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Witness: Gary A. Naumick
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Sponsoring Party: Missouri-American Water Company
Case No.: WR-2011-0337
SR-2011-0338
Date: June 30, 2011

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. WR-2011-0337
CASE NO. SR-2011-0338

DIRECT TESTIMONY

OF

GARY A. NAUMICK

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

MAWC Exhibit No. 16
Date 2-21-12 Reporter JL
File No. WR-2011-0337

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 RATES FOR WATER AND SEWER SERVICE	)))))	**CASE NO. WR-2011-XXXX** **CASE NO. SR-2011-XXXX**

AFFIDAVIT OF GARY A. NAUMICK

Gary A. Naumick, being first duly sworn, deposes and says that he is the witness who sponsors the accompanying testimony entitled "Direct Testimony of Gary A. Naumick"; that said testimony and schedules were prepared by him and/or under his direction and supervision; that if inquires 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.

Gary A Naumick
Gary A. Naumick

State of New Jersey
County of Mercer
SUBSCRIBED and sworn to
Before me this 28 **day of** June **2011.**

JUN 28 2011

Notary Public

My commission expires: DAVID E. LEACH IV COMMISSION EXPIRES 03/25/14 ID #2223562

DIRECT TESTIMONY
GARY A. NAUMICK
MISSOURI-AMERICAN WATER COMPANY
CASE NO. WR-2011-0337
SR-2011-0338

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DIRECT TESTIMONY

OF

GARY A. NAUMICK

I. WITNESS IDENTIFICATION AND BACKGROUND

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Gary A. Naumick. My business address is 1025 Laurel Oak Road, Voorhees, New Jersey 08043.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by the American Water Works Service Company, Inc. ("Service Company") as the Senior Director of American Water Engineering.

Q. WHAT ARE YOUR RESPONSIBILITIES IN THIS POSITION?

A. My duties include directing the engineering function for American Water Works Company, Inc. ("American Water"). The Engineering department's responsibilities include providing engineering services, strategy, standards, governance and oversight for water and wastewater system master planning; capital budgeting and capital investment management; asset technical standards; design and design management; capital project delivery and construction management; support to operations, environmental management, and rates functions.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I received a Bachelor of Science degree in Civil Engineering from the Pennsylvania State University in 1977. I received a Master of Science degree in Engineering Management from the New Jersey Institute of Technology in 2002.

Q. WHAT HAS BEEN YOUR BUSINESS EXPERIENCE?

A. I have been employed by the Service Company since 1986. From 1986 to 1988, I was a Senior Planning Engineer. I was promoted to Director of Planning in 1988, and to the position of Director of Planning & Strategy and Capital Investment Management in 2003. I have been in charge of American Water's asset planning program since 1988. I was promoted to my present position, Senior Director of Engineering for American Water, in 2008.

During the period from 1977 to 1986, I was employed by the U.S. Environmental Protection Agency ("USEPA") as an Environmental Engineer.

I am a licensed Professional Engineer in the Commonwealth of Pennsylvania. I am an active member of the American Water Works Association (AWWA), and have served on AWWA's Conservation Committee. Since 2005, I have served as a faculty member for the Institute of Public Utilities Regulatory Studies Program. I have presented on the topic of water consumption trends at national water industry functions (AWWA Water Utility Management Conference, February 2011; National Association of Regulatory Utility Commissioners (NARUC), Subcommittee on Accounting and Finance, September 2006; NARUC, Regulatory Policy Conference, December 2004). I also co-authored an article entitled "Declining Residential Water Use Presents Challenges, Opportunities" which was published in the May 2011 edition of *Opflow*, a monthly publication of the AWWA.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE REGULATORY AGENCIES?

A. Yes. I have provided testimony on behalf of American Water subsidiary rate filings in Indiana, Kentucky, New Jersey, New Mexico, and Pennsylvania.

II. SCOPE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to supplement the findings of Missouri-American Water Company ("MAWC" or "Company") witness Mr. Kevin Dunn regarding the water usage trend exhibited by MAWC's residential customers. A significant and continuing trend of declining water usage by residential customers has been experienced by MAWC, and my testimony discusses the reasons why this decline is occurring.

III. DECLINING USAGE

Q. WHAT WERE THE RESULTS OF MR. DUNN'S ANALYSIS?

A. Mr. Dunn's analysis has shown that there is a continuing annual decline across all MAWC districts, ranging from 682 gallons per customer per year (gpcy) in the Mexico district to 3,169 gpcy in the Platte County district. In the Company's largest district, St. Louis County, the rate of decline is 1,137 gpcy, or approximately 3.1 gallons per customer per day (gpcd).

