COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	**)**	
	)	
THE APPLICATION OF KENTUCKY-AMERICAN WATER COMPANY FOR AN ADJUSTMENT OF RATES ON AND AFTER JANUARY 27, 2013	**)**	**CASE NO. 2012-00520**

REBUTTAL TESTIMONY OF LINDA C. BRIDWELL, P.E.

May 15, 2013

Q. PLEASE STATE YOUR NAME.

A. My name is Linda C. Bridwell.

Q. DID YOU FILE DIRECT TESTIMONY IN THIS CASE?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to address Kentucky-American Water Company's ("Kentucky American" or "Company") revisions filed with the Commission on May 15, 2013. I will also address certain comments, questions, and revenue requirement adjustments that were made by Brian Kalcic and Stephen Rackers, two witnesses who are jointly sponsored by the Attorney General ("AG") and the Lexington-Fayette Urban County Government ("LFUCG").

Q. WHAT ARE THE ISSUES THAT YOU WILL BE ADDRESSING IN YOUR REBUTTAL TESTIMONY?

A. The issues that I will be addressing are: 1) Revisions to the forecasted revenue requirement filed May 15, 2013; 2) Tap fee accounting; 3) Kentucky American's forecasted customer count; 4) Kentucky American's forecasted sales and declining usage; 5) Working Capital; and 6) Single tariff pricing.

Q. WHAT REVENUE REQUIREMENT RESULTS FROM THE REVISIONS MADE IN THE FILING?

A. The revised filing results in a revenue requirement of $96,208,414 or a revenue request increase of $12,068,431, which is a reduction of $249,271 from the original filing of $12,317,702.

Q. WHAT ARE THE ITEMS THAT ARE INCLUDED IN THE REVISION TO THE REVENUE REQUIREMENT?

A. There are eight items included in the revision to the revenue requirement. The first item in the revised filing is the application of the slippage factor that was addressed in response to Item 41 of the Commission Staff's Second Request for Information. The second item is a mathematical correction on the calculation of income tax. The third item is a mathematical correction on the Group Insurance and Other Benefits. The fourth items is a revision to the Pension and OPEB forecasts based on updated actuarial information received after the case was filed. The fifth item is revision to the long-term debt costs based on a rescheduled debt issuance and revised information regarding debt costs that is discussed in Mr. Rungren's testimony. The sixth item is the correction of a calculation in the working capital to remove federal income tax from net income. The seventh item is a correction to the number of public hydrants as included in the response to Item 10 of the LFUCG's First Request for Information. The eighth and final item is a correction to remove Charitable Donations from the Miscellaneous Expense forecast of $212,250 as identified in the updated response to Item 109 of the Commission Staff's Second Request for Information.

Q. WHAT WAS THE SLIPPAGE FACTOR THAT WAS APPLIED IN THE REVISION?

A. The Company applied the slippage factors, as calculated by the Commission, of 122.14% to all recurring capital expenditure projects from October 2012 through the end of the forecasted test year July 2014, and a slippage factor of 82.25% to all investment project expenditures for that same time period.

Q. DOES THE COMMISSION GENERALLY APPLY A SLIPPAGE FACTOR TO THE UTILITY PLANT IN THE COMPANY'S FILING?

A. Yes, it has been the past practice of this Commission to apply a slippage factor.

Q. DO YOU AGREE WITH MR. RACKERS THAT KENTUCKY AMERICAN SHOULD NOT APPLY A SLIPPAGE FACTOR ABOVE 100%?

A. No, I do not. When the Commission applied the first slippage factor in Case No. 92-452, Kentucky American recognized that it had to shift its entire process on planning and implementing capital construction. This was a culture shift that was appropriate for both the customers and the business. The Company increased the level of detail and oversight involved in identifying and planning projects. Additional engineering resources were allocated and comprehensive planning across the operations was heightened. Projects were planned to a much higher degree before capital construction dollars were included in the budget. Kentucky American looked at the timing of construction projects to shift across fiscal years, allowing more flexibility to accelerate or delay projects as needed in managing the overall capital construction spending. Most importantly, capital construction plans no longer have large contingency percentages budgeted on a project level. Kentucky American approves individual project cost increases after the budget is approved on an individual, as needed basis. Penalizing Kentucky American for not meeting projected capital expenditures by applying a slippage factor of less than 100% when it occurs, and penalizing Kentucky American by not recognizing the efforts to reduce contingency costs in the planning process when expenditures exceed the plan defeats the purpose of increasing the accuracy of managing the capital construction projects.

Q. WHY HAS THE COMPANY ADJUSTED THE REVENUE REQUIREMENT FOR INCOME TAXES?

A. During the calculation of the slippage factor adjustment, Kentucky American realized there was a mathematical error in the calculation of income taxes that the calculation did not flow through in the forecasted test year, and that was exacerbated with the application of the slippage factor. Correcting this error results in an increase to the revenue requirement of $436,182.

Q. WHAT IS THE ADJUSTMENT FOR GROUP INSURANCE & OTHER BENEFITS?

A. Kentucky American determined there was a duplicated cost in the Group Insurance & Other Benefits in the forecast. Correcting this mathematical error reduces the revenue requirement by $8,783.

Q. DID THE COMPANY BECOME AWARE OF ANY CHANGES TO EXPENSE ITEMS APPLICABLE TO FORECASTED TEST-YEAR ITEMS FROM THOSE INCLUDED IN THE INITIAL FILING OF THIS RATE CASE?

A. Yes, the Company received updated actuarial information from Towers Watson regarding the pensions and OPEBs after the initial filing, for a total reduction of $84,051 to the requested revenue requirement.

Q. WHAT WAS THE RESULT OF INCLUDING THE REVISED NUMBERS FOR THESE ITEMS IN THE FORECASTED TEST YEAR REVENUE REQUIREMENT?

A. The revised pension expense resulted in a revenue requirement reduction of $35,902 and the revised OPEBs resulted in a reduction of $48,149.

Q. WOULD YOU PLEASE SUMMARIZE THE COMPANY'S RATE FILING?

A. Yes. As noted in my direct testimony, the Company filed this application for an increase in rates based upon a fully forecasted test period of 12 months ending July 31, 2014, as currently allowed by 807 KAR 5:001 Section 10(1)(b). The Commission has outlined various filing requirements concerning a forecasted test period. The Company's filing complied with all of those filing requirements. We have now updated the original schedules that support the base period as required with actual results.

Q. CAN YOU ADDRESS MR. KALCIC'S CONCERNS REGARDING TAP FEE ACCOUNTING?

A. Yes. In his direct filed testimony, Mr. Kalcic recommends that the Company should explain the tap fee accounting in the case. He had reviewed the Other Water Revenues and determined, correctly, that there was not an increase correlated to the increase in tap fees. This is because tap fees are considered contributions, not other water revenues. They are accounted for in Contributions in Aid of Construction (CIAC) in utility plant as a direct offset for meter and service line installations. The CIAC line reflects an increase through the forecasted period to include the increase in tap fees.

Q. HAVE YOU REVIEWED THE ADJUSTMENTS THAT MR. RACKERS HAS PROPOSED FOR KENTUCKY AMERICAN FORECASTED REVENUES?

A. Yes, I have.

Q. DO YOU AGREE WITH THOSE ADJUSTMENTS?

A. No, I do not. Mr. Rackers describes in his testimony that he has made adjustments to the number of Industrial, Other Public Authority, and Sale for Resale customers. As explained below and based on our review of his files, it appears that he incorrectly altered

the number of residential and commercial customers for the forecasted period. Further, Mr. Rackers made adjustments to the forecasted per customer usage for residential and commercial customers that simply project the previous year's usage. This logic would ignore any trend in water use from conservation efforts or efficiencies, and ignore any weather impact at all. The Commission has previously recognized weather normalization, and the financial risk involved with forecasted test periods that may be impacted from changing water usage trends.

Q. MR. RACKERS STATED THERE WERE MORE INDUSTRIAL, OTHER PUBLIC AUTHORITY, AND SALE FOR RESALE CUSTOMERS IN THE ACTUAL BASE PERIOD THAN WERE UTILIZED TO FORECAST REVENUES. IF THIS IS TRUE, AND THERE HAVEN'T BEEN ANY MAJOR ACCOUNTS CLOSED, WHY DID KENTUCKY AMERICAN USE FEWER CUSTOMERS IN THE FORECAST?

A. It is true that there are fewer customers in the forecasted revenue model than in the actual base period for these customer classes. In preparing the revenue model, Kentucky American attempted to identify trends in water usage for each customer class. There are three industrial customers in the base period that have historically had little to no water usage. In forecasting usage, Kentucky American felt that including these three customers skewed the efforts to identify usage trends. So the historical usage was determined by taking the total usage and dividing it by 21 customers, not 24. Likewise, Kentucky American used 21 customers in making its projections for the forecasted period. By applying 24 customers to the historical usage per customer that Kentucky American has calculated using only a customer count of 21, Mr. Rackers has overstated the usage in the

industrial class, and thus the forecasted revenues. Similarly, for Sale for Resale customers, Mr. Rackers took the historical usage per customer calculated by Kentucky American and applied it to 13 customers in the forecast. But Kentucky American has one Sale for Resale customer that has used very little water in recent years after expanding its own water treatment plant. Kentucky American took the historical usage, and divided it by 12 customers to come up with the usage per customer, thus removing the outlier. Kentucky American then used the 12 customers for the forecasted period. By applying the higher calculated usage to more customers, Mr. Rackers has also overstated the forecasted revenues in his adjustment for Sale for Resale. With regard to the Other Public Authority customers, Mr. Rackers includes 2 additional customers to the forecast based on the December 2012 customer count and 2012 usage per customer. Kentucky American has experienced a sharp decline in usage in this service classification in the last five years, primarily led by a handful of customers. Further, Kentucky American has seen continued fluctuation in the number of customers, recognizing that there are some seasonal customers that do not use water all year. Kentucky American attempted to project a more moderate decline in usage using a ten-year decline in usage per customer, but remove the fluctuation that appears to be seasonal from the projected number of customers. For example, in January 2013, the customer count was back at 531. With regard to the number of customers projected for the Other Public Authority class, I believe Kentucky American's approach is more reasonable.

Q. DO YOU AGREE WITH MR. RACKERS' PROJECTION OF THE NUMBER OF CUSTOMERS IN THE RESIDENTIAL AND COMMERCIAL CLASSES?

A. No, I do not. Although Mr. Rackers indicates that he doesn't propose an adjustment to the forecasted customers in the residential and commercial classes, his schedules do not use the same forecasted number of customers as Kentucky American does. It appears that for residential and commercial classes, he uses the July 2014 forecasted number of customers found on WP 2-2 p. 298 rather than using the number of customers in the revenue forecast file. For example, Mr. Rackers uses a residential customer count of 112,673 and a commercial count of 8,807. However, the average number of residential customers across the forecasted period is 112,015 and the average number of commercial customers across the forecasted period is 8,776. This change makes a difference of $50,163.

Q. DO YOU AGREE WITH MR. RACKERS' ADJUSTMENT TO THE CUSTOMER USAGE FOR RESIDENTIAL, COMMERCIAL, AND OPA CUSTOMERS IN REVENUE PROJECTIONS?

No, I do not. Mr. Rackers simply recommends that 2012 levels of usage per customer be used to project future usage for the residential, commercial and OPA customer classes. His approach totally ignores the influence of known and continuing drivers such as the impact of high efficiency water fixtures. Furthermore, as I will describe in detail below, Mr. Rackers simply utilizes the annual usage for a single year, and suggests that this constitutes a valid forecast. He does not adjust for the influence of summer weather on usage, and casually (and erroneously) opines that this is acceptable because "During 2012 rainfall in Kentucky was more close to normal levels" (Rackers, p. 23).

Q. BY USING HISTORIC USAGE TO PROJECT FUTURE RESIDENTIAL, COMMERCIAL AND OPA CONSUMPTION, MR. RACKERS IS SUGGESTING THAT THE WATER USAGE PER CUSTOMER WILL NOT DECLINE FURTHER. WHY ARE YOU CONFIDENT THAT THE BASE USAGE PER CUSTOMER WILL CONTINUE TO DROP IN THESE CUSTOMER CLASSES?

A. I am confident of continued decline for many reasons. First, as I explained in my Direct Testimony at pages 37-38, I have analyzed data reflecting the age of the housing stock in the communities served by Kentucky American. According to the 2010 American Housing Survey, 75% of homes in the Lexington Fayette Urban County area were built prior to 1994. The US Energy Policy Act first mandated the manufacture of low flow fixtures in 1992 and this regulation was effective as of 1994. The high prevalence of these older homes makes it likely that fixture and appliance replacements will continue to occur over time for many years to come.

Second, we have looked at quantitative analysis of the theoretical indoor usage in a fully conserving home. The basis for the calculation of usage in a fully conserving home is taken from the data presented in Exhibit LB-2 from my direct testimony in this proceeding. At full saturation of water efficient fixtures and appliances, it is estimated that indoor water usage could be reduced to 88 gallons per customer per day (gpcd). Therefore, Kentucky American residential customer use may continue to decline over time by an additional 33%, or 43 gpcd, until full saturation with water efficient fixtures is reached. How long it takes for the Kentucky American customers to reach this

theoretical threshold, or even if they will reach it, is dependent on numerous economic, demographic and price factors that will impact the conservation rates over time.

Third, the American Water Works Service Company compared the base usage of Kentucky American residential customers versus those in other states served by American Water as of 2012. This comparison shows that base usage by Pennsylvania American customers is 3% lower (and still declining) when compared to usage exhibited by Kentucky American customers. Similarly, base usage by West Virginia American customers is 7% lower (and still declining) when compared to usage exhibited by Kentucky American customers. This trend further illustrates that there is ample opportunity for the customers of Kentucky American to continue to reduce usage even further.

Q. HOW IS MR. RACKERS' ANALYSIS INFLUENCED BY SUMMER WEATHER VARIATIONS, COMPARED TO KENTUCKY AMERICAN'S ANALYSIS THAT IS "WEATHER NEUTRAL"?

A. Kentucky American's analysis is "weather neutral" because it isolates "base" (generally speaking, indoor) usage that is not weather dependent from discretionary outdoor usage that is dependent on weather during the warmer months of the year. While summer weather (and therefore discretionary outdoor usage) in any given year is random, base indoor use is showing a steady and predictable declining trend.

By averaging ten years of non-base (e.g., outdoor) usage, Kentucky American minimizes the impact of weather variation in its projection of future residential usage, and arrives at a "most likely" projection for any future year. Kentucky American then adds the historic

average outdoor usage and the trended base (indoor) usage to project future usage. It is this trend in indoor base usage which is described in detail in my direct testimony that Mr. Rackers ignores, in spite of compelling evidence that this is a strong and continuing trend.

Mr. Rackers recommends that the usage per customer actually experienced during 2012 of 4.58 and 37.2 thousand gallons for the residential and commercial classes, respectively, be used to establish rates and states that "during 2012 rainfall in Kentucky was more close to normal levels." According to the National Oceanic and Atmospheric Administration's data for Kentucky Division 3, which mostly closely represents the Kentucky American service area, the year of 2012 was the 10th warmest and 40th driest (based on 118 years of data). Furthermore, the summer of 2012 was the 47th warmest and 13th driest (also based on 118 years of data). It would be inappropriate to call any single year a "normal" usage and base a forecast solely on that year without any effort to look at recent trends. Therefore, Mr. Rackers' conclusion that it is acceptable to forecast future usage solely based on 2012 is both inappropriate and inaccurate.

