Petitioner's Exhibit JJC

TENNESSEE AMERICAN WATER COMPANY, INC.

DOCKET NO. 12-XXXXX

DIRECT TESTIMONY

OF

JAMES J. CHELIUS

ON

RESIDENTIAL AND COMMERCIAL CUSTOMER WATER CONSUMPTION TRENDS

SPONSORING PETITIONER'S EXHIBIT JJC-1 THROUGH JJC-4

DIRECT TESTIMONY
OF
JAMES J. CHELIUS

DOCKET NO. 12-_____

WITNESS IDENTIFICATION AND BACKGROUND

Q. Please state your name and business address.

A. My name is James J. Chelius. 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. (hereinafter referred to as "AWWSC" or the "Service Company") as Director of Engineering Asset Planning.

Q. What are your responsibilities in this position?

A. My duties include directing the engineering planning function for American Water Works Company, Inc. ("American Water"). The planning function's responsibilities include providing engineering planning services for operating subsidiaries, including development of water and wastewater system comprehensive planning studies or master plans, development of water usage projections for capital and business planning, and development and delivery of strategy, practices, governance and oversight of planning related activities for American Water.

Q. Please describe your educational background.

A. I received my Bachelor of Science degree in General Sciences from Villanova University in 1982 and my Masters of Science degree in Water Resources Engineering from Villanova University in 1984.

Q. What has been your business experience?

A. I have been employed by AWWSC since 1989. From 1989 to 1993 I held the position of Planning Engineer, and from 1993 to 2003 I held the position of Senior Planning Engineer. From 2004 to 2005 I took on the role of Program Implementation Manager to implement American Water's Asset Management Program. In 2005 I returned to American Water's Corporate Engineering department, and in 2007 was promoted to my current position as Director of Engineering Asset Planning. Prior to joining American Water, I was employed by Roy F. Weston, Inc. as a Project Engineer from 1984 to 1989.

I am a licensed Professional Engineer in the Commonwealth of Pennsylvania. I am an active member of the American Water Works Association (AWWA). I have coauthored publications on the topic of trends in water consumption in the industry, including "Declining Residential Water Use Presents Challenges, Opportunities" in the American Water Works Association's May 2011 Opflow as well as an extended abstract entitled "Trends in Residential Water Usage and its Impact on Water Utility Financial Planning," published in conference proceedings for the 2011 Water Utility Management Conference in Denver, CO.

Q. Have you previously testified before regulatory agencies?

A. Yes. I have provided testimony on behalf of company rate filings in Connecticut and California.

SCOPE OF TESTIMONY

Q. What is the purpose of your testimony with regard to the trend in residential and commercial water usage?

A. The purpose of my testimony is to present the results of an analysis that my staff and I conducted regarding water usage trends by Tennessee-American Water Company, Inc.'s ("TAWC's") residential and commercial customers. A significant and continuing trend of declining water usage by residential and commercial customers has been experienced by TAWC, and this testimony discusses the magnitude and causes of the decline. Specifically, the analysis has shown that there is a continuing annual decline of 648 gallons per residential customer per year, or approximately 1.8 gallons per residential customer per day (gpcd); and a decline of 6,415 gallons per commercial customer per year, or approximately 17.6 gallons per commercial customer per day (gpcd). This relates to approximate annual rates of decline of 1.31% and 1.85% per year respectively at present customer usage levels. Later in my testimony, I will describe in detail the methodology used in the analysis.

DECLINING USAGE

Q. What is the cause of this decline?

A. The decline is attributed to several key factors, including but not limited to: increasing prevalence of low flow (water efficient) plumbing fixtures within residential households and commercial establishments, 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. 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 and businesses, or replacement of aging fixtures in existing homes and businesses.[2]

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

[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.

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 new home constructed in 2012 would use 35% less water for indoor purposes than a non-retrofitted home built prior to 1994. In addition, recent water efficiency standards on pre-rinse spray valves will result in significant savings for restaurants, which are classified within the commercial customer class. Petitioner's Exhibit JJC-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 and commercial consumption.