Q. WHAT DO YOU BELIEVE IS THE CAUSE OF THIS DECLINE?

A. This decline can be attributed to several key factors, including but not limited to: increasing prevalence of low flow (water efficient) plumbing fixtures and appliances within residential

households, conservation ethic of the customers, conservation programs implemented by the utility or other entities, and price elasticity.

Q. PLEASE EXPLAIN WHAT YOU MEAN BY THE "PREVALENCE OF LOW FLOW FIXTURES AND APPLIANCES."

A. Plumbing fixtures such as toilets, showerheads, and faucets are more water efficient today than they were in the past. Similarly, appliances such as dishwashers and washing machines are also more water efficient. So, put very simply, when a customer replaces an older toilet, washing machine, or dishwasher, the new unit will use less water than the one it replaced. New homes will have water efficient fixtures. Similarly, if a customer remodels his or her kitchen, bathroom or laundry room, he or she will use less water in the future.

Q. HOW MUCH WATER DO THE NEW FIXTURES AND APPLIANCES SAVE?

A. The Energy Policy and Conservation Act of 1992 mandated the manufacture of water efficient toilets, showerheads and faucet fixtures. For example, a toilet manufactured after 1994 uses 1.6 gallons per flush, compared to a pre-1994 toilet which uses 3.5 to 7 gallons per flush. In fact, toilets using 1.28 gallons per flush are now becoming more prevalent in the marketplace. That is a savings of 2 to nearly 6 gallons for every flush for every toilet that is replaced with a more efficient model. The USEPA has estimated that there are over 220 million toilets in the U.S.[1], and that 10 million new toilets are sold each year for installation in new homes or replacement of aging fixtures in existing homes.[2]

[1] US EPA, WaterSense Tank-Type High-Efficiency Toilet Specification Supporting Statement, February 9, 2007.
[2] D&R International, Plumbing Fixtures Market Overview: Water Savings Potential for Residential and Commercial Toilet and Urinals, September 30, 2005.

A recently enacted law will impact indoor water usage further, and could perpetuate and further accelerate the downward trend. The Energy Independence & Security Act of 2007 (Public Law 110–140) has established high efficiency standards for dishwashers and clothes washers. Dishwashers manufactured after 2009 and clothes washers manufactured after 2010 must meet water usage requirements that could reduce water used by these appliances by 54% and 30%, respectively. Overall, with all other factors being equal, a typical residential household in a home with new fixtures and appliances would use 35% less water for indoor purposes than a non-retrofitted home built prior to 1994. Schedule GAN-1 contains more details on the requirements of the laws and the typical expected impact on residential water usage.

Q. ELABORATE ON THE OTHER FACTORS CAUSING THE DECLINE IN RESIDENTIAL CONSUMPTION.

A. Customer awareness and interest in the benefits of conserving water and energy continue to increase. As awareness of water and energy efficiency increases, customers may decide to replace a fixture or appliance even before it has broken. Also, customers may further reduce consumption by changing their household water use habits in other various ways. As discussed above, Missouri-American's residential customers in the St. Louis County district have reduced their base usage by about 3.1 gallons per customer per day on average. A 3.1 gallon per day decrease can be achieved by subtle changes in customer behavior. For instance, here are some ways a customer can reduce 3.1 gallons per day:

- A shorter shower by about 1 minute
- Two flushes per day with a newer low-flow toilet fixture vs. an older toilet

- Running the dishwasher 5 times per week instead of 7
- Turning off the water for about 1 minute while brushing your teeth

In addition, there is some elasticity to price that contributes to a reduction in usage as rates increase.

Q. HAVE YOU STUDIED WATER CONSUMPTION TRENDS FOR OTHER AMERICAN WATER SUBSIDIARIES BESIDES MAWC?

A. Yes.

Q. ARE THE RESULTS OF MR. DUNN'S ANALYSIS CONSISTENT WITH YOUR ANALYSIS IN OTHER STATES?

A. Yes. We have studied the residential consumption patterns for other American Water state operating systems located in climates similar to Missouri, and it has become clear that the trend experienced by MAWC is very similar to the trends being experienced in other states. The results are shown on Schedule GAN-2. This Schedule shows that nearby states have experienced a decline in residential consumption per customer averaging 1.35% per year over the last 10 years.