Q. WHAT IS THE IMPACT OF MR. RACKERS' PROJECTIONS ON THE PROMOTION OF CONSERVATION?

A. As I have described, a significant reduction in usage per customer is occurring. These reductions have primarily occurred due to improved efficiency in usage which is clearly part of an overall trend in more resource conservation. There are other factors impacting the trend that may or may not have lasting impacts including economic conditions and smaller household sizes. But there is unquestionably a trend in less water usage. The benefits from more efficient water use by customers include better stewardship of the

water resources, energy savings both within the home and at the water utility, and the opportunity to extend the life of the existing capacity to meet projected growth within our community.

It is extremely relevant to note how closely linked water and energy conservation are. For instance, a customer that purchases a new washing machine or dishwasher will save both water and energy. With tax credits and rebate programs for energy savings, some customers are taking the opportunity to seek out more efficient appliances when it is time to replace them, even if they may not have otherwise done so. This is reducing their water usage.

Mr. Rackers recommends basing future revenue on 2012 usage. This not only dissuades Kentucky American from further efforts to promote resource conservation, it in fact punishes the Company financially for doing so.

Q. SO IN SUMMARY, DO YOU AGREE WITH MR. RACKERS' ADJUSTMENTS TO PER CUSTOMER USAGE IN THE FORECASTED PERIOD?

A. No, I absolutely do not. Mr. Rackers has taken an inappropriate position to simply use one year's per customer usage and project it going forward, without accounting for usage trends, promoting conservation, or neutralizing for weather. Kentucky American has attempted to deliberately and thoughtfully project usage with the moderate decline that it has been experiencing while also neutralizing any weather impacts. The Commission has accepted weather normalization efforts in past cases and the change for Kentucky American in this filing has only been to utilize a model that addresses declining usage in addition to weather impacts.

Q. MR. RACKERS ALSO RECOMMENDED ELIMINATING THE WORKING CAPITAL COMPONENT OF RATE BASE IN ITS ENTIRETY. DO YOU AGREE WITH THAT?

A. No, I do not. Working capital has long been recognized as a method of allowing the Company to recover the investment of funds needed for operations of the business. It recognizes that there are costs to providing service the day a customer receives that service, but the cost for providing that service is not recovered until the customer has paid the bill for that service. Over two decades ago, the Commission established a practice of allowing not only cash items, but also non-cash items, because both are still an expense for operating the business. Mr. Rackers proposes that first the working capital be revised to eliminate all non-cash items, and when that adjustment is made, the working capital component is then an immaterial item and should be eliminated altogether.

Q. HAS THE AG RECOMMENDED EXCLUDING NON-CASH EXPENSE ITEMS IN PREVIOUS KENTUCKY AMERICAN RATE CASES?

A. Yes. The AG has made similar recommendations in Kentucky American Case Nos. 2004-00103, 97-034, 95-554, and in 92-452. In each case, the Commission denied the adjustment. Kentucky American has filed this application based on this longstanding practice and believes it to be appropriate to continue.

Q. CAN YOU PLEASE EXPLAIN YOUR UNDERSTANDING OF MR. RACKERS' RECOMMENDATION OF THE ADJUSTMENT TO WORKING CAPITAL?

A. Mr. Rackers recommends excluding non-cash expenses, specifically depreciation, amortization, and deferred income taxes, as well as net income as components in the calculation of the net days of working capital requirement.

Q. CAN YOU EXPLAIN HOW THE COMPANY UTILIZED THE NON-CASH EXPENSES IN ITS CALCULATION AND WHY THAT METHODOLOGY IS CORRECT?

A. Yes. Let's start with depreciation expense. The Company's calculation presumes that the Company earned the right to receive revenue on the date that utility service was provided. However, it does not actually receive the cash for an estimated 38.55 days (the average revenue lag days [Exhibit 37 Schedule B-5.2]). The Company's calculation included depreciation and amortization expenses in the base of net operating funds with a zero lag. A zero lag is associated with the expense because the Company has reduced its investment in the underlying depreciable assets and therefore reduced its rate base. The rate base reduction presumes that the recovery of that investment from the utility customers has occurred. However, recovery has not occurred, as evidenced by the revenue lag days (38.55 days). Including the expense in the base of net operating funds with zero lag matches the rate base reduction time with the earning of revenue at the time utility service was provided and appropriately compensates the Company for the lag in the recovery of associated revenue requirement.

The Company utilized the same rationale for deferred income tax expense as it did regarding depreciation and amortization expense. The rate base reduction for accumulated deferred income taxes, similar to the reduction for accumulated depreciation and amortization, presumes that recovery from customers has occurred when it will not occur until the revenue lag days are exhausted. Therefore, including deferred income tax expense in the base of net operating funds in with zero lag days in the working capital calculation is appropriate.

Q. IS INCLUDING NON-CASH EXPENSES AN ATTEMPT TO REDEFINE THE PURPOSE OF PROVIDING WORKING CAPITAL TO THE UTILITY AS STATED BY MR. RACKERS? (RACKERS DIRECT TESTIMONY, P. 16)

A. No. To my knowledge, the Company has utilized the same methodology for calculating working capital in quite a number of rate cases up to and including this case. The Commission has previously ruled in favor of the Company to include both non-cash expenses and net income (net earnings) in the calculation with zero lag days. In its order dated November 19, 1993 regarding Case No. 92-452, the Commission noted that the Company's calculation had been previously affirmed by the Franklin Circuit Court (p. 19) and concluded that, "…including net earnings and noncash items is theoretically sound." (p. 20) In its orders dated September 11, 1996 (Case No. 95-554, p. 23) and September 30, 1997 (Case No. 97-034, p. 28) the Commission referred to its decision in the November 19, 1993 Order and reaffirmed its position regarding inclusion of non-cash expenses and net income in the working capital calculation. While Mr. Rackers refers to working capital as "cash working capital," the Commission's Standard Schedules (Schedule B-5 Working Capital Allowance) is a filing requirement for a utility in filing a forecasted test year. The Commission's use of the term "working capital allowance" is an all encompassing item in which a utility can propose to include in rate base an allowance which is necessary to bridge the gap between the time the utility provides service to its customers and the time it is paid for the service rendered to its customers.

Q. CAN YOU PLEASE EXPLAIN THE REASON FOR THE INCLUSION OF THE NET INCOME COMPONENT WITHIN THE WORKING CAPITAL CALCULATION?

A. Yes. As previously stated, the Company's calculation presumes that the Company earned the right to receive revenue on the date that utility service was provided. However, it doesn't actually receive the cash for an estimated 38.55 days (the average revenue lag days). Therefore, including a net income component with zero lag is appropriate since it compensates the Company for that revenue requirement lag.

Q. HAS THE COMPANY APPROPRIATELY CALCULATED NET INCOME WITHIN THE WORKING CAPITAL REQUIREMENT?

A. No. The Company made an error in its calculation as Mr. Rackers cites. The correct income amount should be $11,570,948 (Rate base of $385,415,083 [Exhibit 37 Schedule B-1] x Common Equity Percentage of 4.87% [Exhibit 37 Schedule J-1.1]). This results in a revised working capital requirement of $3,092,000. This revision has been included along with the update to the base period.

Q. DO YOU SEE ANY REASON FOR THE COMMISSION TO REVERSE ITS POSITION HELD IN PREVIOUS RATE CASES AND DISALLOW THE INCLUSION OF NET INCOME AND NON-CASH EXPENSES, SUCH AS DEPRECIATION AND DEFERRED INCOME TAXES IN THE CALCULATION OF WORKING CAPITAL?

A. No, I do not. If the Commission took the position that the sole purpose of cash working capital was for the provision of paying for goods and services within daily operations, then the regulatory process would have to utilize a different method to compensate the

stockholder for the revenue lag -- the time between customer service being provided, when earnings are earned, and the collection of those earnings. Including net earnings and non-cash items in the working capital allowance is not only theoretically sound, but is a straight-forward and basic approach to compensate the stockholder for the lag. If the Commission were to reverse its position on this issue, it would be unduly imposing a form of regulatory lag after it had affirmed the use of a long-standing, theoretically sound methodology that eliminates such lag.

I recommend the Commission follow its longstanding precedent and approve the Company's calculation methodology and approve $3,092,000 in working capital allowance which includes the adjustment for correcting net income noted previously.

Q. DO YOU AGREE WITH THE LFUCG IN THEIR RESPONSE TO ITEM 1 OF THE COMMISSION STAFF'S FIRST REQUEST FOR INFORMATION THAT THE NORTHERN DIVISION CONNECTION PROJECT SHOULD BE PAID FOR SOLELY BY THE CUSTOMERS OF THE NORTHERN DIVISION?

A. No, I do not. I find it ironic that the LFUCG is only interested in a scenario in which Northern Division customers share in the cost of facilities that benefit only the Central Division, while those same Northern Division Customers should bear the full burden of costs associated with facilities that provide benefit primarily to the Northern Division. Northern Division customers have been paying for Kentucky River Station II for several years. For the same reasons that KRS II costs were not assigned exclusively to the Central Division, the costs for the Northern Division Connection should not be assigned exclusively to Northern Division customers.

Single tariff pricing has been encouraged and accepted by this Commission, and should not be removed simply because the LFUCG perceives there would be a savings to their citizens by not paying for this single project. Single tariff pricing is a huge benefit to all customers in the sense that it helps ensure that the same quality of service is applied equally to all customers, and helps cost share as facilities are installed or replaced at various times. Kentucky American evaluates its infrastructure needs equally across the system and determines the priorities based on the greatest needs within the overall financial management of the Company. Former Governor Paul Patton recognized there was a need to provide access to high quality drinking water across the state and implemented a number of programs and legislative efforts to encourage that. Each administration since that time has continued those programs. The position of the LFUCG is unreasonable and inappropriate. I recommend that the Commission reject the position of the LFUCG, and continue to approve single tariff pricing without a surcharge for any individual project.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) **SS:**
COUNTY OF FAYETTE)

The undersigned, **Linda C. Bridwell,** being duly sworn, deposes and says she is the Manager of Rates and Regulation for Kentucky-American Water Company, that she has personal knowledge of the matters set forth in the foregoing testimony, and the answers contained therein are true and correct to the best of her information, knowledge, and belief.

LINDA C. BRIDWELL

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of May, 2013.

(SEAL)
Notary Public

My Commission Expires:

10/3/2016

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	)	
	)	
THE APPLICATION OF KENTUCKY-AMERICAN	)	CASE NO. 2012-00520
WATER COMPANY FOR AN ADJUSTMENT OF	)	
RATES ON AND AFTER JANUARY 27, 2013	)	

REBUTTAL TESTIMONY OF
PAUL R. HERBERT

CONCERNING
COST OF SERVICE ALLOCATION
AND
CUSTOMER RATE DESIGN

Filed: May 15, 2013

BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION

RE: KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2012-00520

REBUTTAL TESTIMONY OF PAUL R. HERBERT

Line
No.

Q. Please state your name and address.

A. My name is Paul R. Herbert. My business address is 207 Senate Avenue, Camp Hill, Pennsylvania.

Q. Are you the same Paul R. Herbert that submitted direct testimony in this proceeding?

A. Yes, I am. My direct testimony was submitted on December 28, 2012.

Q. What is the subject of your rebuttal testimony?

A. I will address certain rate design issues presented in the direct testimony submitted by AG/LFUCG witness Brian Kalcic and Community Action Committee (CAC) witness Jack Burch.

Q. Please address Mr. Kalcic's testimony.

A. Mr. Kalcic agrees with my cost of service study and approves of my proposed revenue distribution. The main difference in our rate designs is that Mr. Kalcic uses Mr. Rackers' recommended revenue requirement with an overall increase of $2,485,170, or 2.9%, and I used the Company's proposed revenue requirement with an overall increase of $12,317,522, or 14.6%. Mr. Kalcic generally used the same relative increases by customer classification as I did. This is demonstrated by

comparing Mr. Kalcic's column 5 of Schedule BK-1 (Company proposal), with column 5 of Schedule BK-3 (AG/LFUCG proposal).

Q. Mr. Kalcic states that the Company's proposed revenue distribution is cost-based because all classes move toward their respective cost of service by decreasing the subsidies under proposed rates. Is it necessary to eliminate all subsidies under proposed rates?

A. No, it is not. The Company's proposal moves revenues toward the indicated cost of service without excessive increases to any one class of customers. This is commonly referred to as gradualism, which is frequently considered in the design of a proposed rate structure.

Q. Do you agree with Mr. Kalcic that the increase to customer charges should be much greater than the overall increase in this case?

A. Yes, I do. Based on my analysis of customer costs shown in Exhibit 36, page 45 of 46, the customer cost for a 5/8-inch meter is $14.86 per month. Based on that analysis, I recommended that the customer charge for a 5/8-inch meter increase from $8.90 per month to $14.00 per month or 57.3%, compared to an overall increase in water sales of 14.6% - a factor of about 3.9 times the overall increase. Mr. Kalcic limited his increase to customer charges to 10.7% to avoid any decrease in consumption charges. The 10.7% increase to customer charges compared to his overall increase to water sales revenue of 2.5% is a factor of about 4.3 times.

Q. What do you propose with respect to any scale-back of the Company's original revenue increase proposal?

A. Based on my analysis of customer costs of $14.86 per month for a 5/8-inch meter, any scale-back to the Company's original proposal should only be to the

consumption charges. The customer charges should remain as-filed, at the $14.00 per month (per 5/8-inch meter) level.

Q. Why should the customer charges remain unchanged from the Company's original proposal?

A. It is not likely that the customer cost analysis under a reduced revenue requirement level would fall below $14.00 per month. Therefore, the customer charges should remain unchanged even if that results in slightly lower consumption charges than existing rates.

Q. Please address Mr. Burch's testimony with regard to rate design.

A. Mr. Burch is concerned about the effect of the rate increase on low-income customers. His solution is to propose an increasing tier block structure so that the initial usage is priced at zero or at a very low rate.

Q. Is Mr. Burch's solution cost-based or the most equitable?

A. No, it is not. First, an increasing block rate structure with the initial usage priced very low or at zero is simply not cost-based. Since customer charges only recover customer costs, the only way to recover the fixed and variable costs of delivering water (intake structures, treatment plants, pumping stations, storage facilities, pipes, power, chemicals, labor, etc.) is to recover such costs in the volume charges. So the initial usage for each customer is the most expensive water that is delivered, not the lowest.

Second, instead of targeting low-income customers, Mr. Burch's solution would give the same break to all customers, even those that can afford the full rate. This places an increased burden on customers that cannot conserve at or below the

initial block, such as customers with home gardens or large families who may also be low-income.

Third, increasing block rate structures are mainly found in areas where there is short supply, such as ground water sources where drought conditions are frequent (New Mexico, Arizona, California and other western states). The New Jersey proposal, mentioned by Mr. Burch, was only a 5% discount on the first block rate for summer usage only (May through September). This proposal was rejected by the opposing parties in the case and did not become effective.

Q. What approach would you propose to address the low-income customers?

A. My approach would be a discount to the customer charge applicable only to low-income customers. Of course, any lost revenue would have to be recovered with slightly higher rates to other residential customers who do not qualify as low-income.

Q. Does this conclude you rebuttal testimony?

A. Yes, it does.

VERIFICATION

COMMONWEALTH OF PENNSYLVANIA)
) **SS:**
COUNTY OF CUMBERLAND)

The undersigned, **Paul R. Herbert,** being duly sworn, deposes and says he is employed by Gannett Fleming, Inc., that he has personal knowledge of the matters set forth in the foregoing testimony, and the answers contained therein are true and correct to the best of his information, knowledge, and belief.