A. Customer awareness and interest in the benefits of conserving water and energy continues 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, TAWC's residential customers are reducing their base usage by 1.8 gallons per customer per day. A 1.8 gallon per day decrease can be achieved by subtle changes in customer behavior. For instance, here are some ways a customer can reduce 1.8 gallons per day:

- A shorter shower by 1 minute
- One flush 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 1 minute while brushing your teeth

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

Q. Describe your analysis methodology.

A. An analysis of monthly customer consumption by TAWC's residential customers[3] during winter months over the past ten years was undertaken. Specifically, monthly water sales recorded in January through April for each of the last ten years was studied. Similarly, an analysis of monthly customer consumption by TAWC's commercial customers during winter months over the past five years was undertaken. Specifically, monthly water sales recorded in January through April for each of the last five years was studied.

Q. Why did you focus your analysis on winter consumption?

A. By studying winter consumption, we have attempted to isolate base, non-discretionary usage. In a climate such as Tennessee's, outdoor usage by residential customers is seasonal. Outdoor usage during the summer season includes discretionary usage such as lawn and landscape irrigation, car washing, filling swimming pools, etc. Outdoor and other discretionary usage is very low during the winter months. Therefore, studying usage in the winter months helps us see the underlying trends in indoor (or "base") usage, which is largely independent of discretionary usage in these months.

[3] The analysis includes the Chattanooga district, but not Lone Oak or Suck Creek districts due to limitations in the available data for these very small systems. However, due to the significant representation the Chattanooga district has within TAWC, the resulting trends were assumed to be representative of TAWC's total residential and commercial customer base respectively.

Q. Please continue describing your analysis methodology.

A. In order to calculate the usage per customer trend, a four-step calculation was performed for each customer category. I have attached graphs of the calculations described below. These graphs are attached as Petitioner's Exhibit JJC-2a and 2b.

1) Monthly water sales data were recorded and divided by the number of customers to yield the average usage per customer. For graphing purposes, the time variable in months was plotted on the x-axis, and the consumption per customer variable was plotted on the y-axis. (Note that water sales data lag actual consumption by approximately one month for customers on a monthly meter reading cycle).

2) Winter consumption, expressed in gallons per customer per month, was calculated for each year from 2002 through 2011 for residential customers, and 2007 through 2011 for commercial customers. For each year, a single point, representing the average monthly usage for that winter was plotted. (Note: For purposes of this discussion, the term "winter" is used to describe sales recorded for the months of January through April, as this represents a period of the year generally not influenced by outdoor usage).

3) A "best-fit" linear regression trend line was created using the 10 year winter usage per residential customer history and the 5 year winter usage per commercial customer history.

4) In order to apply the trend in "base" usage to the full year usage by customers, that portion of consumption which is constant throughout the year was calculated (and therefore is considered to be baseline indoor usage) vs. the amount of increased usage that occurs during the discretionary summer usage period. This is done by calculating the daily usage per customer during winter months vs. the daily usage per customer for the entire year. This correlation was studied for

the years 2002-2011. The details of the calculations and the results are found on Petitioner's Exhibit JJC-3a and 3b. For example, the results show that 90.5% of residential usage is considered base usage. The winter trend was then applied to the full year consumption.

Q. Explain how your analysis produces a result that is "weather neutral."

A. It is well known that water usage will vary during the summer months based on weather conditions. Customers use more water for outdoor purposes such as lawn irrigation during hot, dry summers than they do during cool, wet summers. As described in step #4 above, we add the average non-base (i.e., outdoor) usage from ten years of history to our projection base (indoor) use. In other words, Tennessee American is demonstrating that a distinct and continuing trend is happening in base, indoor use for the reasons I have described previously. At this time, Tennessee American is not claiming that there is a continuing underlying trend in outdoor use; rather, it is pointing out that summer usage will vary year to year based on summer weather patterns, and our ten year average represents the "most likely" outcome in a given year.[4] In this way, we achieve a forecast of residential and commercial usage that is weather neutral.

