUSPICIOUS” AND “UNRELIABLE”. IS THERE STATISTICAL EVIDENCE THAT THIS MONTHLY USAGE VALUE SOMEHOW MAKES THE ENTIRE RESIDENTIAL USAGE PER CUSTOMER SERIES “UNRELIABLE”?

A. Absolutely not. As I explained above, a set of cancel/rebills, especially with a large base of quarterly billed customers can impact a particular month’s usage per customer statistic as noted by Commission Staff and OPC with the June 2013 value. This billing event occurred as MAWC was transitioning from a legacy enterprise system to Systems, Applications and Products (SAP) during the implementation phase of the installation. Having said that, as I mentioned above, the impact of the cancel/rebill is mitigated over time. Reported below in Table GPR-2R are the monthly values for MAWC system-wide residential usage per customer for the years 2013 and 2014 and the mean annual residential usage per customer for each year. Staff and OPC are apparently focusing on the value of 3,771 for June 2013, which appears unduly low, even when compared with non-summer usage. Table GPR-2R below illustrates, however, that even with the abnormally low value for June 2013; the mean annual residential usage per customer difference between the two years is only 52 gallons per customer month. That amounts to a 0.8% percent difference. Just as important, Table GPR-2R demonstrates that the annual difference between the two years, 52 gallons per customer is

1 inconsequential when compared to the standard deviation that occurred
 2 within a particular year (2013–1,658 and 2014-1,155 gallons per customer
 3 month respectively). Based on this analysis, the Commission Staff and OPC
 4 “concerns” related to MAWC residential usage per customer values are
 5 without basis or merit.

Table GPR-2R
Missouri American Water Company
Comparison of Usage Per Customer
2013 and 2014

	Monthly	Annual			Monthly	Annual	
		Average	Std Dev.			Average	Std Dev.
Jan-13	5,934			Jan-14	5,304		
Feb-13	5,261			Feb-14	5,047		
Mar-13	5,048			Mar-14	5,985		
Apr-13	5,532			Apr-14	6,361		
May-13	5,752			May-14	7,834		
Jun-13	3,771			Jun-14	8,023		
Jul-13	8,815			Jul-14	8,365		
Aug-13	8,309			Aug-14	6,838		
Sep-13	9,581			Sep-14	5,911		
Oct-13	6,250			Oct-14	5,735		
Nov-13	5,427			Nov-14	4,929		
Dec-13	5,273			Dec-14	5,243		
2013		6,246	1,657.7	2014		6,298	1,155.0
Difference 2014 to 2013 (gal)		52					
Difference 2014 to 2013 (%)		0.82%					

7
 8
 9 **Q. COMMISSION STAFF AND OPC SPECIFICALLY RELY, HOWEVER, ON**
 10 **THE ONE, JUNE 2013 RESULT TO QUESTION MAWC’S**
 11 **ENTIREDECLINING USE ANALYSIS. IS THERE STATISTICAL EVIDENCE**
 12 **THAT THIS MONTHLY USAGE VALUE SOMEHOW MAKES THE**
 13 **DECLINING USE ANALYSIS OF BASE RESIDENTIAL USAGE PER**
 14 **CUSTOMER SERIES “UNRELIABLE”?**

1 A. Absolutely not. Citing a "concern" that the June 2013 system wide usage per
2 customer value somehow would impact the MAWC system wide declining use
3 analysis illustrates a lack of understanding of both how the MAWC system
4 wide declining use analysis was estimated and how the bifurcation of base
5 non-discretionary usage from non-base outdoor discretionary usage mitigates
6 the impact of that June 2013 value.

7

8 **Q. PLEASE EXPLAIN WHY THE JUNE 2013 RESIDENTIAL USAGE PER**
9 **CUSTOMER VALUE DOES NOT HAVE ANY IMPACT ON THE**
10 **RESIDENTIAL DECLINING USE TREND ESTIMATE EMPLOYED BY**
11 **MAWC.**

12 A. As detailed in my direct testimony, the MAWC approach to estimating the
13 residential customer usage per customer declining use trends is to separate
14 out the non-discretionary indoor base usage, which is where the declining use
15 trend is most prevalent, from discretionary, weather-related outdoor usage.
16 The "base usage" is defined by the average of the residential usage per
17 customer for the months of February – April for the 10 years analyzed; 2006
18 through 2015. We use this period, of course, because discretionary, outdoor
19 water use is, at most, negligible. The discretionary non-base, outdoor usage
20 is the difference between the annual total residential usage less the total
21 annual base usage. Usage in June 2013 by definition did not occur during
22 the February to April base usage averaging period. As a result, June 2013
23 usage has no impact on the calculated base residential usage per customer

1 value for 2013. Hence, such usage does not and cannot affect the
2 estimated declining use trend which I presented.