Paul R Herbert
PAUL R. HERBERT

Subscribed and sworn to before me, a Notary Public in and before said County and Commonwealth, this 10th day of May, 2013.

(SEAL)
Notary Public

My Commission Expires:
February 20, 2015

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Cheryl Ann Rutter, Notary Public
East Pennsboro Twp., Cumberland County
My Commission Expires Feb. 20, 2015
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	**)**	
	)	
THE APPLICATION OF KENTUCKY-AMERICAN	**)**	**CASE NO. 2012-00520**
WATER COMPANY FOR AN ADJUSTMENT OF	**)**	
RATES ON AND AFTER JANUARY 27, 2013	**)**	

REBUTTAL TESTIMONY OF
CARL MEYERS
Filed May 15, 2013

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Carl R. Meyers and my business address is 131 Woodcrest Road, Cherry Hill, NJ 08003.

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

A. I am employed by American Water Works Company, Inc. ("AWW") as Director of Income Tax.

Q. HAVE YOU PREVIOUSLY FILED TESTIMONY BEFORE THIS OR ANY OTHER COMMISSION?

A. Yes. While I have never testified before the Kentucky Public Service Commission ("PSC"), I have testified before the California Public Utilities Commission.

Q. PLEASE STATE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I received a B.S. degree in Accounting from Rowan University and I am a Certified Public Accountant. I have 20 years of tax and accounting experience with approximately 5 years in the utility industry. Previous to AWW, I worked in public accounting, including employment with both Ernst & Young and Pricewaterhouse Coopers.

Q. WHAT ARE YOUR DUTIES AS DIRECTOR OF INCOME TAX?

A. I am primarily responsible for the preparation of the federal and state income tax returns and related reports to ensure AWW is in compliance with all federal, state and local tax laws and regulations. I am also responsible for the preparation of all the consolidated tax accounting schedules, statements and reconciliations. In addition, I provide advice and assistance to corporate management and the subsidiary companies personnel in other tax matters and planning.

Q. DID YOU FILE DIRECT TESTIMONY IN THIS CASE?

A. No, I did not. I am filing rebuttal testimony on behalf of Kentucky-American Water Company ("KAW" or the "Company") in order to respond to Mr. Stephen Rackers' direct testimony on FIN 48 related to the repairs tax deduction.

REPAIRS TAX DEDUCTION

Q. WHAT WAS THE PSC'S DECISION WITH REGARD TO THE TREATMENT OF THE REPAIRS TAX DEDUCTION IN THE LAST CASE?

A. In KAW's most recent rate case, Case No. 2010-00036, the PSC authorized the treatment of the FIN 48 as KAW has presented in this case. The Commission's final Order in Case No. 2010-00036 stated on page 20, "We…decline to adopt the AG's proposed adjustment…No party challenges the reasonableness of this determination or the appropriateness of establishing a reserve in the event of an adverse IRS ruling. Kentucky-American's action, moreover, is consistent with FIN 48. If the IRS ultimately allows the deduction or the statute of limitations expires without a challenge to the deduction, ratepayers and shareholders will benefit from the tax deferral. If the IRS disallows Kentucky-American's deduction, Kentucky-American has stated that it will not seek recovery for interest and penalties imposed by the IRS and the ratepayers will not be negatively affected."

Q. DOES MR. RACKERS' CURRENT RECOMMENDATION CONTRADICT THE DECISION IN THE LAST CASE?

A. Yes. Mr. Rackers wants ADIT included in the rate base calculation without the effect of the FIN 48 reserve on the repairs deduction taken, but will allow recovery of the interest.

Q. DO YOU AGREE WITH MR. RACKERS' CURRENT PROPOSAL?

A. No.

Q. WHY DON'T YOU AGREE WITH MR. RACKERS' PROPOSAL TO REVISE THE FIN 48 TREATMENT?

A. ADIT accounts for the expected future tax consequences of events that have been recognized in the financial statements or tax return. The ADIT needs to be reported at the amount realizable by the Company. FIN 48 requires a company to look at its tax positions and if questionable, make adjustments, if necessary, in order to report its current financial statements with the most accurate tax balances. FIN 48 entries represent the incremental quantity of tax that the Company and its auditors have concluded will most likely be owed with respect to previously filed tax returns. FIN 48 specifies the criteria for reporting the amount of the reserve. It does not allow the reserve to be included in ADIT, though, because it is a tax liability. Using an ADIT balance that is known to be wrong because it includes an uncertain tax position (without the adjustment for the FIN 48 reserve) does not present the best tax balances for use in the rate case.

Q. MR. RACKERS MAKES THE COMMENT THAT IF KAW IS ALLOWED "TO REFLECT A FIN 48 RESERVE IN THE DETERMINATION OF [THE] REVENUE REQUIREMENT [IT] PROVIDES A DEFINITE INCENTIVE TO THE COMPANY TO REFLECT THE MAXIMUM AMOUNT POSSIBLE". IS THIS TRUE?

A. No. The Company cannot pick and choose a FIN 48 reserve amount. It is calculated based on the rules of FIN 48 and audited by external auditors for reasonableness and compliance with the standard. Per FIN 48, paragraph 8, "A tax position that meets the more-likely-than-not recognition threshold shall initially and subsequently be measured

as the largest amount of tax benefit that is greater than 50 percent likely of being realized upon settlement with a taxing authority that has full knowledge of all relevant information. Measurement of a tax position that meets the more-likely-than-not recognition threshold shall consider the amounts and probabilities of the outcomes that could be realized upon settlement using the facts, circumstances, and information available at the reporting date."

Q. CAN THE COMPANY CHOOSE A DIFFERENT PROCESS TO CALCULATE AND RECORD FIN 48?

A. No. All companies must follow the guidelines set in the pronouncement.

Q. DO THE GUIDELINES ENSURE A COMPANY RECORDS THE EXACT AMOUNT OF THE LIABILITY?

A. No, but it is the process best determined to present the financial statements reasonably and accurately.

Q. CAN THE FIN 48 AMOUNT BE CHANGED?

A. The recognition and measurement can only be changed if the Company has new information to evaluate. It cannot got back and re-evaluate the same information again. True ups, though, to the liability can and should be booked when determined.

Q. IS RATE BASE CONSIDERED WHEN CALCULATING FIN 48?

A. No. Rate base is not considered in the calculation of FIN 48. It is not the intent of the Company to maximize rate base with its FIN 48 reserve. FIN 48 is booked according to Generally Accepted Accounting Practices ("GAAP").

Q. MR. RACKERS PROVIDES AN ALTERNATIVE RECOMMENDATION. IS THE ALTERNATIVE ACCEPTABLE?

A. No.

Q. WHY?

A. Primarily because of the statements made above regarding ADIT needing to be reported at its realizable amount. The ADIT used in the rate case should be the amount able to be sustained by the Company. In addition, the Company does not know when the FIN 48 will be resolved so it cannot project the future potential annual interest cost it will have to pay. It is possible that IRS guidance will be issued in 2013, but it is not known for sure. In addition, it is not certain that resolution will come when the guidance is issued or if it will come with an audit, and it is not known if the Company will be audited, when, or how long it will take to resolve.

Q. WHAT DOES THE COMPANY RECOMMEND FOR THIS RATE CASE?

A. KAW recommends that the Commission continue following its Order in the prior rate case. ADIT should reflect what the Company determines it will sustain under an audit based on the guidelines set by GAAP. The tax law is unclear. At each reporting date, the Company is making its best estimate of its liability to the IRS. It is required to record any uncertain tax positions, such as for its repairs deduction, based on GAAP. The information is audited by external auditors, who have represented that the Company's audited financial statements are not materially misstated. We believe that allowing the ADIT balance to remain in the rate case, as would be shown in the financial statements, will present the rate case with the best possible amounts and most likely minimize any true up to rate base in a future case once this issue is resolved.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

VERIFICATION

STATE OF NEW JERSEY)
) **SS:**
COUNTY OF CAMDEN)

The undersigned, **Carl Meyers,** being duly sworn, deposes and says he is the Tax Director for American Water Works Company, Inc., that he has personal knowledge of the matters set forth in the foregoing testimony, and the answers contained therein are true and correct to the best of his information, knowledge, and belief.

CARL MEYERS

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of May, 2013.

(SEAL)
Notary Public

My Commission Expires:

JACLYN D MARTELL
NOTARY PUBLIC
NEW JERSEY
MY COMMISSION EXPIRES 10-22-2013

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	**)**	
	)	
THE APPLICATION OF KENTUCKY-AMERICAN	**)**	**CASE NO. 2012-00520**
WATER COMPANY FOR AN ADJUSTMENT OF	**)**	
RATES ON AND AFTER JANUARY 27, 2013	**)**	

REBUTTAL TESTIMONY OF CHERYL D. NORTON

May 15, 2013

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS AND WHETHER YOU FILED DIRECT TESTIMONY IN THIS CASE.

A. My name is Cheryl D. Norton and my business address is 2300 Richmond Road, Lexington, Kentucky 40502. I am President of Kentucky-American Water Company ("KAW" or "Company"). I filed Direct Testimony on December 28, 2012 in support of the Company's Application.

Q. HAVE YOU REVIEWED THE TESTIMONY OF JACK BURCH FILED ON BEHALF OF COMMUNITY ACTION COUNCIL ("CAC") AND BILL O'MARA FILED ON BEHALF OF LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT ("LFUCG") AND DO YOU HAVE COMMENTS ON THOSE TESTIMONIES?

A. Yes, I have reviewed Messrs. Burch's and O'Mara's testimonies and I do have comments. I have also reviewed the data responses CAC and LFUCG filed in this matter in response to Commission Staff's and KAW's discovery requests.

Q. WHAT ARE YOUR COMMENTS ON MR. BURCH'S TESTIMONY?

A. I was both intrigued and disappointed to read that Mr. Burch believes that KAW has somehow been "not helpful" in attempting to provide relief to low-income customers. On the contrary, KAW shareholders have made significant contributions to low-income assistance programs over the years. Those contributions are reflected, in part, in the table on page 8 of Mr. Burch's testimony. Additionally, as long ago as KAW's 2004 rate case, KAW proposed a low-income discount that would have been available to KAW's low-income customers. Unfortunately, the Attorney General opposed the proposal on the

basis that it violated Kentucky law that prohibits "discrimination" in utility rates and the Commission agreed with the Attorney General when it decided KAW's 2004 rate case.

Q. IS KAW STILL WILLING TO PROVIDE ITS LOW-INCOME CUSTOMERS ASSISTANCE?

A. Absolutely. Although I was not employed at KAW during its 2010 rate case, it is my understanding that KAW committed in that proceeding to work with CAC to promote legislation that specifically allows some form of a discount for low-income water customers. KAW believes that such legislation is the best and most direct way to provide assistance to low-income customers. Given the Attorney General's opposition to a low-income discount in 2004 and the Commission's agreement with that opposition, it is clear that legislation is a necessary and focused way to provide assistance because it is the most direct way to solve the problem created by Kentucky law's prohibition against discrimination in rates.

Q. AFTER KAW'S 2010 RATE CASE, DID KAW MAKE GOOD ON ITS COMMITMENT TO WORK WITH CAC ON A LEGISLATIVE SOLUTION?

A. Yes. When the Commission decided KAW's 2010 rate case, it ordered KAW to initiate a collaborative effort to address the issue of low-income assistance. Of course, KAW did initiate that effort which included CAC, the Attorney General and LFUCG. Initiation of that effort led to a series of meetings among the parties. At those meetings, KAW explained that a legislative solution is the best and most direct way to provide assistance. First, a legislative solution would remove the

legal roadblock encountered in the 2004 KAW rate case. Second, it would put water customers on equal footing with electric and gas customers in terms of their ability to receive rate assistance.

Q. DID THE PARTIES TO THOSE MEETINGS PARTICIPATE IN AND SUPPORT A LEGISLATIVE SOLUTION?

A. Yes. As a result of the first meeting, the parties began the task of drafting and circulating a proposed statute. This effort (there were approximately four meetings) continued during most of 2011 and KAW believed that the parties supported a legislative solution.

Q. WHAT HAPPENED TO THE LEGISLATIVE SOLUTION IN 2011 AND 2012?

A. In late 2011, unfortunately, it became apparent that the legislation we had all been working on would not be fully supported. Without that full support, it was not introduced during the 2012 General Assembly. Up until that time, KAW believed that the legislation that the parties drafted would have the parties' support after introduction in the 2012 General Assembly. When it became clear that was not going to be the case, neither CAC, the Attorney General nor KAW took meaningful steps towards having the legislation introduced in the 2012 General Assembly. Near the end of 2012, the parties held another meeting to explore the possibility of introducing the proposed legislation in the 2013 General Assembly. Unfortunately, although KAW believed and continues to believe the proposed legislation should be introduced in the General Assembly, it was again apparent that the legislation would not be fully supported by the parties. The absence of

full support from both the Attorney General and CAC is puzzling. The passage of the drafted legislation would put KAW on equal footing with its sister companies that operate in states that, in one way or another, are not faced with the legal obstacle presented by Kentucky's prohibition against discriminatory rates. Removal of that obstacle would provide the most direct and focused method of providing assistance to low-income customers. Additionally, the passage of legislation would put KAW's low-income customers on equal footing with low-income gas and electric customers in Kentucky, who, due to legislation, are eligible to receive discounts that water customers cannot.

Q. PLEASE RESPOND TO MR. O'MARA'S STATEMENT THAT KAW'S DECISION TO TERMINATE ITS BILLING SERVICES ARRANGEMENT WITH LFUCG HAS NOT BENEFITED THE CITIZENS OF LEXINGTON.

A. Mr. O'Mara restricts his analysis of the benefits arising from the termination of the billing services arrangement to the annual cost difference between the two vendors with which LFUCG contracted and the amounts LFUCG was paying KAW for similar services. As he is an employee of LFUCG, we understand that this is Mr. O'Mara's primary interest, but KAW's decision to terminate the billing contracts and the benefits arising from that decision are broader than Mr. O'Mara acknowledges.

KAW is a *water* company – it is not a billing services provider or billing collection company. Our chief aim is to provide high quality water at a reasonable cost to our customers and we necessarily perform billing and

collection services as part of our business to further that mission. In our effort to provide service at a reasonable cost, KAW evaluates opportunities to perform ancillary services, including the billing services we provided to LFUCG. These services, however, are subordinate to our provision of water service, which means that KAW will only engage in these auxiliary business functions if they do not impede or adversely affect our core business objective of reliably providing high quality water.

The benefits to our customers as a result of terminating the third party billing arrangement include reduced Company labor and labor-related costs and an overall lower cost for the Business Transformation project. The estimated $254,635 in annual customer savings was documented in response to Item No. 78 of the Commission's Second Request for Information.

Additional benefits include fewer late fees and reconnection charges. Since discontinuing third party billing, the Company has seen a nearly 37% drop in the number of shut-offs and fewer late fees charged than anticipated by roughly 16%. In other words, when presented a bill containing only KAW's services, a greater number of customers are timely paying their bills, incurring fewer charges, and enjoying fewer interruptions to their water service as a result.