Q. Why was ten years of data used for the residential customer analysis and five years of data used for the commercial customer analysis?

A. We utilized a period that best balances the availability and completeness of customer consumption data. For residential customers, ten years of historic data has been utilized.

[4] Tennessee American's assumption that there is not a continuous underlying declining trend in outdoor usage by customers is a conservative assumption. It is likely that, similar to indoor usage, advancing technologies are enabling residential and commercial customers to be more efficient in their outdoor usage of water. For example, products like drought-resistant grass seed and "smart" irrigation sensors enable customers to use less water for irrigating their lawns and landscaping. Also, price elasticity will continue to impact water usage, and outdoor use is considered to have a higher elasticity to price increase than indoor usage which is primarily non-discretionary. In addition, as awareness of environmental stewardship continues to increase, residents may choose practices such as use of rain barrels or xeriscape landscaping, which will serve to reduce outdoor water usage. American Water continues to study customer usage trends, including further analysis of outdoor usage, to determine whether an underlying, continuing trend in outdoor usage is occurring.

For Commercial customers, limitations in the available customer consumption data limited the period of historical study to five years.

Q. What are the results of your analysis?

A. As mentioned above, the analysis shows that residential usage per customer is declining at a rate of 648 gallons per customer per year, or 1.8 gallons per customer per day (gpcd) and that the commercial usage per customer is declining at a rate of 6,415 gallons per customer per year, or 17.6 gallons per customer per day (gpcd).

Q. Have you studied water consumption trends for other American Water subsidiaries besides Tennessee-American?

A. Yes. We have studied the residential consumption patterns for other American Water state operating systems and it has become clear that the trend exhibited by TAWC is very similar to the trends being experienced in other states. The results are shown on Petitioner's Exhibit JJC-4 show a consistent trend across a number of states spanning a wide range of geographic and demographic characteristics. This Exhibit shows that other American Water states have experienced a decline averaging 1.42% per year over the last 10 years.

Q. Is this trend happening across the industry, beyond TAWC 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."[5] (WRF Report, p. 1) The report further states: "A pervasive decline

[5] Coomes, Paul et al., North America Residential Water Usage trends since 1992 – Project # 4031. (Water Research Foundation, 2010). (Hereinafter referred to as the "WRF Report")

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 conservation actions by utilities will continue to drive further efficiency into residential usage per customer. In fact, the trend could accelerate. According to the 2010 American Housing Survey, 65% of homes in the City of Chattanooga were built prior to 1990.[6] These homes were constructed with toilets, washing machines, and dishwashers that are more water-intensive than newer fixtures and appliances now on the market. 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 and businesses 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. As turnover of household fixtures and appliances continues to occur over time, residential and commercial usage will continue to decline accordingly.

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.

[6] U.S. Census Bureau, 2010 American Community Survey 1-Year Estimates, http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_1YR_DP04&prodType=table

Q. In addition to the external factors impacting usage, are there initiatives TAWC is undertaking that impact the water usage trends and promote water efficiency?

A. Yes. TAWC has taken numerous steps to promote customer conservation activities. These initiatives include customer education literature; and information provided at workshops, community events, and speaking engagements. TAWC also provides information on its website regarding wise water use and conservation and even has information on how customers can obtain a leak detection kit. Deron Allen of TAWC describes the company's efforts in environmental participation in his testimony.

Q. Are there benefits from reduced water usage by residential and commercial customers?

A. Yes. There are environmental and operational benefits from lower water usage by residential and commercial 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 customers also reduces energy consumption within the customer's property, for instance, through lower hot water heating needs.

Currently, there is an economic disincentive to TAWC to sell less water in its service territory; however, TAWC would like to work with the Tennessee Regulatory Authority 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 page 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 page 74-75). TAWC 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 our customers.