Q. IS THIS TREND BEING OBSERVED ACROSS THE INDUSTRY, BEYOND MAWC AND OTHER AMERICAN WATER COMPANIES?

A. Yes. According to the 2010 Water Research Foundation ("WRF") report, "many water utilities across the United States and elsewhere are experiencing declining water sales

among households." (WRF Report, p. 1)[3] The report further states: "A pervasive decline in household consumption has been determined at the national and regional levels." (WRF Report, p. xxviii).

Q. DO YOU EXPECT THE DECLINING USAGE TREND TO CONTINUE IN THE FUTURE?

A. Yes. It is clear that water efficient fixtures and other drivers such as conservation education and price elasticity will continue to drive further efficiency into residential usage per customer. In fact, the trend could accelerate. Water usage declines when a resident changes from an older, less efficient fixture, to a new, efficient fixture. This occurs (1) when a resident remodels his or her existing bathroom, kitchen or laundry, replacing older fixtures and appliances with new, water-efficient ones; and (2) as new homes that include water-efficient fixtures and appliances are built. As discussed, a new toilet will use 1.6 (or 1.28) gallons per flush, compared to 3.5 to 7.0 gallons per flush for a pre-1994 toilet.

The regulations mandating water efficient washing machines and dishwashers are relatively new. Given the life expectancy of appliances, it is likely that the replacement of existing appliances, and the corresponding reduction in water used, will continue to occur over time for the next fifteen years or more.

Q. ARE THERE BENEFITS FROM REDUCED WATER USAGE BY RESIDENTIAL CUSTOMERS?

[3] Coomes, Paul et al., North America Residential Water Usage Trends Since 1992 – Project #4031. (Water Research Foundation, 2010)

A. Yes. There are environmental and operational benefits from lower water usage by residential customers. Reduced usage helps maintain source water supplies. Diversions from supply sources are lessened, leaving more water for passing flows, environmental benefit, or drought reserve. Reductions in power consumption, chemical usage, and waste disposal not only reduce water utility operating costs but also provide environmental benefits such as reduced carbon footprint and waste streams. Furthermore, reduced water usage by residential customers also reduces energy consumption within the customer's home, for instance, through lower hot water heating needs. In addition, on a case-specific basis, reduced water usage has the potential to enable the utility to delay or downsize a capacity addition. In systems where demand is approaching the capacity of water supplies or treatment facilities, the water saved through efficient usage by customers can be a preferred alternative to a supply-side expansion, with a resulting lower cost to customers. Currently, there is an economic disincentive to MAWC to sell less water in its service territories; however, MAWC would like to work with the Commission to move beyond historic barriers, to fully unlock the benefits of resource preservation. According to the WRF Report, "while water conservation is normally seen as positive, this gradual erosion in residential consumption may force utilities to raise rates to provide sufficient revenues for expanding service and replacing old water mains and equipment." (WRF report p. xxi) The report further states, "pricing that recovers the costs of building, operating and maintaining the systems is absolutely essential to achieving sustainability. Drinking water and wastewater utilities must be able to price water to reflect the full costs of treatment and delivery." (WRF report p. 74-75) MAWC is fully committed to preserving natural

resources, and welcomes the Commission's support and partnership to help all parties receive the benefits from conservation and efficient water use by its customers.

Q. WHAT IS YOUR CONCLUSION ABOUT MR. DUNN'S FINDINGS REGARDING DECLINING CONSUMPTION BY MAWC'S RESIDENTIAL CUSTOMERS?

A. It is my conclusion that Mr. Dunn's analysis is fundamentally sound, and that his findings are consistent with the findings of my analyses conducted for other American Water systems, and with findings being reported across the water utility industry.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Schedule GAN-1

The following regulations are listed in the "*Energy Independence & Security Act of 2007,*" Public Law 110–140 – Dec. 19, 2007:

1. A top-loading or front-loading standard-size residential clothes washer manufactured on or after January 1, 2011 shall have a water factor of not more than 9.5. (water factor is equal to gallons/cycle/cubic feet)

2. Dishwashers manufactured on or after January 1, 2010, shall—
   a. for standard size dishwashers (≥ 8 place settings + six serving pieces) not exceed **6.5 gallon per cycle**; and
   b. for compact size dishwashers (< 8 place settings + six serving pieces) not exceed **4.5 gallons per cycle.**

TABLE 1
Flow rates from typical household fixtures and appliances before and after Federal Standards