Another benefit resulting from terminating third party billing is that our bills are easier for customers to understand. While KAW previously made a business decision to perform third-party billing services for LFUCG, the burgeoning complexity of the services provided, coupled with LFUCG's actual and anticipated rate and fee increases, led KAW to determine that this ancillary

service detracted from KAW's provision of water service by causing undue confusion among our customers regarding the true cost of water service. KAW frequently received calls from customers regarding their sewer service and the documents KAW produced in response to a Commission Staff data request demonstrate that LFUCG similarly received calls from customers regarding their water service. It was clear to KAW that customers were confused about the services they were receiving because of the third party billing services KAW was performing for LFUCG.

We are very proud that the average residential customer pays less than one penny for a gallon of water and we felt that engaging in third party billing services prevented our customers from understanding the value of the service we provide. Eliminating the confusion among our customers regarding the true price of water, which is our core business, is a benefit of terminating the billing services arrangement with LFUCG.

Q. ARE THERE OTHER BENEFITS FROM TERMINATING THE BILLING SERVICES ARRANGEMENT?

A. Yes. Ending the billing services agreement eliminated the obscured price signals our customers were receiving regarding their efficiency efforts. We continue to stress the importance of water efficiency, but by including fees, such as the water quality management fee and landfill fee that are not based on water consumption on our customers' water bills customers were unable to properly gauge the benefit of their efforts. KAW is a *water* company and we believe it is our duty to

provide high quality water, and to encourage water efficiency by properly conveying price signals.

The Company believes that all of our customers, including those residing in Lexington, have benefited from our decision to terminate the third party billing contracts. Although KAW fully assisted LFUCG in their transition to a new billing services provider, which included extending KAW's termination date, KAW had no control over the fact that LFUCG is now paying more for the services KAW previously provided. Moreover, KAW has no control over how LFUCG recovers these costs. While LFUCG may be paying more for these services on an annual basis, that is not the means by which to measure the prudence of KAW's decision or the benefits to its customers.

Q. DO YOU AGREE WITH STEPHEN RACKERS' CONTENTION THAT KAW HAS AN "OBLIGATION TO SEEK OUT OPPORTUNITIES TO USE UTILITY EMPLOYEES AND ASSETS TO GENERATE ANCILLARY REVENUES?"

A. No, I do not believe KAW has an obligation to engage in services unrelated to the provision of water simply to generate additional revenues, especially when the activity detracts from the perceived value, bill clarity, and pricing signals of the water service KAW is providing. As I explained above, KAW evaluates opportunities to perform ancillary services, but KAW's good faith willingness to do so should not be considered a mandate to undertake all possible services perpetually. Mr. Rackers does not cite any statutory or regulatory authority to

support his argument that KAW is obligated to perform ancillary and/or non-regulated business services.

It is important that the Commission understand the critical difference between KAW's willingness to evaluate these opportunities with Mr. Rackers' punitive characterization of these opportunities as an obligation, eliminating KAW's right to choose to engage in these services. If Mr. Rackers' characterization is accepted, KAW could be found to have an obligation to use its employees and assets to engage in a host of auxiliary services – from reading meters for other utilities to requiring its public relations staff to perform projects for other companies. While these examples may seem extreme, these examples are no different than financially penalizing KAW for not participating in third party billing contracts. The only difference is that KAW previously found this ancillary service beneficial to our customers, but later determined that it conflicted with our ability to provide water service as transparently as possible.

Q. DO YOU AGREE WITH MR. RACKERS THAT KAW CUSTOMERS "SHOULD RECEIVE SOME COMPENSATION FOR THE LOST BILLING REVENUES?"

A. No, because I disagree with the premise on which Mr. Rackers' claim is based and customers are already benefiting from a reduced revenue requirement, fewer fees and charges, and fewer service interruptions. During the period that KAW provided third party billing services for LFUCG, KAW included all of the revenues from the arrangement as an above-the-line discount to the revenue requirement. Because of the changing nature of the fees, coupled with the

confusion demonstrated by our customers, KAW is no longer providing the discount to customers. Mr. Rackers mischaracterizes the discount as a credit to which customers are perpetually entitled, even though no utility, including KAW, is required to continue any and all revenue streams.

Q. PLEASE EXPLAIN WHAT YOU MEAN BY THE CHANGING NATURE OF LFUCG'S FEES.

A. Since 2008, LFUCG's sewer fees have increased every year.[1] Similarly, LFUCG instituted a water quality management fee in 2010, and increased the fee in 2011 and 2012.[2] LFUCG admitted in discovery that it anticipates future increases as a result of the consent decree it entered into with the United States Environmental Protection Agency.[3] In fact, the documents produced demonstrate that LFUCG expects to increase its rates significantly by 2024 to fund over $591 million in capital projects to comply with the consent decree (and over $30 million in additional flood/storm related capital projects), causing the average sewer bill to increase from $30.00 in 2012 to $71.00 by 2025.[4] This means that LFUCG will have annual rate increases of 5% to 10% for the next decade.[5] Additionally, a working group has been established to consider funding changes to waste management services, which includes the landfill user fee.[6]

The rate and fee increases that LFUCG instituted while KAWC was providing billing services made it appear as if customers' water bills were

[1] *See* LFUCG's Response to Item No. 13 of KAW's Data Requests for Information.
[2] *Id.*
[3] *See* LFUCG's Response to Item No. 10 of KAW's Data Requests for Information.
[4] *Id.*; LFUCG's Response to Item No. 15 of KAW's Data Requests for Information.
[5] *See* LFUCG's Response to Item No. 10 of KAW's Data Requests for Information.
[6] LFUCG's Response to Item No. 11 of KAW's Data Requests for Information.

increasing. Because LFUCG's rates and fees are not regulated by the Commission, customers' notice of the increases and the opportunity to participate in public comment meetings is not the same as when KAW seeks to adjust its rates, further adding to a customer's lack of understanding regarding the charges and fees set forth on their water bill. For example, between January 2008 and December 2010, a Lexington resident using 4.5 thousand gallons of water experienced a bill increase of $15.53 due to city service charge increases, and $10.78 due to water service fee increases. KAW believes it is important that customers understand the cost of water, as well as the cost of the services it is receiving from LFUCG, particularly when LFUCG's rates and fees continue to increase annually.

Q. HAS KAW MINIMIZED THE FINANCIAL EFFECT OF NO LONGER RECEIVING REVENUES FOR BILLING SERVICES?

A. Yes. As explained in response to Item 30 of the Commission Staff's Third Request for Information, KAW was able to eliminate a full-time position associated with managing the contract with LFUCG, and avoided Business Transformation ("BT") capital software costs, fees, and charges by terminating the bill services arrangement. It is important to understand there were operation and maintenance expenses associated with performing the billing services that have been eliminated, in addition to avoiding increasing the capital costs associated with BT.

Q. DO YOU AGREE WITH MR. RACKERS' SUGGESTION THAT KAW CUSTOMERS DESERVE A CREDIT FOR THE COST OF BT BECAUSE KAW DISCONTINUED THIRD PARTY BILLING?

A. No. As KAW explained to LFUCG during the termination process, as well as throughout this proceeding, the reasons supporting KAW's termination of its third party billing contracts were manifold. The expiration of the existing contract coincided with the BT project. While it is true that renewing the LFUCG contract would have resulted in additional cost increases to customers related to system configuration, data cleansing, testing, implementation and on-going program and server maintenance because of the BT project, avoidance of these costs certainly is not the only reason that KAW terminated providing billing services to third parties.

As explained above, LFUCG's rates and fees have increased and are expected to increase each year in the next decade. The confusion regarding the price of the service KAW provides, as differentiated from the services LFUCG provides, was a growing concern. Regardless of the fact that various American Water operating subsidiaries were collectively able to avoid additional BT cost increases by ending billing services agreements, the circumstances surrounding LFUCG's rates and fees were specific and unique to KAW. It was KAW's leadership that made this difficult decision, but we continue to believe it was in the best interest of our customers.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF FAYETTE)

The undersigned, **Cheryl D. Norton,** being duly sworn, deposes and says she is the President of Kentucky-American Water Company, that she has personal knowledge of the matters set forth in the foregoing testimony, and the answers contained therein are true and correct to the best of her information, knowledge, and belief.

Cheryl D. Norton
CHERYL D. NORTON

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of May, 2013.

Peggy A. Stone (SEAL)
Notary Public

My Commission Expires:

10/3/2016

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	**)**	
	)	
THE APPLICATION OF KENTUCKY-AMERICAN WATER COMPANY FOR AN ADJUSTMENT OF RATES ON AND AFTER JANUARY 27, 2013	**)**	**CASE NO. 2012-00520**

REBUTTAL TESTIMONY OF SCOTT W. RUNGREN

May 15, 2013

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Scott Rungren. My business address is 727 Craig Road, St. Louis, Missouri 63141.

Q. DID YOU PREVIOUSLY FILE DIRECT TESTIMONY IN THIS CASE?

A. Yes, I did.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to:

- describe Kentucky American Water Company's ("KAW" or "the Company") updates to the capital structure and weighted average cost of capital ("WACC") filed with the Commission on May 15, 2013. These revisions impact both the base period ending March 31, 2013 and the forecast period, which is based on the twelve months ending July 31, 2014;
- address the change to income tax expense for the forecast period ending July 31, 2014; and,
- respond to the Direct Testimony of AG and LFUCG witness J. Randall Woolridge as it pertains to KAW's costs of short-term debt and long-term debt used in the WACC calculation.

Q. DID YOU PREPARE, OR CAUSE TO BE PREPARED UNDER YOUR DIRECTION AND SUPERVISION, THE EXHIBITS THAT YOU ARE SPONSORING?

A. Yes, I did.

BASE PERIOD CORRECTIONS AND UPDATES TO CAPITAL STRUCTURE & WACC

Q. PLEASE EXPLAIN THE CORRECTIONS YOU HAVE MADE TO THE COMPANY'S CAPITAL STRUCTURE FOR THE BASE PERIOD ENDING MARCH 31, 2013.

A. The common equity balance as of March 31, 2013, as shown on page 2 of Exhibit 37, Schedule J-1, was incorrectly reported as $157,723,157. The correct balance should have been $161,672,857. This was due to an incorrect cell reference in the spreadsheet used to calculate Schedule J-1. However, the Company has provided the actual common equity balance at March 31, 2013 as part of its update filing in this proceeding. That balance is $159,551,101, as shown on attached Exhibit SWR-1.

In addition, there was an error in the embedded cost of long-term debt. The embedded cost of 5.87% shown on Exhibit 37, Schedule J-3, page 3, was incorrect due to errors in the individual cost rates for each debt issue. These errors have been corrected, and as discussed below the balance has been updated, resulting in a revised embedded cost of long-term debt of 6.19%. This is also shown on attached Exhibit SWR-1.

Q. PLEASE EXPLAIN HOW YOU HAVE UPDATED THE COMPANY'S CAPITAL STRUCTURE FOR THE BASE PERIOD ENDING MARCH 31, 2013.

A. The Company's budget for the base period ending March 31, 2013 included a long-term debt issuance in the amount of $8 million. The Company chose to defer that issuance to May 2013. Thus, that debt issuance and its associated costs have been removed from the calculation of the Company's cost of long-term debt as of March 31, 2013. Removing that debt issuance and correcting for the errors in the long-term debt cost calculation discussed previously results in a revised embedded cost of long-term debt of 6.19% for

the base period ending March 31, 2013. This is shown on updated Exhibit 37, Schedules J-3, page 2 of 2, and J-1, page 2 of 2, and also on attached Exhibit SWR-1.

Q. WHAT IS THE UPDATED MARCH 31, 2013 CAPITAL STRUCTURE AND WACC?

A. The updated capital structure at March 31, 2013 is attached to this testimony as Exhibit SWR-1 and is also included on Schedule J-1, page 2 of 2, of Exhibit 37 in the updated filing documents. Exhibit SWR- 1 indicates the updated March 31, 2013 capital structure is comprised of 3.600% short-term debt, 51.250% long-term debt (54.850% total debt), 1.234% preferred stock, and 43.917% common equity. The resulting weighted average cost of capital is 8.080%.

FORECAST PERIOD REVISIONS TO CAPITAL STRUCTURE & WACC

Q. PLEASE EXPLAIN THE REVISIONS YOU HAVE MADE TO THE COMPANY'S CAPITAL STRUCTURE FOR THE FORECAST PERIOD ENDING JULY 31, 2014.

A. The revisions pertain to the following five areas:

1) Updating the long-term debt schedule to reflect the deferral to May 15, 2013 of the $8 million issuance originally planned for November 2012;
2) Updating the long-term debt schedule to reflect the deferral to November 2013 of the $3 million issuance originally planned for May 2013;
3) Updating the interest rate and issuance cost projections for the planned long-term debt issuances in May 2013, November 2013, and May 2014;
4) Updating the Company's projection for the cost of short-term debt; and

5) Providing an updated WACC based on the revisions noted in items 1 through 3 above.

Q. PLEASE DISCUSS THE DEFERRAL OF THE $8 MILLION LONG-TERM DEBT ISSUE THAT WAS PLANNED FOR NOVEMBER 2012.

A. The Company's 2012 budget included an $8 million long-term debt issuance scheduled for November. As the issuance date drew near, the Company determined that the financing was not needed at that time, and could be postponed until the next scheduled debt issuance, which is May 2013. On May 15, 2013, KAW issued a new Promissory Note to American Water Capital Corp. ("AWCC") in the amount of $7.859 million, which is slightly less than the planned $8 million. The new Note has a maturity date of October 15, 2037, and the interest rate is 4.00%. As a result of moving the November 2012 issuance to May 2013, the $3 million debt issuance previously planned for May 2013 has been rescheduled to November 2013, and added to the $3 million that was previously scheduled for November. Thus, the November 2013 long-term debt financing is now planned to be $6 million. The plan to issue $3 million in May 2014 has not changed.

Q. HAVE YOU UPDATED THE TERMS OF THE LONG-TERM DEBT ISSUANCES PLANNED FOR NOVEMBER 2013 AND MAY 2014?

A. Yes, I have. The updated projected interest rates for the November 2013 and May 2014 issuances are 4.49% and 4.62%, respectively. These projections are shown on Exhibit SWR-3 attached to this testimony. The base rates for these estimates are 3.39% and 3.52. To those rates 1.10% was added to capture the estimated spread at which AWCC debt has recently traded in the secondary market relative to the 30-year U.S. Treasury rate. The

long-term debt issuance costs, which were projected to be 3.0% of the issue amount in the Company's direct case, have been revised to 1.02%, which was the actual issuance cost rate for AWCC's 2012 debt issuance. Both debt issuances are assumed to be taxable instruments with 30-year terms.

Q. WHAT IS KAW'S UPDATED OVERALL COST OF LONG-TERM DEBT FOR THE FORECAST PERIOD?

A. As shown on Exhibit SWR-2 attached to this testimony, the updated overall cost of long-term debt is 6.06% for the 13-month average forecast period ending July 31, 2014. This updated long-term debt cost is also included in the updated filing documents on Schedules J-1.1/J-1.2 of Exhibit 37.

Q. HAVE YOU ALSO UPDATED KAW'S PROJECTED COST OF SHORT-TERM DEBT FOR THE FORECAST PERIOD?

A. Yes, I have. The updated short-term debt cost projection is 0.50%, as shown on attached Exhibit SWR-4. This cost rate is applicable to the short-term debt balance as of July 31, 2014 and the 13-month average forecasted short-term debt balance for the period ending July 31, 2014. This updated short-term debt cost is included in the updated filing documents on Schedules J-1 and J-2 of Exhibit 37.