Q. How has TAWC factored the observed trend in residential customer usage into its pro forma test year revenues in this case?

A. Yes. The development of TAWC's revenue claim, including the adjustment to test year data to reflect the observed trend in residential customer usage, is addressed by TAWC witness Donald Petry in Petitioner's Exhibit REV-4-Declining Usage-DJP.

Q. Does this conclude your testimony?

A. Yes, it does.

STATE OF NEW JERSEY

COUNTY OF CAMDEN

BEFORE ME, the undersigned authority, duly commissioned and qualified in and for the State and County aforesaid, personally came and appeared James J Chelius, being by me first duly sworn deposed and said that:

He is appearing as a witness on behalf of Tennessee-American Water Company before the Tennessee Regulatory Authority, and if present before the Authority and duly sworn, his testimony would set forth in the annexed transcript.

James J Chelius

Sworn to and subscribed before me
this 29 day of May, 2012.

Notary Public

Annette Ocasio
Notary Public of New Jersey
My Commission Expires 12/20/2016

TAWC Exhibit JJC-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 washers 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 fixtures and appliances before and after Federal Standards

Type of Use	Pre-Regulatory Flow*	New Standard (maximum)	Federal Standard	Year Effective	WaterSense / ENERGY STAR Current Specification+ (maximum)
Toilets	3.5 gpf	1.6 gpf	**U.S. Energy Policy Act**	1994	**1.28 gpf**
Clothes washers**	41 gpl (14.6 WF)	Estimated 26.6 gpl (9.5 WF)	**Energy Independence & Security Act of 2007**	2011	**Estimated 16.8 gpl (6.0 WF)**
Showers	2.75 gpm	2.5 gpm	**U.S. Energy Policy Act**	1994	**2.0 gpm**
Faucets***	2.75 gpm	2.5 gpm (1.5 gpm)	**U.S. Energy Policy Act**	1994	**1.5 gpm at 60 psi**
Dishwashers	14.0 gpc	6.5 gpc for standard; 4.5 gpc for compact	**Energy Independence & Security Act of 2007**	2010	**4.25 gpc for standard; 3.5 gpc for compact**
Commercial Pre Rinse Spray Valves	1.8 to 6 gpm	1.6 gpm	**U.S. Energy Policy Act of 2005**	2006	**Under development**

* 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)
+Source: http://www.epa.gov/watersense/ and http://www.energystar.gov websites

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

Chattanooga, TN American Water
Residential Sales Per Customer
(10-Year Winter Trend)