Type of Use	Pre-Regulatory Flow*	New Standard (maximum)	Federal Standard	Year Effective
Toilets	3.5 gpf	1.6 gpf	U.S. Energy Policy Act	1994
Clothes washers**	41 gpl (14.6 WF)	Estimated 26.6 gpl (9.5 WF)	Energy Independence & Security Act of 2007	2011
Showers	2.75 gpm	2.5 gpm	U.S. Energy Policy Act	1994
Faucets***	2.75 gpm	2.5 gpm (1.5 gpm)	U.S. Energy Policy Act	1994
Dishwashers	14.0 gpc	6.5 gpc for standard; 4.5 gpc for compact	Energy Independence & Security Act of 2007	2010

* Source: *Handbook of Water Use and Conservation*, Amy Vickers, May 2001
** Average estimated gallons per load and water factor (see calculations)
*** Regulation maximum of 2.5 gpm at 80 psi, but lavatory faucets available at 1.5 gpm maximum (see calculations)

ABBREVIATIONS USED	
gpcd	gallons per capita per day
gpf	gallons per flush
gpl	gallons per load
gpm	gallons per minute
gpc	gallons per cycle
WF	water factor, or gallons per cycle per cubic feet capacity of the washer (the smaller the water factor, the more water efficient the clothes washer)

TABLE 2

Daily indoor per capita water use from various fixtures and appliances in a typical single family home before and after Federal Regulations

Type of Use	Pre-Regulatory Standards		Post-Regulatory Standards		Savings
	Amount** (gpcd)	Percent of Total	Amount** (gpcd)	Percent of Total	
Toilets	17.9	30.4%	8.2	21.4%	54%
Clothes washers*	15	25.5%	9.8	25.6%	30%
Showers	9.7	16.5%	8.8	23.0%	9%
Faucets	14.9	25.3%	10.8	28.2%	28%
Dishwashers*	1.4	2.4%	0.65	1.7%	54%
Total Indoor Water Use	**58.9**	**100%**	**38.3**	**100%**	**35%**
Note: List only includes common household fixtures and appliances and excludes leaks and "other domestic uses" in order to be conservative.					

*Regulatory Standards effective in 2010 and 2011. For calculations of amount in gpcd, refer to the calculation below.

**Source: *Handbook of Water Use and Conservation*, Amy Vickers, May 2001

CALCULATIONS

Clothes washer (pre-regulatory):

Number of times clothes washer used everyday *	= 0.37 loads per day
Clothes washer water use rate range *	= 39 gpl to 43 gpl
Average water use rate	= **41 gpl**
Water usage per capita	= 41 gpl * 0.37 loads/day = **15 gpcd**
Water factor (WF) as gallons/cycle/cu. ft	= 41 gpl / 2.8 cu. ft (assuming capacity of an average washer to be 2.8 cu. ft, most washers range between 2.7 – 2.9 cu. ft) = **14.6**

Clothes washer (new standard):

Number of times clothes washer used everyday *	= 0.37 loads per day
New regulatory standard	= **9.5 WF** = 9.5 gallons/per cycle/cubic feet = **26.6 gpl** (Assuming capacity of an average washer to be 2.8 cu. ft, most washers range between 2.7 – 2.9 cu. ft)
Therefore, new usage per capita	= 26.6 gpl * 0.37 loads/day = **9.8 gpcd**

Dishwasher:

Number of times dishwasher used everyday*	= 0.10 times
New regulatory standard	= **6.5 gallons/per cycle** (for standard dishwashers only)
Therefore, new usage per capita	= 6.5 gallons/per cycle * 0.1 = **0.65 gpcd**

Faucet:

Actual faucet flow during use*	= 67% rated flow
Rated flow*	= **1.5 gpm** to **2.5 gpm**
Frequency of faucet use*	= 8.1 min/day
Range of usage per capita	= 8.1 gpcd to 13.5 gpcd
Assume average of range for estimated gpcd	= **10.8 gpcd**

*Source: *Handbook of Water Use and Conservation,* Amy Vickers, May, 2001

Schedule GAN-2

Historic Slopes of Trendlines (Residential Usage) for Other Eastern/Midwestern US States*	
	10-Year Winter Trend
Maximum	-1.68%
Minimum	-1.17%
Average	-1.35%

* See below for more details about the other eastern/midwestern states.

As with Missouri American Water, residential usage trends were analyzed for other American Water subidiaries. Four of these states are listed and summarized below. In all cases residential winter consumption trends were analyzed using a similar methodology as presented in this testimony.

Background Information for Other State Trend Summary		
State	**Number of Residential Customers as of 12/2010**	**Annual Rate of Decline at 2010**
Illinois	252,991	-1.17%
Iowa	54,702	-1.68%
Indiana	250,949	-1.32%
Pennsylvania	587,386	-1.21%