Q. WHAT IS THE UPDATED WACC FOR KAW?

A. As a result of the revisions to the Company's capital structure and costs of short-term and long-term debt discussed above, the Company's updated overall weighted average cost of capital is 8.12% for the 13-month average forecasted period ending July 31, 2014, as shown on Exhibit SWR-2 attached to this testimony. The Company's complete capital structure and cost of capital presentation is shown in the updated filing documents on

Schedules J-1 through J-4 to Exhibit 37. The Company continues to request that its return on equity ("ROE") be set at 10.9%, which is within the ROE range recommended by Company witness Dr. James Vander Weide.

INCOME TAXES

Q. PLEASE EXPLAIN THE UPDATE TO INCOME TAX EXPENSE IN THE FORECAST PERIOD.

A. The Company's forecasted income tax expense has changed due to the impact of changes to various expenses, including several slippage-related items such as depreciation, cost of removal, and property tax. Forecasted income tax expense has also changed due to revisions to items such as revenues, pension, miscellaneous expense, group insurance, and other benefits. In addition, the slippage revision corrected a formula error in the original filing that was causing an understatement to deferred tax expense. The updates to income tax expense for the forecast period are shown on updated Schedule E-1.3 (Federal) and E-1.4 (State) of Exhibit 37.

RESPONSE TO OAG AND LFUCG WITNESS J. RANDALL WOOLRIDGE

Q. IN HIS COMPUTATION OF KAW'S OVERALL RATE OF RETURN DR. WOOLRIDGE HAS USED A SHORT-TERM DEBT COST RATE OF 0.50%, RATHER THAN THE 0.81% THE COMPANY USED IN ITS DIRECT CASE. WHAT IS YOUR REPONSE?

A. Dr. Woolridge has used the current 1-month and 3-month LIBOR (London Inter Bank Offer Rate) rates, plus a spread of 0.25%, to arrive at his short-term debt cost rate of 0.50% (OAG Exhibit JRW-1, p. 16). As noted previously, the Company has revised its

projected cost of short-term debt for the forecast period to 0.50%. Thus, Dr. Woolridge and I are in agreement on the appropriate cost rate to apply to the Company's short-term debt component in the WACC calculation. However, as shown on attached Exhibit SWR-4, the 0.50% projection I developed relies on 1-month LIBOR rate projections as of April 26, 2013 for six quarters, starting with June 30, 2013 and ending with September 30, 2014. Since the short-term debt cost is being estimated for the forecast year ending July 31, 2014, to the extent possible it is more appropriate to base the cost on projections for that period, rather than the current 1-month and 3-month LIBOR rates used by Dr. Woolridge. In addition, it is only the 1-month LIBOR rate that impacts the Company's short-term borrowing rate. The 3-month LIBOR is not used in the calculation. Thus, while it is not an issue in this case due to our agreement on the appropriate short-term debt cost rate, the methodology used by Dr. Woolridge is not consistent with how the Company's short-term debt cost is determined, or with the Company's chosen forecast period.

Q. DR. WOOLRIDGE RECOMMENDED AN OVERALL LONG-TERM DEBT COST RATE OF 6.05% RATHER THAN THE COMPANY'S CALCULATED RATE OF 6.14% FOR THE FORECAST PERIOD. DO YOU AGREE WITH DR. WOOLRIDGE'S LONG-TERM DEBT COST?

A. No, I do not. Dr. Woolridge has adjusted the interest rates on the Company's 2013 and 2014 debt issuances to 4.3% from the 5.20% used by the Company in its direct case. This is based on the fact that KAW's financing affiliate, AWCC, issued senior unsecured notes at a rate of 4.30% on December 17, 2012. However, as I noted previously, the Company has issued a Promissory Note to AWCC for the May 2013 debt issuance, the

rate for which is 4.00%. With regard to the planned November 2013 and May 2014 issuances, their rates should be based on interest rate projections. As the Company noted in its response to data request PSC2-45 (also cited by Dr. Woolridge), "the rate the Company attained in December 2012 is not necessarily indicative of the rate the Company will attain on issuances in 2013 and 2014." Thus, it is more appropriate to base the rates for those planned issuances on projections for the time period in which they will be issued. Accordingly, Dr. Woolridge's use of the 4.30% interest rate for KAW's November 2013 and May 2014 debt issuances should be rejected.

Q. HAVE YOU PROVIDED REVISED INTEREST RATE PROJECTIONS FOR KAW'S NOVEMBER 2013 AND MAY 2014 LONG-TERM DEBT ISSUANCES?

A. Yes, I have. As noted previously, I have updated the projected interest rates for KAW's planned November 2013 and May 2014 debt issuances. The rates are 4.49% for the November 2013 debt issue and 4.62% for the May 2014 debt issue. The rates are based on U.S. Treasury yield forecasts for the fourth quarter of 2013 and the second quarter of 2014, respectively, plus a credit spread. These projections are shown on attached Exhibit SWR-3.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes, it does.

VERIFICATION

STATE OF MISSOURI)
) **SS:**
CITY OF ST. LOUIS)

The undersigned, **Scott W. Rungren,** being duly sworn, deposes and says he is a Financial Analyst III for Kentucky-American Water Company, that he has personal knowledge of the matters set forth in the foregoing testimony, and the answers contained therein are true and correct to the best of his information, knowledge, and belief.

Scott W. Rungren
SCOTT W. RUNGREN

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of May, 2013.

(SEAL)
Notary Public

My Commission Expires:

STACI A. OLSEN
Notary Public - Notary Seal
STATE OF MISSOURI
St. Charles County
My Commission Expires: March 20, 2017
Commission #13519210

KENTUCKY-AMERICAN WATER COMPANY
Case No. 2012-00520
COST OF CAPITAL SUMMARY
AS OF MARCH 31, 2013

Exhibit SWR-1

DATA: _X_ BASE PERIOD ___ FORECASTED PERIOD
DATE OF CAPITAL STRUCTURE: AS OF END OF BASE PERIOD
TYPE OF FILING: __ ORIGINAL _X_ UPDATED _X_ REVISED
WORKPAPER REFERENCE NO(S).: W/P-7-1, 7-2, 7-3

Exhibit 37, Schedule J-1
Exhibits with Slippage - Updated with Actuals\Exhibits\Capital Structure\[Capital Structure 2012.xls]Sch J
PAGE 2 of 2
Witness Responsible: Scott Rungren

Line No.	Class of Capital	Amount	% of Total	Add (1)	Adjusted Capital	Cost Rate	Terminal Weighted Cost
1							
2	Short-Term Debt	$ 13,077,729	3.600%	$ 25,593	$ 13,103,322	0.390%	0.01%
3							
4	Long-Term Debt	186,192,717	51.250%	364,374	186,557,091	6.190%	3.17%
5							
6	Preferred Stock	4,481,756	1.234%	8,771	4,490,527	8.520%	0.11%
7							
8	Common Equity	159,551,101	43.917%	312,236	159,863,338	10.900%	4.79%
9							
10	Total Capital	$ 363,303,304	100.000%	$ 710,974	$ 364,014,278		8.08%
11							
12							
13							
14							
15							
16	(1) JDITC:	$ 710,974					

KENTUCKY-AMERICAN WATER COMPANY
Case No. 2012-00520
COST OF CAPITAL SUMMARY
13 MONTH AVERAGE FOR FORECAST PERIOD ENDING JULY 31, 2014

Exhibit SWR-2

DATA: ___ BASE PERIOD _X_ FORECASTED PERIOD
DATE OF CAPITAL STRUCTURE: AVERAGE FOR FORECASTED PERIOD
TYPE OF FILING: __ ORIGINAL _X_ UPDATED _X_ REVISED
WORKPAPER REFERENCE NO(S).: W/P-7-1, 7-2, 7-3

Exhibit 37, Schedule J-1.1/J-1.2
Exhibits with Slippage - Updated with Actuals\Exhibits\Capital Structure\[Capital Structure 2012.xls]Sch J
PAGE 1 of 1
Witness Responsible: Scott Rungren

Line No.	Class of Capital	13 Month Average Amount	% of Total	Add (1)	Adjusted Capital	Cost Rate	Average Weighted Cost
1							
2	Short-Term Debt	$ 9,189,188	2.391%	$ 15,462	$ 9,204,650	0.500%	0.01%
3							
4	Long-Term Debt	198,907,129	51.748%	334,648	199,241,777	6.060%	3.14%
5							
6	Preferred Stock	4,482,398	1.166%	7,540	4,489,938	8.520%	0.10%
7							
8	Common Equity	171,796,415	44.695%	289,037	172,085,452	10.900%	4.87%
9							
10	Total Capital	$ 384,375,130	100.000%	$ 646,687	$ 385,021,817		8.12%
11							
12							
13							
14							
15							
16	(1) JDITC:	$ 646,687					

Kentucky-American Water Company
Case No. 2012-00520
Long-Term Interest Rate Projection

Exhibit SWR-3

	30-Year U.S. Treasury Yields	
Forecasts	**Q4 2013**	**Q2 2014**
Bloomberg	2.96%	3.03%
JP Morgan	3.25%	
Wells Fargo	3.50%	
Royal Bank of Canada	3.85%	4.00%
Average Treasury Yield	3.39%	3.52%
Reoffer Spread	1.10%	1.10%
Reoffer Yield	4.49%	4.62%

Kentucky - American Water Company
Case No. 2012-00520
Short-Term Interest Rate Projection

Exhibit SWR-4

Projected Date	1 Month LIBOR *	Spread To LIBOR	Estimated AWCC Short-Term Interest Rate
6/30/2013	0.2146%	0.2500%	0.4646%
9/30/2013	0.2355%	0.2500%	0.4855%
12/31/2013	0.2577%	0.2500%	0.5077%
3/31/2013	0.2357%	0.2500%	0.4857%
6/30/2013	0.2769%	0.2500%	0.5269%
9/30/2013	0.3050%	0.2500%	0.5550%
Average			0.5042%

* Source: Bloomberg (ICVS50), April 26, 2013

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	**)**	
	)	
THE APPLICATION OF KENTUCKY-AMERICAN WATER COMPANY FOR AN ADJUSTMENT OF RATES	**)**	**CASE NO. 2012-00520**

REBUTTAL TESTIMONY OF JAMES H. VANDER WEIDE

April 2013

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I. WITNESS IDENTIFICATION

Q. 1 What is your name and business address?

A. 1 My name is James H. Vander Weide. I am Research Professor of Finance and Economics at Duke University, the Fuqua School of Business. I am also President of Financial Strategy Associates, a firm that provides strategic and financial consulting services to business clients. My business address is 3606 Stoneybrook Drive, Durham, North Carolina 27705.

Q. 2 Are you the same James Vander Weide who previously filed direct testimony in this proceeding?

A. 2 Yes, I am.

Q. 3 What is the purpose of your testimony?

A. 3 I have been asked by Kentucky American Water Company ("KAWC") to review the direct testimony of Dr. J. Randall Woolridge. Dr. Woolridge's testimony is presented on behalf of the Kentucky Office of Attorney General.

Q. 4 Is there anything in the testimony of Dr. Woolridge that causes you to change your recommended cost of equity for KAWC?

A. 4 No.

II. REBUTTAL OF DR. WOOLRIDGE

Q. 5 What is Dr. Woolridge's recommended rate of return on equity for KAWC?

A. 5 Dr. Woolridge recommends a rate of return on equity for KAWC equal to 8.50 percent.

Q. 6 How does Dr. Woolridge arrive at his recommended 8.50 percent cost of equity for KAWC?

A. 6 Dr. Woolridge arrives at his recommended 8.50 percent cost of equity for KAWC primarily by applying the DCF model to a comparable group of water utility companies and a comparable group of natural gas distribution companies. [Woolridge at 52]

Q. 7 Does Dr. Woolridge also present Capital Asset Pricing Model ("CAPM") results for his proxy companies?

A. 7 Yes. Dr. Woolridge presents CAPM results both for his comparable group of natural gas distribution companies and his comparable group of water companies. However, he gives little or no weight to his CAPM results in this proceeding because he believes the CAPM provides a less reliable indication of the cost of equity for public utilities. [Woolridge at 25]

A. Comparable Companies

Q. 8 What comparable companies does Dr. Woolridge use to estimate KAWC's cost of equity?

A. 8 Dr. Woolridge uses a group of nine water utilities and a group of eight natural gas distribution companies followed by Value Line and AUS Utility Reports.

Q. 9 Does Dr. Woolridge eliminate any companies from his comparable groups of water or gas utilities?

A. 9 Dr. Woolridge selects all nine publicly-traded water utilities, but he eliminates New Jersey Resources, UGI, and NiSource from his natural gas comparable group.

Q. 10 Why does Dr. Woolridge eliminate NiSource from his natural gas group?

A. 10 Dr. Woolridge eliminates NiSource from his comparable group because, in his opinion, it "has a riskier operating and financial profile than gas distribution companies." [Woolridge at 59]

Q. 11 Dr. Woolridge notes that AUS classifies NiSource as a combination electric and gas utility. How does Value Line classify NiSource?

A. 11 Value Line classifies NiSource as a natural gas utility.

Q. 12 What percentage of revenues does NiSource earn from its electric and gas operations?

A. 12 According to Value Line, NiSource receives sixty-eight percent of its revenues from its gas operations, thirty percent from its electric operations, and two percent from other operations.

Q. 13 Based on the Value Line information for NiSource, do you agree with Dr. Woolridge's decision to eliminate NiSource from his comparable group of natural gas utilities?

A. 13 No. Although NiSource may be slightly more risky than the average for the natural gas distribution company group, as a matter of simple mathematics, there will always be some companies in a group that are more risky than the average, and some companies that are less risky than the group average. In choosing a comparable group of natural gas utilities for the purpose of estimating the cost of equity for a water utility such as KAWC, the important question is whether the average risk of the natural gas utility group is comparable to the average risk of the water utility group. Dr. Woolridge's data

indicates that the natural gas distribution company group is less risky than the water utility group.

Q. 14 Does Dr. Woolridge compare the risk of his natural gas distribution companies to the risk of his water utility group?

A. 14 Yes. Dr. Woolridge provides a risk comparison of his natural gas distribution and water utility groups in his testimony and in Exhibit JRW-4. He concludes:

> I have assessed the riskiness of the two groups using five different risk measures published by *Value Line*. These measures include Beta, Safety, Financial Strength, Earnings Predictability, and Stock Price Stability. All five of the risk measures suggest that the Gas Proxy Group is less risky than the Water Proxy Group. However, the magnitude of the differences in the risk metrics is not large. Nonetheless, these *Value Line* measures do suggest that that the Gas Proxy Group is a little less risky than the Water Proxy Group. [Woolridge at 15]

Q. 15 Would Dr. Woolridge's conclusion that his natural gas utility group is slightly less risky than his water utility group change materially if Dr. Woolridge had included NiSource in his natural gas utility group?

A. 15 No. Dr. Woolridge's natural gas utility group would still be slightly less risky than his water utility group, even if NiSource were included in his comparable group (see Vander Weide Rebuttal Schedule 1).

Q. 16 What comparable companies do you use to estimate KAWC' cost of equity?

A. 16 I use a comparable groups of water utilities and natural gas distribution companies followed by Value Line, shown in Schedule 1 and Schedule 2 of my direct testimony.

Q. 17 What criteria do you use to select your comparable group of water utilities?

A. 17 As discussed in my direct testimony, I select all water utilities in Value Line's Standard and Extended editions that: (1) pay dividends; (2) did not decrease dividends during any quarter of the past two years; (3) have an one analyst's long-term growth forecast; and (4) are not the subject of a merger that is not yet complete. [Vander Weide Direct at 27] In addition, all of the companies included in my group have a Value Line Safety Rank of 2 or 3, where 3 is the average Safety Rank of the Value Line universe of companies and 2 indicates that a company is less risky than average.