Exhibit JJC-2a

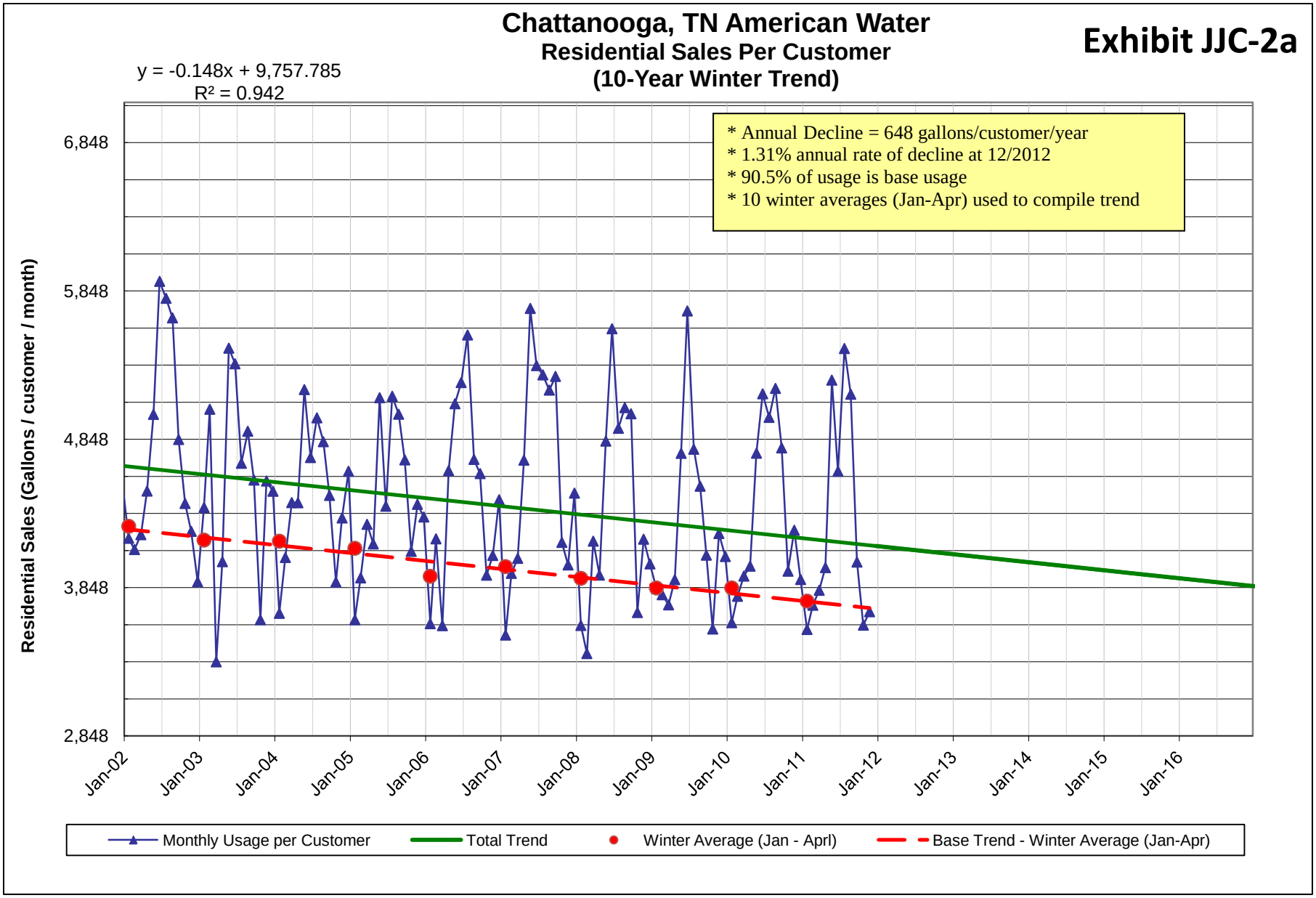