3
4 **Q. BECAUSE THE JUNE 2013 VALUE OCCURRED DURING THE NON-BASE**
5 **DISCRETIONARY WEATHER PERIOD IN 2013 DID THIS VALUE IMPACT**
6 **THE ESTIMATION OF NON-BASE USAGE FOR 2013 OR FOR THE 10**
7 **YEAR AVERAGE OF NON-BASE?**

8 A. As detailed in Table GPR-2R, the variance between the annual average
9 residential usage per customer for 2013 and 2014 is 52 gallons per month or
10 0.8%. As stated prior, any impact of the June 2013 value due to cancel/rebills
11 is mitigated during the course of a typical year and has no discernable impact
12 on annual usage per customer as compared to normal variation of residential
13 usage due to climatic conditions which on average vary by approximately
14 1,400 gallons per customer month during the course of 2013 and 2014. Thus
15 by association, the June 2013 value has no appreciable impact on the
16 estimation of non-base usage either which is resulting difference between
17 base and total residential usage.

18
19 **Q. IS THERE A LARGER PROBLEM WITH THE CRITICISM LEVELED**
20 **AGAINST YOUR DECLING USE ANALYSIS BY THE STAFF AND OPC?**

21 A. Yes. They are focusing on a small variation one month (June 2013) of
22 several years of data (which, in any event I have explained as a billing
23 anomaly) to deny a widely accepted trend of declining use per customer. For
24 example, in 2009, the Water Research Foundation and the United States

1 Environmental Protection Agency jointly sponsored a study by the Center for
2 Infrastructure Research of the University of Louisville. That study, *North*
3 *America Residential Water Usage Trends Since 1992*, found the following:

4 This research documents a pervasive trend toward lower
5 water usage per household. The magnitude of the
6 decline is consistent across North American utilities and
7 is confirmed by more detailed data provided by the
8 study's 11 partner utilities, although there were annual
9 variations due to regional factors. The results of the
10 study's statistical models identify the magnitude of both
11 positive and negative forces affecting water usage. The
12 decline in number of residents per household is clearly
13 an important factor in falling water consumption per
14 residential customer. However, the negative
15 consequences of smaller households appears to be more
16 than offset by the positive consequences of higher
17 household incomes. Higher incomes have led to larger
18 homes, with more water-using appliances, and more
19 landscape irrigation. Thus, the net decline in water usage
20 per household appears to be due to the steady
21 penetration of low-flow appliances over the past 20
22 years. The end-use study found that low-flow appliances
23 and changing household demographics accounted for a
24 16 percent reduction in average household water use in
25 2007, as compared to 1990.

26
27 Other studies come to similar conclusions, some of which are referenced in
28 my initial testimony. The trend in declining use per customer is, therefore,
29 well established and almost universally recognized. Staff's and OPC's use
30 of a simple five-year average of usage per customer, which is unadjusted for
31 either the influence of weather or for the well-recognized trend in declining
32 usage per customer is, therefore, not only wrong but simply ignores reality.

33
34 **V. CONCLUSION AND RECOMMENDATIONS**

1 Q. BASED ON YOUR ANALYSIS DETAILED IN YOUR REBUTTAL
2 TESTIMONY, WHAT ARE YOUR RECOMMENDATIONS TO THE
3 COMMISSION RELATED TO THE COMMISSION STAFF AND OPC'S USE
4 OF A 60 MONTH AVERAGE TO SET TEST YEAR WATER SALES AND
5 REVENUES AS WELL AS THE COMMISSION STAFF AND OPC'S
6 CONCERNS RELATED TO CERTAIN MONTHLY RESIDENTIAL USAGE
7 PER CUSTOMER VALUES AND THE IMPACT THOSE VALUES MAY
8 HAVE ON THE MAWC RESIDENTIAL DECLINING USE ANALYSIS FILED
9 BY MAWC IN THIS PROCEEDING?