Q. 18 Do you have any evidence that your comparable group of water utilities is a reasonable proxy for the risk of investing in KAWC and its parent, American Water Works Company ("AWC")?

A. 18 Yes. Based on data from Standard & Poor's and Value Line, my comparable group of water utilities has a higher Standard & Poor's bond rating (A) than AWC (BBB+), and a slightly higher average Value Line Safety Rank (2.5) than AWC (3).[1] (See Rebuttal Schedule 2.)

Q. 19 What criteria do you use to select your group of natural gas distribution companies?

A. 19 I select all the companies in Value Line's natural gas industry groups that: (1) are in the business of natural gas distribution; (2) paid dividends during every quarter of the last two years; (3) did not decrease dividends during any

[1] Value Line describes its Safety Rank as "a measurement of potential risk associated with individual common stocks." Safety Ranks range from 1 to 5, with the most safe rating being a 1.

quarter of the past two years; (4) have an available I/B/E/S growth forecast; and (5) are not the subject of a merger that is not yet complete. [Vander Weide Direct at 30] In addition, all of the LDCs included in my group have an investment grade bond rating and a Value Line Safety Rank of 1, 2, or 3.

Q. 20 Do you have evidence that your comparable group of natural gas distribution companies is a reasonable proxy for the risk of investing in KAWC and its parent, AWC?

A. 20 Yes. My comparable group of natural gas distribution companies has a higher average Value Line Safety Rank (1.7) and a slightly higher average bond rating (A-) than AWC, which has a Safety Rank of 3 and a bond rating of BBB+.

B. DCF Model

Q. 21 What cost of equity results does Dr. Woolridge obtain from his application of his DCF model?

A. 21 Dr. Woolridge obtains a DCF result of 8.6 percent for his comparable group of nine water utilities and 8.5 percent for his comparable group of eight natural gas distribution companies. [Woolridge at 41]

Q. 22 What DCF Model does Dr. Woolridge use to estimate KAWC's cost of equity?

A. 22 Dr. Woolridge uses an annual DCF model of the form, $k = D_0(1+.5g)/P_0 + g$, where k is the cost of equity, D_0 is the first period dividend, P_0 is the current stock price, and *g* is the average expected future growth in the company's earnings and dividends.

Q. 23 What are the basic assumptions of Dr. Woolridge's annual DCF model?

A. 23 Dr. Woolridge's annual DCF model is based on the assumptions that: (1) a company's stock price is equal to the present value of the future dividends investors expect to receive from their investment in the company; (2) dividends are paid annually; (3) dividends, earnings, and book values are expected to grow at the same constant rate forever; and (4) the first dividend is received one year from the date of the analysis.

Q. 24 Do you agree with Dr. Woolridge's use of an annual DCF model to estimate KAWC's cost of equity?

A. 24 No. The annual DCF model is based on the assumption that companies pay dividends only at the end of each year. Since Dr. Woolridge's proxy companies pay dividends quarterly, Dr. Woolridge should have used the quarterly DCF model to estimate KAWC's cost of equity.

Q. 25 Why is it unreasonable to use an annual DCF model to estimate the cost of equity for companies that pay dividends quarterly?

A. 25 It is unreasonable to apply an annual DCF model to companies that pay dividends quarterly because: (1) the DCF model is based on the assumption that a company's stock price is equal to the present value of the expected future dividends associated with investing in the company's stock; and (2) the annual DCF model cannot be derived from this assumption when dividends are paid quarterly. [*See* Vander Weide Direct, Appendix 2]

Q. 26 Does Dr. Woolridge acknowledge that one must recognize the assumptions of the DCF model when estimating the model's inputs?

A. 26 Yes. Dr. Woolridge states, “In general, one must recognize the assumptions under which the DCF model was developed in estimating its components (the dividend yield and expected growth rate).” [Woolridge at 29]

Q. 27 Recognizing your disagreement with Dr. Woolridge’s use of an annual DCF model, did Dr. Woolridge apply the annual DCF model correctly?

A. 27 No. Dr. Woolridge’s annual DCF model is based on the assumption that dividends will grow at the same constant rate forever. Under the assumption that dividends will grow at the same constant rate forever, the cost of equity is given by the equation, $k = D_0 (1 + g) / P_0 + g$, where D_0 is the current annualized dividend, P_0 is the stock price, and g is the expected constant annual growth rate. [See Vander Weide Direct Appendix 2] Thus, the correct first period dividend in the annual DCF model is the current annualized dividend multiplied by the factor, (1 + growth rate). Instead, Dr. Woolridge uses the current annualized dividend multiplied by the factor (1 + 0.5 times growth rate) as the first period dividend in his DCF model. This incorrect procedure, apart from other errors in his methods, causes him to underestimate KAWC’s cost of equity.

Q. 28 How does Dr. Woolridge estimate the expected future growth component of the DCF cost of equity?

A. 28 Dr. Woolridge considers Value Line data on historical growth rates in earnings, dividends, and book value, as well as Value Line data on projected growth rates in earnings, dividends, and book value. He also considers analysts’ forecasts of future growth provided by Yahoo, Reuters, and Zacks, and internal growth

estimates based on Value Line's estimates of retention ratios and rates of return on book equity. Dr. Woolridge's final estimate of the growth rate that investors expect for his proxy companies is based on his judgment of what he considers to be a "reasonable" or "appropriate" growth rate. [Woolridge at 32]

Q. 29 Do you agree with Dr. Woolridge's use of historical growth rates to estimate investors' expectation of future growth in the DCF model?

A. 29 No. Historical growth rates are inherently inferior to analysts' growth rate forecasts because analysts' forecasts already incorporate all relevant information regarding historical growth rates and also incorporate the analysts' knowledge about current conditions and expectations regarding the future. My studies described in my direct testimony indicate that investors use analysts' earnings growth forecasts in making stock buy and sell decisions rather than historical or internal growth rates such as those presented by Dr. Woolridge.

Q. 30 What is the internal growth method of estimating the growth component for the DCF method?

A. 30 The internal growth method estimates expected future growth by multiplying a company's retention ratio, "b," times its expected rate of return on equity, "r." Thus, "g = b x r," where "b" is the percentage of earnings that are retained in the business and "r" is the expected rate of return on equity.

Q. 31 Do you agree with the internal growth method for estimating growth in the DCF model?

A. 31 No. The internal growth method is logically circular because it requires an estimate of the expected rate of return on equity, "r," in order to estimate the

cost of equity using the DCF model. Yet, for regulated companies such as KAWC, the allowed rate of return on equity is set equal to the cost of equity.

Q. 32 What rate of return on equity does Dr. Woolridge assume in his calculation of expected growth using his internal growth method?

A. 32 Dr. Woolridge uses a median rate of return on equity of 10.5 percent for his comparable group of water utilities, and a median rate of return on equity of 10.5 percent for his comparable group of natural gas companies [Woolridge Exhibit JRW-10, p. 4]

Q. 33 Is it reasonable to assume that Dr. Woolridge's proxy companies will earn a rate of return on equity of 10.5 percent when he is recommending that they be allowed to earn a return on equity of only 8.50 percent?

A. 33 No. Investors are well aware that water and natural gas utilities are regulated by rate of return regulation. If investors truly believed that the utilities' cost of equity were equal to Dr. Woolridge's recommended 8.50 percent, they would forecast that the utilities would earn 8.50 percent on equity. Thus, Dr. Woolridge's recommended 8.50 percent rate of return on equity is inconsistent with his assumed 10.5 percent earned rate of return on equity for his proxy companies.

Q. 34 Does Dr. Woolridge's internal growth method recognize that, in addition to growth from retained earnings, the companies in his comparable group can also grow by issuing new equity at prices above book value?

A. 34 No. Dr. Woolridge's internal growth method underestimates the expected future growth of his proxy companies because it neglects the possibility that the companies can also grow by issuing new equity at prices above book value.

Since many of the proxy companies are selling at prices in excess of book value, and Value Line forecasts that many of them will issue new equity over the next several years, Dr. Woolridge's failure to recognize the "external" component of future growth causes to him to underestimate his proxy companies' expected future growth. This failure is noteworthy at a time when the water industry is expected to undertake substantial infrastructure investments and to finance part of this expansion through the capital markets.

Q. 35 Does Dr. Woolridge's internal growth method recognize that Value Line's reported rates of return on equity generally understate each company's average rate of return on equity for the year?

A. 35 No. Dr. Woolridge fails to recognize that Value Line calculates its reported rates of return on equity by dividing a company's net income by end of year equity, whereas most financial analysts calculate a company's rate of return on equity by dividing net income by the average equity for the year. In the general case where a company's equity is increasing, Value Line's reported ROEs will understate the average ROE for the year.

Q. 36 Do you agree with Dr. Woolridge's use of analysts' growth forecasts to estimate the expected growth component of his DCF model?

A. 36 Yes. As discussed in my direct testimony, I recommend the use of analysts' growth forecasts for the purpose of estimating the expected growth component of the DCF model. I have conducted extensive studies that demonstrate that stock prices are more highly correlated with analysts' growth rates than with

either historical growth rates or the internal growth rates considered by Dr. Woolridge.

Q. 37 What growth rates does Dr. Woolridge obtain from Yahoo, Reuters, and Zacks?

A. 37 Dr. Woolridge obtains a mean growth rate of 6.5 percent (median 6.0 percent) for his water utility comparable group and a mean growth rate of 4.4 percent (median 4.6 percent) for his natural gas comparable group [Woolridge Exhibit JRW-10, p. 5].

Q. 38 What DCF result would Dr. Woolridge have obtained for his proxy water companies if he had relied entirely on the average EPS growth rates of Yahoo, Reuters, and Zacks?

A. 38 Dr. Woolridge reports an average dividend yield of 3.1 percent for his water utility comparable group [Woolridge JRW-10, page 2]. The average analyst EPS growth rate for his water utility comparable group is 6.5 percent [Woolridge JRW-10, page 5]. Adding this dividend yield and growth rate, and using Dr. Woolridge's (incorrect) ½ g multiplier, produces a DCF result for his water comparable group equal to 9.7 percent. Correctly implementing the annual DCF model using a full year of growth produces an average DCF result equal to 9.8 percent for the water comparable group.

Q. 39 Have you calculated updated DCF results for the water utilities that have sufficient data to estimate the cost of equity?

A. 39 Yes. The average updated DCF result for the water utilities is 10.8 percent. (See Rebuttal Schedule 3)

C. Analysts' Growth Forecasts

Q. 40 How do you recommend estimating the future growth component in the DCF model?

A. 40 As described in my written evidence, I recommend using the analysts' forecasts published by I/B/E/S Thomson Reuters.

Q. 41 Why do you believe that the analysts' forecasts of earnings growth are more accurate indicators of investors' growth expectations than the historical and internal growth data provided by Dr. Woolridge?

A. 41 Security analysts analyze the prospects of companies and forecast earnings. They take into account all available historical and current data plus any additional information that is available, such as changes in projected capital expenditures, regulatory climate, industry restructuring, regulatory rulings, or changes in the competitive environment. The performance of security analysts is measured against their ability to weigh the above factors, to predict earnings growth, and to communicate their views to investors. Financial research indicates that securities analysts are influential, and, most importantly, the consensus of their forecasts is impounded in the current structure of market prices. This result is key, since a proper application of the DCF model requires the matching of stock prices and investors' growth expectations.

Q. 42 Are analysts' forecasts readily available?

A. 42 Yes. An important part of the analysts' job is getting their views across to investors. Major investment firms send out monthly reports with their earnings forecasts, and institutional investors have direct access to analysts. Individual investors can get the same forecasts through their investment advisors or

online. Studies reported in the academic literature indicate that recommendations based on these forecasts are relied on by investors. Indeed, because analysts' forecasts are perceived by investors as being useful, there are services which offer analysts' forecasts on all major stocks. I/B/E/S and Zack's are some of the providers of these data. I recommend use of the I/B/E/S growth rates because they have been: (1) shown to be highly correlated with stock prices; (2) widely studied in the finance literature; and (3) widely available to investors for many years.

Q. 43 Is it your contention that analysts make perfectly accurate predictions of future earnings growth?

A. 43 No. Forecasting earnings growth, for either the short-term or long-term, is very difficult. This statement is consistent with the fact that stocks, unlike high-quality bonds, are risky investments whose returns are highly uncertain. Though analysts' forecasts are not perfectly accurate, they are better than either retention growth rates or historical growth in predicting stock prices. One would expect this result, given that analysts have all the past data plus current information. The important consideration is: what growth rates do investors use to value a stock? Financial research suggests that the analysts' growth forecasts are used by investors and therefore most related to stock prices.

Q. 44 Does the observation that analysts' growth forecasts are inherently uncertain imply that investors should ignore analysts' growth forecasts in making stock buy and sell decisions?

A. 44 No. Because growth forecasts have a significant influence on a company's stock price, investors have a great incentive to use the best available forecasts of a company's growth prospects, even if these growth forecasts are inherently uncertain. In this regard, the investor's situation is similar to the situation of a pilot who is flying across the country. Although the pilot recognizes that weather forecasts are inherently uncertain, he or she has a strong incentive to obtain the best available forecasts of cross-country weather patterns before taking off.

Q. 45 Have you done research on the appropriate use of analysts' forecasts in the DCF model?

A. 45 Yes. As described in my direct testimony, I prepared a study in conjunction with Willard T. Carleton, Professor of Finance Emeritus at the University of Arizona, on why analysts' forecasts are the best estimate of investors' expectations of future long-term growth. This study is described in a paper entitled "Investor Growth Expectations and Stock Prices: the Analysts versus History," published in the Spring 1988 edition of *The Journal of Portfolio Management*. My studies indicate that the analysts' forecasts of future growth are superior to historically-oriented growth measures and retention growth measures in predicting a firm's stock price.

Q. 46 Please summarize the results of your study.

A. 46 First, we performed a correlation analysis to identify the historically oriented growth rates which best described a firm's stock price. Then we did a regression study comparing the historical and retention growth rates to the consensus analysts' forecasts. In every case, the regression equations

containing the average of analysts' forecasts statistically outperformed the regression equations containing the historical and retention growth estimates. These results are consistent with those found by Cragg and Malkiel, the early major research in this area (John G. Cragg and Burton G. Malkiel, Expectations and the Structure of Share Prices, University of Chicago Press, 1982). These results are also consistent with the hypothesis that investors use analysts' forecasts, rather than historically oriented growth calculations, in making stock buy and sell decisions. They provide overwhelming evidence that the analysts' forecasts of future growth are superior to historically oriented growth measures in predicting a firm's stock price.

Q. 47 Has your study been updated to include more recent data?

A. 47 Yes. Researchers at State Street Financial Advisors updated my study using data through year-end 2003. Their results continue to confirm that analysts' growth forecasts are superior to historical and retention growth measures in predicting a firm's stock price.

Q. 48 Does Dr. Woolridge agree with your assessment that analysts' growth forecasts should be used to estimate the future growth component of the DCF model?

A. 48 No. Dr. Woolridge argues that analysts' growth forecasts should not be used to estimate the future growth component of the DCF model because, in his opinion, it is well known that analysts' growth forecasts are overly optimistic [Woolridge at 36].