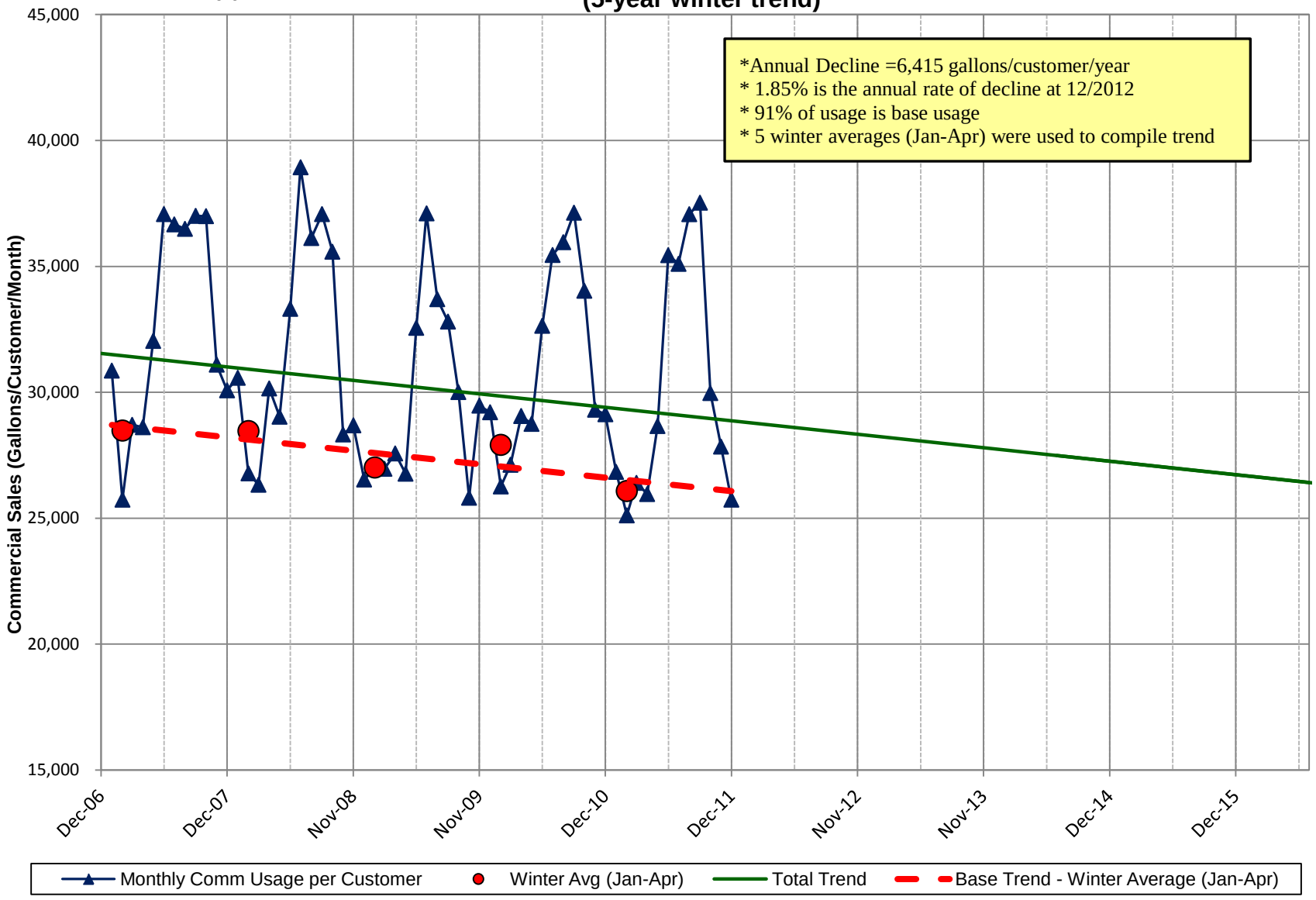