10 A. I recommend the following: 1) that the Commission reject the 60 month
11 averaging technique employed by the Commission Staff and the OPC to set
12 Test Year water sales volumes and revenues as the technique is biased by
13 averaging a period of time significantly warmer than 40 year average climatic
14 conditions, is not representative of normalized weather and as such is unable
15 to incorporate the declining use trend present in non-discretionary indoor
16 usage, 2) that the Commission reject the assertion by the Commission Staff
17 and the OPC that variations in residential monthly usage per customer due to
18 billing variations somehow makes the MAWC residential usage per customer
19 data unreliable and impacts the MAWC residential declining use analysis.
20 Detailed analysis clearly illustrates such billing variations do not impact the
21 MAWC residential declining use analysis trend or forecast of future declining
22 use.

23

1 Q. IS THERE EMPIRICAL EVIDENCE DEMONSTRATING THAT THE NON-
2 DISCRETIONARY WATER USE DECLINING USE TREND YOU HAVE
3 ESTIMATED FROM HISTORICAL DATA WILL CONTINUE INTO THE
4 FUTURE? IF SO, WHAT EVIDENCE DO YOU OFFER TO SUPPORT
5 SUCH CONTINUATION OF THE TREND?

6 A. Yes the trend will absolutely continue into the future. As reported in my direct
7 testimony in this proceeding, the empirical evidence for continuation of the
8 declining trend of non-discretionary use, perhaps even acceleration of the
9 trend, is compelling. First, the impact of the post-Joplin tornado rebuild
10 illustrated that a home newly built or remodeled home averaged an 8.4%
11 reduction in water usage from pre to post-tornado levels. This rebuild of
12 approximately 2,500 homes in that district increased the rate of declining use
13 for the district by approximately 37%. Second, the theoretical family of four
14 analysis detailed in Exhibit GPR-4, page 1 of 1 of my direct testimony
15 demonstrated that the trend could extend for as many as 45 years in to the
16 future. In summary, the era of residential non-discretionary use has just
17 begun and will continue well into the foreseeable future.

18

19 Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

20 A. Yes, it does.

**Missouri American Water Company
Comparison of 40 Year Weather to 2010-2015
Summer Season (May - Sept)**

Time Period Measured	Cooling Degree Days	Maximum Monthly Temperature	Minimum Monthly Temperature	Mean Maximum Daily Temperature	Mean Minimum Daily Temperature	Mean Average Daily Temperature
Mean 1976-2015	314.7	95.4	52.1	84.0	64.9	74.4
STDV 1976-2015	148.0	5.0	8.2	5.6	5.9	5.7
SD as % Mean 76-15	47.0%	5.2%	15.8%	6.7%	9.2%	7.7%
Mean 10-2010 - 9-2015	355.9	98.0	53.6	85.4	66.4	75.9
STDV 10-2010 - 9-2015	146.0	5.1	8.4	5.6	5.6	5.6
SD as % Mean 76-15	41.0%	5.2%	15.6%	6.6%	8.5%	7.3%
% Change Staff to 40 Years	13.1%	2.7%	2.9%	1.6%	2.3%	1.9%
% Change Staff to 40 Years	-1.3%	2.6%	1.6%	-0.5%	-5.0%	-2.7%

**Missouri American Water Company
Comparison of 40 Year Weather to 2010-2015
Summer Season (May - Sept)**

Time Period Measured	Cooling Degree Days	Maximum Monthly Temperature	Minimum Monthly Temperature	Mean Maximum Daily Temperature	Mean Minimum Daily Temperature	Mean Average Daily Temperature
Mean 1976-2015	314.7	95.4	52.1	84.0	64.9	74.4
STDV 1976-2015	148.0	5.0	8.2	5.6	5.9	5.7
SD as % Mean 76-15	47.0%	5.2%	15.8%	6.7%	9.2%	7.7%
Mean 10-2010 - 9-2015	355.9	98.0	53.6	85.4	66.4	75.9
STDV 10-2010 - 9-2015	146.0	5.1	8.4	5.6	5.6	5.6
SD as % Mean 76-15	41.0%	5.2%	15.6%	6.6%	8.5%	7.3%
% Change Staff to 40 Years	13.1%	2.7%	2.9%	1.6%	2.3%	1.9%
% Change Staff to 40 Years	-1.3%	2.6%	1.6%	-0.5%	-5.0%	-2.7%