Q. 49 Have you reviewed the research literature on the properties of analysts' growth forecasts?

A. 49 Yes, I have reviewed the articles identified in Rebuttal Schedule 4.

Q. 50 What basic questions does the research literature on analysts' forecasts address?

A. 50 The research literature on analysts' growth forecasts addresses three basic questions: (1) Are analysts' forecasts superior to historical growth extrapolations in their ability to forecast future earnings per share? (2) Is the correlation between changes in analysts' EPS growth forecasts and stock prices greater than the correlation between historical earnings growth rates and stock prices? and (3) Are analysts' growth forecasts overly optimistic?

Q. 51 How do researchers test whether analysts' growth forecasts are more accurate than forecasts based on historical growth extrapolations?

A. 51 I have identified at least eight published research studies dating from 1972 to 2006 that compare the accuracy of analysts' growth forecasts to the accuracy of forecasts based on historical extrapolations. Typically, these research studies follow several basic steps: (1) gather data on historical earnings per share for a large sample of firms over a reasonably long historical period of time; (2) gather data on actual earnings per share growth rates for the same firms over a subsequent future time period; (3) apply statistical forecasting techniques to determine the best model for forecasting future earnings growth based on historical growth data; (4) gather data on analysts' growth forecasts for the study period; (5) calculate the difference between the actual growth rate and the

forecasted growth rate for both the best statistical forecasting model and the analysts' forecasts; (6) determine whether there is a significant difference between the forecasting errors of the statistical forecasting model and the forecasting errors of analysts' EPS growth forecasts; and (7) if the errors from the analysts' EPS growth forecasts are less than the errors from the statistical forecasting techniques and the difference is statistically significant, conclude that analysts provide superior forecasts to the forecasts obtained by statistical forecasting techniques. The main differences between the studies reported in the literature relate to the time period studied, the size of the database, and the statistical techniques used to forecast future earnings growth based on historical earnings data.

Q. 52 What are the general conclusions of the research literature regarding the accuracy of analysts' growth forecasts compared to the accuracy of growth forecasts based on historical growth extrapolations?

A. 52 Seven of the eight articles strongly support the hypothesis that analysts' forecasts provide better predictions of future earnings growth than statistical models based on historical earnings, and one of the articles neither supports nor rejects this hypothesis (see TABLE 1 below). These articles strongly support the conclusion that analysts' EPS growth forecasts are better proxies for investor growth expectations than historical growth rates.

TABLE 1
ARTICLES THAT STUDY WHETHER ANALYSTS' FORECASTS OR HISTORICAL GROWTH EXTRAPOLATIONS ARE BETTER PREDICTORS OF EPS GROWTH

Author (Date)	Support Historical	Support Analysts
Elton and Gruber (1972)	Neutral	Neutral
Brown and Rozeff (1978)	No	Yes
Crichfield, Dyckman, and Lakonishok (1978)	No	Yes
Givoly and Lakonishok (1984)	No	Yes
Brown, Hagerman, Griffin, and Zmijewski (1987)	No	Yes
Newbold, Zumwalt, and Kannan (1987)	No	Yes
Brown, Richardson, and Schwager (1987)	No	Yes
Banker and Chen (2006)	No	Yes

Q. 53 Why is the correlation between analysts' EPS growth forecasts and stock prices a significant issue in the research literature on analysts' growth forecasts?

A. 53 If analysts' EPS growth forecasts are good proxies for investor growth expectations, one would expect that changes in analysts' growth forecasts would have a significant impact on stock prices. The impact of changes in analysts' growth expectations on stock prices can be estimated using standard statistical regression techniques.

Q. 54 What are the general conclusions of the research literature regarding the correlation between changes in analysts' EPS forecasts and stock prices?

A. 54 I have identified at least seven published research studies that use regression techniques to test whether the impact of changes in analysts' growth forecasts on stock prices is sufficiently strong to justify the conclusion that analysts' EPS growth forecasts are good proxies for investor growth expectations. All these studies find that changes in analysts' growth forecasts have a large and statistically significant impact on changes in stock prices. Five of these studies also test whether the impact of analysts' growth forecasts on stock prices is

stronger than the impact of historical and/or retention growth rates on stock prices (see Table 2 below). These studies find that changes in analysts' growth forecasts have a significantly stronger impact on stock prices than changes in historical and/or retention earnings growth rates. In summary, financial research strongly supports the conclusion that analysts' growth forecasts are the best proxies for investor growth expectations.

TABLE 2
ARTICLES THAT STUDY THE RELATIONSHIP
BETWEEN ANALYSTS' GROWTH FORECASTS AND STOCK PRICES

Author (Date)	Support Historical	Support Analysts
Malkiel (1970)	No	Yes
Malkiel and Cragg (1970)	No	Yes
Elton, Gruber, and Gultekin (1981)		Yes
Fried and Givoly (1982)		Yes
Vander Weide and Carleton (1988)	No	Yes
Gordon, Gordon, and Gould (1989)	No	Yes
Timme and Eisemann (1989)	No	Yes

Q. 55 What are the general conclusions of the research literature regarding the claim that analysts' forecasts are overly optimistic?

A. 55 A review of available research evidence strongly supports the hypothesis that analysts' growth forecasts are not optimistic. I have reviewed nine articles that address whether analysts' growth forecasts are overly optimistic (see Table 3 below). At least seven of the nine articles reviewed find no evidence that analysts' growth forecasts are overly optimistic. Two articles find evidence of optimism, but also conclude that optimism is declining significantly over time. Of these two studies, one finds that analysts' forecasts for the Standard & Poor's 500 are pessimistic for the last four years of the study.

TABLE 3
ARTICLES THAT STUDY WHETHER ANALYSTS' FORECASTS ARE BIASED TOWARD OPTIMISM

Author (Date)	Conclusion
Crichfield, Dyckman, and Lakonishok (1978)	Unbiased
Elton, Gruber, and Gultekin (1984)	Unbiased
Givoly and Lakonishok (1984)	Unbiased
Brown (1997)	Declining optimism
Keane and Runkle (1998)	Unbiased
Abarbanell and Lehavy (2003)	Unbiased
Ciccone (2005)	Pessimistic
Clarke, Ferris, Jayaraman, and Lee (2006)	Unbiased
Yang and Mensah (2006)	Unbiased

Q. 56 What is the most important contribution of the more recent research literature on the accuracy of analysts' forecasts?

A. 56 The most important contribution of more recent research is to identify substantial statistical difficulties in earlier research studies that caused some of these studies to unwittingly accept the hypothesis of optimism when no optimism was present. For example, recent studies recognize that the results of earlier studies are heavily influenced by the presence of large unexpected accounting write-offs and special accounting charges at a small number of sample companies. Unexpected accounting write-offs and special charges have a potentially dramatic impact on conclusions concerning analysts' bias because analysts' forecasts intentionally exclude the impact of accounting write-offs and special charges, whereas actual earnings include these items. Thus, a comparison of analysts' forecasts premised on normalized earnings (that is, earnings that exclude the impact of accounting write-offs and special charges) to reported earnings that include the negative effect of accounting write-offs and special charges will bias the results in favor of concluding that analysts are optimistic. Recent studies demonstrate that, once the distorting effect of

unexpected accounting write-offs and special charges are removed from the analysis, there is no evidence that analysts' EPS growth forecasts are optimistic.

Recent research also highlights the potential impact of high correlation in analysts' forecast errors on study conclusions. Analysts' forecast errors tend to be highly correlated because unexpected industry and economy-wide shocks, such as unexpected increases in oil prices or terrorist attacks, have similar effects on all firms in the same industry. However, the relevant statistical tests of optimism are based on the assumption that analysts' forecast errors are independent, that is, the tests assume that the correlation of the analyst errors is zero. Once the statistical tests of optimism are adjusted to account for the high correlation in forecast errors that generally characterize the data, evidence supports the hypothesis that analysts' EPS growth forecasts are unbiased, and hence not optimistic.

Q. 57 Dr. Woolridge claims that his own studies and studies by Lacina, Lee, and Xu support his view that analysts' growth forecasts are overly optimistic [Woolridge at Appendix B, pp. 12 – 13, and Woolridge at 36]. Do these studies suffer from the substantial statistical difficulties you discuss in your previous response?

A. 57 Yes. Dr. Woolridge and Lacina, Lee, and Xu fail to recognize that their findings are heavily influenced by: (1) the presence of large unexpected accounting write-offs and special accounting charges; and (2) the impact of high correlation in analysts' forecasts on their study conclusions.

Q. 58 Dr. Woolridge also argues that analysts face potential conflicts of interest between their companies' research operations and underwriting operations. Has the New York Stock Exchange ("NYSE") and the National Association of Securities Dealers ("NASD") addressed the issue of analysts' potential conflicts of interest?

A. 58 Yes. Beginning in the early 2000s, the NYSE and NASD implemented a series of rule changes that address potential conflicts of interest. Specifically, they:

- Imposed structural reforms to increase analyst independence, including prohibiting investment banking personnel from supervising analysts or approving research reports;
- Prohibited offering favorable research to induce investment banking business;
- Prohibited research analysts from receiving compensation based on a specific investment banking transaction;
- Required disclosure of financial interests in covered companies by the analyst and the firm;
- Imposed quiet periods for the issuance of research reports after securities offerings managed or co-managed by a member;
- Restricted personal trading by analysts;
- Required disclosure in research reports of data and price charts that help investors track the correlation between an analyst's rating and the stock's price movements; and
- Required disclosure in research reports of the distribution of buy/hold/sell ratings and the percentage of investment banking clients in each category.[2]

Q. 59 What is your overall conclusion regarding the use of analysts' growth forecasts as proxies for investors' growth expectations?

A. 59 Contrary to Dr. Woolridge's assessment that analysts' growth forecasts should not be used in the DCF model because they are well known to be optimistic, I find that the research literature provides strong support for the conclusion that: (1) analysts' EPS growth forecasts are not optimistic; and (2) analysts' EPS

[2] "Joint Report by NASD and the NYSE on the Operation and Effectiveness of the Research Analyst Conflict of Interest Rules," December 2005, p. 5.

growth forecasts are reasonable proxies for investor growth expectations, while the historical growth extrapolations and retention growth rates used by Dr. Woolridge are not. Furthermore, Dr. Woolridge's concerns regarding analysts' potential conflicts of interest have been fully addressed by rule changes implemented by the NYSE and NASD in the early 2000s. In addition, Dr. Woolridge fails to recognize that the DCF model requires the growth forecasts of investors, whether accurate or not. In this regard, it is helpful to keep in mind that investors would not pay for analysts' growth forecasts if they did not find them to be helpful in making stock buy and sell decisions. Similarly, the NYSE and NASD would not have taken steps to address conflicts of interest if investors did not rely on analysts' forecasts in making investment decisions.

D. Capital Asset Pricing Model

Q. 60 What is the CAPM?

A. 60 The CAPM is an equilibrium model of expected returns on risky securities in which the expected or required return on a given risky security is equal to the risk-free rate of interest plus the security's "beta" times the market risk premium:

Expected return = Risk-free rate + (Security beta x Market risk premium).

The risk-free rate in this equation is the expected rate of return on a risk-free government security, the security beta is a measure of the company's risk relative to the market as a whole, and the market risk premium is the premium investors require to invest in the market basket of all securities compared to the risk-free security.

Q. 61 How does Dr. Woolridge use the CAPM to estimate KAWC's cost of equity?

A. 61 The CAPM requires estimates of the risk-free rate, the company-specific risk factor, or beta, and either the required return on an investment in the market portfolio, or the risk premium on the market portfolio compared to an investment in risk-free government securities. For the risk-free rate, Dr. Woolridge uses a 4.0 percent yield for 30-year Treasury bonds [Woolridge at 43]; for the company-specific risk factor or beta, Dr. Woolridge uses the current Value Line beta for each company [Woolridge at 44]; and for the required return or risk premium on the market portfolio, Dr. Woolridge employs the average 5.0 percent risk premium he obtains from his review of the risk premium literature [Woolridge at 49].

Q. 62 What CAPM result does Dr. Woolridge obtain for his proxy companies?

A. 62 Dr. Woolridge obtains a CAPM result of 7.5 percent for his water utility comparable group and a result of 7.3 percent for his natural gas distribution company comparable group. [Woolridge at 51]

Q. 63 Does Dr. Woolridge recognize that the results of his CAPM analysis are unreasonably low?

A. 63 Yes. Dr. Woolridge reports the results of his DCF and CAPM studies in his testimony as shown below in TABLE 4:

TABLE 4
DR. WOOLRIDGE'S COST OF EQUITY MODEL RESULTS
[WOOLRIDGE AT 52.]

	DCF	CAPM
Water Comparable group	8.6%	7.5%
Gas Comparable group	8.5%	7.3%

From these results, Dr. Woolridge concludes that KAWC's cost of equity is 8.50 percent. Since Dr. Woolridge's CAPM results are 150 to 120 basis points

lower than his recommended 8.50 percent cost of equity, Dr. Woolridge must agree that a CAPM result of 7.5 percent or 7.3 percent is unreasonably low.

Q. 64 Do you agree with Dr. Woolridge's application of the CAPM?

A. 64 No. I agree with Dr. Woolridge that his CAPM results are below a reasonable range of estimates of KAWC's cost of equity.

Q. 65 Why do you believe that the CAPM produces unreasonably low cost of equity results for water and natural gas utilities at this time?

A. 65 I believe there are two reasons why the CAPM produces unreasonably low cost of equity results for water and natural gas utilities at this time. First, as a result of the economic crisis, the U.S. Treasury has kept interest rates on Treasury securities low as part of its effort to stimulate the economy. In addition, the betas of utilities are currently approximately 0.70, and the CAPM tends to underestimate the cost of equity for companies whose equity beta is less than 1.0 and to overestimate the cost of equity for companies whose equity beta is greater than 1.0.

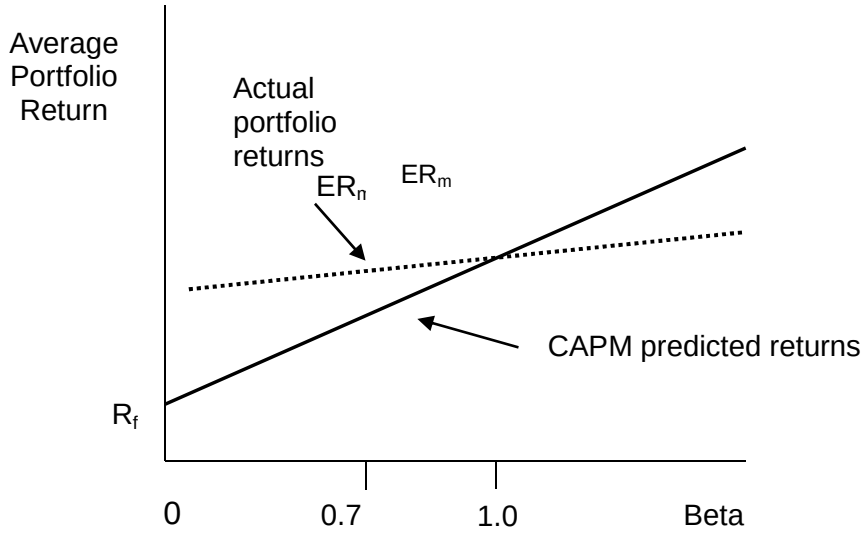
Q. 66 Can you briefly summarize the evidence that the CAPM underestimates the required returns for securities or portfolios with betas less than 1.0 and overestimates required returns for securities or portfolios with betas greater than 1.0?