Exhibit JJC-2b

Chattanooga, TN American Water
Commercial Sales per Customer
(5-year winter trend)

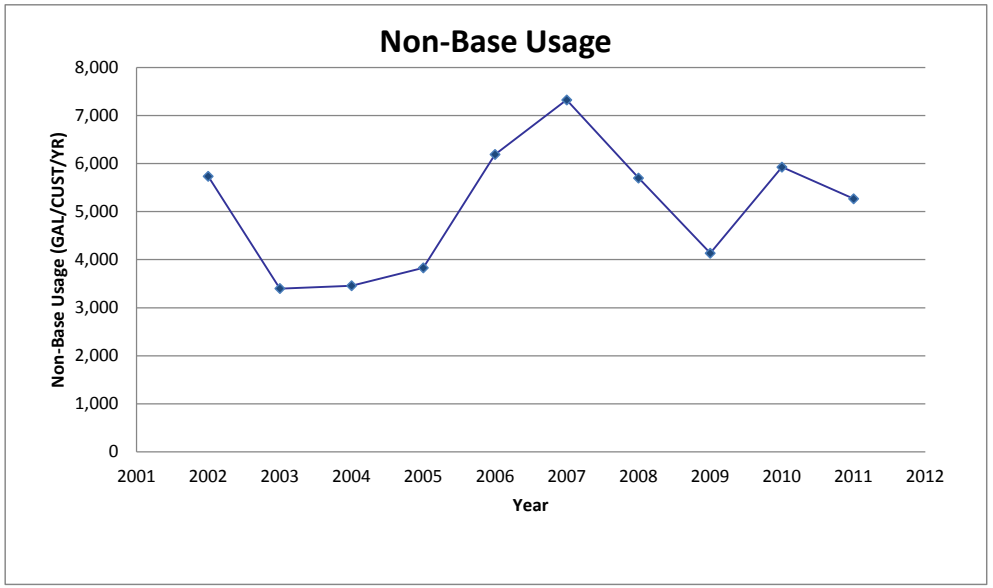
y = -1.465x + 85,944.685
R² = 0.671



Calculation of Percentage of Usage that is Base Usage for the Residential Sector

Exhibit JJC-3a

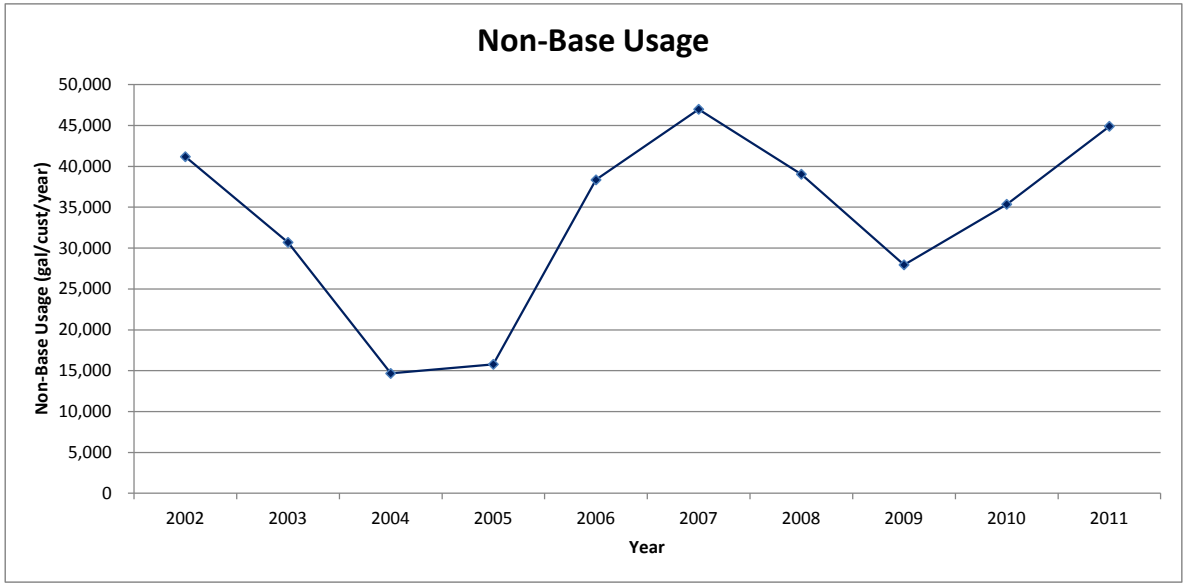
	Basis of Calc.	Unit	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	10-YR AVG
CHATTANOOGA, TENNESSEE													
Winter Residential Usage	Jan-Apr	KGAL	1,028,057	1,007,763	1,016,993	1,015,354	981,985	1,016,214	1,004,269	987,229	985,956	967,156	
Winter Residential Usage Per Day	Divide by 120 or 121	KGAL/DAY	8,567	8,398	8,405	8,461	8,183	8,468	8,300	8,227	8,216	8,060	
Annual Base Residential Usage	Multiply by 365 or 366	KGAL	3,127,007	3,065,279	3,076,194	3,088,368	2,986,871	3,090,984	3,037,706	3,002,822	2,998,950	2,941,766	
Total Annual Residential Usage	Jan-Dec		3,474,461	3,272,271	3,289,599	3,327,439	3,379,249	3,560,925	3,405,336	3,268,218	3,382,019	3,282,711	
Percent Base Residential Usage		%	90.0%	93.7%	93.5%	92.8%	88.4%	86.8%	89.2%	91.9%	88.7%	89.6%	90.5%
Annual Non-Base Residential Usage		KGAL	347,454	206,992	213,405	239,071	392,378	469,941	367,630	265,396	383,070	340,945	
Average Number of Customers	May - Dec		60,575	60,887	61,721	62,431	63,373	64,149	64,505	64,196	64,630	64,722	
Non-Base Usage	May - Dec	GAL/CUST/YR	5,736	3,400	3,458	3,829	6,192	7,326	5,699	4,134	5,927	5,268	**5,097**



Calculation of Percentage of Usage that is Base Usage for the Commercial Sector

Exhibit JJC-3b

	Basis of Calc.	Unit	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	10-YR AVG
CHATTANOOGA, TENNESSEE													
Winter Commercial Usage	Jan-Apr	KGAL	915,864	912,153	1,050,361	1,022,977	923,727	933,813	936,252	884,100	904,851	846,285	
Winter Commercial Usage Per Day	Divide by 120 or 121	KGAL/DAY	7,632	7,601	8,681	8,525	7,698	7,782	7,738	7,368	7,540	7,052	
Annual Base Commercial Usage	Multiply by 365 or 366	KGAL	2,785,753	2,774,465	3,177,125	3,111,555	2,809,670	2,840,348	2,831,969	2,689,138	2,752,255	2,574,117	
Total Annual Commercial Usage	Jan-Dec	KGAL	3,121,207	3,030,158	3,297,662	3,241,290	3,124,489	3,228,910	3,156,351	2,918,115	3,039,942	2,939,234	
Percent Base Commercial Usage		%	89%	92%	96%	96%	90%	88%	90%	92%	91%	88%	91%
Annual Non-Base Commercial Usage		KGAL	335,454	255,693	120,537	129,735	314,819	388,562	324,382	228,978	287,687	365,117	
Average Number of Customers	May - Dec		8,146	8,329	8,221	8,221	8,209	8,270	8,309	8,191	8,136	8,131	
Non-Base Usage	May - Dec	GAL/CUST/YR	41,182	30,698	14,662	15,780	38,349	46,985	39,038	27,953	35,360	44,904	33,491



Residential Usage Trends For American Water State Subsidiaries

Exhibit JJC - 4

Based on Winter Usage Trends except where noted below

State	Customers in April 2011	2012 Forecast Annual Usage (GPCY)	Annual Decline (GPCY)*** 10-year (2002-2011)	Rate of Decline 2010-2011 (%)*** 10-year (2002-2011)
Arizona*	102,445	124,536	-3,136	-2.34%
California*	149,685	138,804	-2,045	-1.41%
Illinois	253,615	58,884	-828	-1.39%
Indiana	251,977	56,232	-682	-1.20%
Iowa	54,926	51,780	-868	-1.65%
Kentucky	108,838	56,796	-624	-1.09%
Maryland	4,152	48,120	-792	-1.62%
Missouri	417,915	81,828	-984	-1.19%
New Jersey (SA1)	341,973	58,428	-1,007	-1.32%
New Jersey (SA2)	193,775	70,644	-1,746	-2.08%
New Mexico	7,883	86,772	-2,575	-2.72%
New York	68,340	93,528	-2,364	-2.47%
Pennsylvania	588,540	48,708	-624	-1.26%
Ohio	46,754	45,744	-708	-1.52%
Virginia	52,561	58,704	-888	-1.49%
West Virginia	157,633	41,112	-588	-1.41%
Michigan**	3,711	36,380	-549	-1.45%
Average	164,984	66,785	-1,050	-1.42%

Notes:

*Arizona, California and New Mexico used the 12 Month Running Average Method for trending.

**Michigan used the Annual Average method for trending due to data reliability issues.

*** MD, NM, NY & OH analyses are based upon 9 years of data, and NJ analyses are based upon 5 years of data.