A. 66 Yes. The CAPM conjectures that security returns increase with increases in security betas in line with the equation

$$ER_i = R_f + \beta_i \left[ER_m - R_f \right],$$

where ER_i is the expected return on security or portfolio *i,* R_f is the risk-free rate, $ER_m - R_f$ is the expected risk premium on the market portfolio, and β_i is a measure of the risk of investing in security or portfolio *i*. If the CAPM correctly predicts the relationship between risk and return in the marketplace, then the realized returns on portfolios of securities and the corresponding portfolio betas should lie on the solid straight line with intercept R_f and slope $[R_m - R_f]$ shown below.

FIGURE 1
AVERAGE RETURNS COMPARED TO BETA
FOR PORTFOLIOS FORMED ON PRIOR BETA



Financial scholars have found that the relationship between realized returns and betas is inconsistent with the relationship posited by the CAPM. As described in Fama and French (1992) and Fama and French (2004), the actual relationship between portfolio betas and returns is shown by the dotted line in the figure above. Although financial scholars disagree on the reasons why the

return/beta relationship looks more like the dotted line in the figure than the solid line, they generally agree that the dotted line lies above the solid line for portfolios with betas less than 1.0 and below the solid line for portfolios with betas greater than 1.0. Thus, in practice, scholars generally agree that the CAPM underestimates portfolio returns for companies with betas less than 1.0, and overestimates portfolio returns for portfolios with betas greater than 1.0.

Q. 67 What conclusions do you reach from your review of the literature on the CAPM to predict the relationship between risk and return in the marketplace?

A. 67 I conclude that the financial literature strongly supports the proposition that the CAPM underestimates the cost of equity for companies such as public utilities with betas less than 1.0. Since the CAPM significantly underestimates the cost of equity for companies with betas less than 1.0, and both Dr. Woolridge's and my proxy companies have betas that are significantly less than 1.0, I further conclude that the Commission should give little or no weight to the results of the CAPM at this time.

E. Comments on Utilities' Market-to-Book Ratios

Q. 68 Does Dr. Woolridge discuss the relationship between rates of return equity, the cost of equity, and market-to-book ratios in his testimony?

A. 68 Yes. Dr. Woolridge asserts that a market-to-book ratio above 1.0 indicates that a company is earning more than its cost of equity:

> As such, the relationship between a firm's return on equity, cost of equity, and market-to-book ratio is relatively straightforward. A firm that earns a return on equity above its cost of equity will see its common stock sell at a price above its book value. Conversely, a

firm that earns a return on equity below its cost of equity will see its common stock sell at a price below its book value. [Woolridge at 20]

Q. 69 Dr. Woolridge reports the results of three regression analyses that he believes support his claim that companies with market-to-book ratios greater than 1.0 are earning more than their costs of equity [Woolridge at 21 and Exhibit JRW-6]. Do Dr. Woolridge's regression analyses provide any support for Dr. Woolridge's claim?

A. 69 No. Dr. Woolridge's regression analyses do not support his claim that companies with market-to-book ratios greater than 1.0 are earning more than their costs of equity. Dr. Woolridge claims that the cost of equity for water utilities like KAWC is 8.50 percent. However, the data shown in Exhibit JRW-6 indicate that there are many utilities with costs of equity less than Dr. Woolridge's recommended 8.50 percent but market-to-book ratios greater than 1.0. These data contradict Dr. Woolridge's claim that companies earning less than their cost of equity will have market-to-book ratios of less than 1.0.

Q. 70 How many of the utilities in Exhibit JRW-6 have ROEs less than 8.5 percent?

A. 70 Dr. Woolridge's Exhibit JRW-6, Panel C, displays a graph of the ROEs and market-to-book ratios for five water utilities. It is evident from the graph that two of the five water utilities shown in his Panel C have ROEs less than 8.5 percent. However, contrary to Dr. Woolridge's hypothesis, both of these water utilities have market-to-book ratios of 1.4 or higher. With regard to Panel A, the electric utilities, there appear to be approximately fifteen companies with ROEs less than 8.5 percent, but only two of these utilities have market-to-book ratios less

than 1.0. With regard to Panel B, two of the natural gas utilities have ROEs less than 8.5 percent, but no company has a market-to-book ratio less than 1.0.[3]

Q. 71 Are you surprised by Dr. Woolridge's evidence that most electric, gas, and water utilities have market-to-book ratios greater than 1.0, even if they are earning ROEs less than their cost of equity?

A. 71 No. According to the DCF model, a company's stock price is equal to the present value of the company's expected future dividends, which, in turn, depend on its expected future ROEs. Thus, market-to-book ratios greater than 1.0, at best, imply that investors expect the company to earn more than its cost of equity at some time in the future. There is nothing in the DCF model that allows the analyst to draw inferences about the relationship between a company's historical ROE and its cost of equity from evidence on market-to-book ratios.

F. Reply to Dr. Woolridge's Rebuttal Comments

Q. 72 What issues does Dr. Woolridge have regarding your estimate of KAWC's cost of equity?

A. 72 Dr. Woolridge disagrees with my: (1) proxy companies; (2) quarterly DCF model; (3) reliance on analysts' growth forecasts; (4) risk premium estimates; and (5) allowance for flotation costs [Woolridge at 59-60].

1. Proxy Companies

Q. 73 What proxy companies do you use to estimate KAWC's cost of equity?

[3] Dr. Woolridge's workpapers provide only pictures of the data represented in Panel A, Panel B, and Panel C. Thus, it is not possible to verify with precision the data that the pictures represent.

A. 73 I use the comparable group of Value Line water utilities shown in Schedule 1 of my direct testimony and the comparable group of Value Line natural gas distribution companies shown in Schedule 2 of my direct testimony.

Q. 74 Why does Dr. Woolridge disagree with your choice of proxy companies?

A. 74 Dr. Woolridge claims that my comparable group of water utilities is unreasonable because it excludes "the three smallest water companies." [Woolridge at 58] Dr. Woolridge also disagrees with my comparable group of natural gas distribution companies because one of my companies, NiSource, "has a riskier operating and financial profile than gas distribution companies." [Woolridge at 58 – 59]

Q. 75 Why does your water comparable group not include the three smallest water utilities, Artesian, Connecticut Water Service, and York Water?

A. 75 I did not include these three companies in my water utility group at the time of my direct testimony because growth estimates were not available from either Value Line or I/B/E/S for these companies. Thus, I did not have the data required to include these companies in my DCF study.

Q. 76 Do you agree with Dr. Woolridge's opinion that you should have eliminated NiSource from your natural gas distribution company group?

A. 76 No. In any group of proxy companies, it is likely that some companies will have a lower risk profile than the average for the comparable group, while others will have a higher risk profile than the average for the group. The most important issue with regard to the natural gas comparable group is whether the average risk for the natural gas group is similar to the average risk for the water group of

utilities. As discussed above, the average risk of the natural gas utility group is approximately the same as the average risk of the water utility group even when NiSource is included in the natural gas group.

2. Quarterly DCF Model

Q. 77 What are Dr. Woolridge's criticisms of your DCF studies?

A. 77 Dr. Woolridge claims that my DCF results are overstated because I: (1) use the quarterly rather than the annual DCF model to estimate KAWC's cost of equity; (2) use analysts' growth rates to estimate the growth component of the DCF model; (3) use market value weighting to calculate my average DCF results; and (4) include an allowance for flotation costs. [Woolridge at 60]

Q. 78 What is the major difference between the quarterly DCF model you use and the annual DCF model employed by Dr. Woolridge?

A. 78 The major difference is that my quarterly DCF model is based on the realistic assumption that dividends are paid quarterly, while Dr. Woolridge's annual DCF model is based on the unrealistic assumption that dividends are paid once at the end of each year.

Q. 79 Why do you use the quarterly rather than the annual DCF model to estimate KAWC's cost of equity?

A. 79 As I discuss in my direct testimony, the DCF model assumes that a company's stock price is equal to the present discounted value of all expected future dividends. Since the companies in my comparable group all pay dividends quarterly, the current market price that investors are willing to pay reflects the expected quarterly receipt of dividends. Therefore, a quarterly DCF model must be used to estimate the cost of equity for these firms. The quarterly DCF model

differs from the annual DCF model in that it expresses a company's price as the present discounted value of a quarterly stream of dividend payments. The annual DCF model is only a correct expression for the present discounted value of future dividends if dividends are paid once at the end of each year.

Q. 80 Why does Dr. Woolridge disagree with your application of the quarterly DCF model?

A. 80 Dr. Woolridge argues first that an early proponent of the DCF model, Dr. Myron Gordon, stated that the appropriate dividend yield adjustment for growth in the DCF model "is the expected dividend for the next quarter multiplied by four." [Woolridge at 30] Second, Dr. Woolridge argues that Professor Bower has stated that the conventional DCF calculation produces a downwardly-biased estimate of the cost of equity, but the annual DCF model provides the most appropriate estimate of the utility's required return on equity for regulated utilities. [Woolridge at 61 - 62]

Q. 81 Is Dr. Gordon's statement in favor of an annual DCF model a reasonable justification for use of the annual DCF model in this proceeding?

A. 81 No. Although Dr. Gordon was certainly a major early proponent of the DCF model, this does not imply that Dr. Gordon is correct in his arguments regarding the quarterly DCF model. As shown in my Appendix 2 (filed with my direct testimony), there can be no doubt that, when dividends are paid quarterly, the quarterly DCF model must be used to estimate the cost of equity.

Q. 82 With reference to Dr. Woolridge's arguments concerning Dr. Bower, do you agree with Dr. Bower's statement that the annual DCF calculation is a

downwardly-biased estimate of the market cost of equity when companies pay dividends quarterly?

A. 82 Yes. Thus, I use the quarterly DCF model to estimate the cost of equity in this proceeding.

Q. 83 Do you agree with Dr. Bower's argument that the annual DCF model is the appropriate measure of the required return on equity, or cost of equity, for regulated utilities?

A. 83 No. I believe that it is important to measure the cost of equity for the proxy companies correctly. As discussed above and in my direct testimony, the quarterly DCF provides the best estimate of the cost of equity for my proxy companies.

3. Analysts' Growth Forecasts

Q. 84 Dr. Woolridge also criticizes your use of analysts' growth rates in your DCF model. Why do you use analysts' growth rates to estimate the growth component of the DCF model?

A. 84 I use analysts' growth rates because my studies indicate that the analysts' growth rates are highly correlated with stock prices. This evidence provides strong support for the conclusion that investors use analysts' growth rates in making stock buy and sell decisions, and thus the analysts' growth rates should be used to estimate the growth component of the DCF model.

Q. 85 Does Dr. Woolridge agree with your statistical studies of the relationship between analysts' growth rates and stock prices?

A. 85 No. Dr. Woolridge has four criticisms of my statistical studies of the relationship between analysts' growth rates and stock prices. First, he argues that my

statistical study is outdated. Second, he argues that my study is misspecified because I used a "linear approximation" to the DCF model rather than a modified version of the DCF model. Third, he argues that I did not use both historical and analysts' forecasted growth rates in the same regression. Fourth, he argues that I did not perform any tests to determine if the difference between historic and projected growth measures is statistically significant. [Woolridge at 65 - 66]

Q. 86 Do you agree with Dr. Woolridge's assertion that your statistical analysis of the relationship between analysts' growth rates and stock prices is outdated?

A. 86 No. As discussed in my direct testimony, my study was updated in August 2004. The updated study continues to support the conclusion that the analysts' growth rates are more highly correlated with stock prices than historical measures such as those employed by Dr. Woolridge. Furthermore, Dr. Woolridge ignores other studies that have corroborated my results.

Q. 87 Do you agree with Dr. Woolridge's criticism that your DCF model is misspecified because you used a "linear approximation" to the DCF model rather than a modified version of the DCF model?

A. 87 No. Most regression analyses are based on the assumption that the relationship between the variables being studied is linear. As part of my studies, I tested whether the linear assumption was sufficiently close to provide reliable estimates of the model parameters. Applying a first order Taylor-series approximation to the DCF equation, I found that the first order, or linear,

approximation was sufficiently close to the true equation to justify using linear regression analysis to study the relationship between price/earnings ratios and growth rates.

Q. 88 Why did you not use a combination of historical and analysts' growth rates in the same regression?

A. 88 I did not use a combination of historical and analysts' growth rates in the same regression because there are an infinite number of such combinations which could be tested. My studies indicate that the relationship between analysts' forecasts and stock prices is so strong compared to the relationship between historical growth rates and stock prices that there would be little advantage to combining historical growth rates with analysts' forecasts to predict stock prices.

Q. 89 Is there a statistically significant difference between historical and projected growth measures in explaining stock prices in your statistical study?

A. 89 Yes. The difference in performance of historical and projected growth rates is both statistically significant and dramatic.

Q. 90 Dr. Woolridge claims in his testimony that "it is well known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased." [Woolridge at 64] Is he correct?

A. 90 No. Contrary to Dr. Woolridge's claim, the academic literature presents compelling evidence that analysts' EPS forecasts are unbiased—that is, neither optimistic nor pessimistic. As discussed above, I have reviewed nine articles that address whether analysts' growth forecasts are overly optimistic. At least

seven of the nine articles reviewed find no evidence that analysts' growth forecasts are overly optimistic. Two find evidence of optimism, but also conclude that optimism is declining significantly over time. Of these two studies, one finds that analysts' forecasts for the S&P 500 are pessimistic for the last four years of the study.

Q. 91 Does some of the later research explain why some earlier studies in the literature conclude that analysts' EPS growth forecasts are optimistic?

A. 91 Yes. Articles by Abarbanell and Lehavy (2003) and Keane and Runkle (1998) recognize that the results of earlier studies are heavily influenced by the presence of large unexpected accounting write-offs and special accounting charges at a small number of sample companies. Analysts' forecasts intentionally exclude the impact of accounting write-offs and special charges because such one-time write-offs and special charges are inherently unpredictable. Unexpected accounting write-offs and special charges have a potentially dramatic impact on conclusions concerning analysts' bias because actual earnings include these items whereas analysts' normalized forecasts exclude them. Thus, a comparison of analysts' forecasts premised on normalized earnings (that is, earnings that exclude the impact of accounting write-offs and special charges) to reported earnings that include the negative effect of accounting write-offs and special charges will bias the results in favor of concluding that analysts are optimistic. These studies demonstrate that, once the distorting effect of unexpected accounting write-offs and special charges are

removed from the analysis, there is no evidence that analysts' EPS growth forecasts are optimistic.

This research also highlights the potential impact of high correlation in analysts' forecast errors on study conclusions. Analysts' forecast errors tend to be highly correlated because unexpected industry and economy-wide shocks, such as unexpected increases in oil prices or terrorist attacks, have similar effects on all firms in the same industry. However, typical statistical tests of optimism (such as R-squares and t-statistics) are based on the assumption that analysts' forecast errors are independent, that is, the tests assume that the correlation of the analyst errors is zero. Once the statistical tests of optimism are adjusted to account for the high correlation in forecast errors that generally characterize the data, evidence supports the hypothesis that analysts' EPS growth forecasts are unbiased, and hence not optimistic.

Q. 92 Dr. Woolridge also discusses his study of the relationship between analysts' forecasted growth rates and subsequently achieved growth rates [Woolridge Appendix B, page 12]. Do you have any criticisms of his study?

A. 92 Yes. First, Dr. Woolridge apparently makes no attempt to screen his data for companies that have only one or two analysts' growth forecasts or for companies that have outlier growth forecasts. Although my studies indicate that analysts' growth forecasts are highly correlated with stock prices for large publicly-traded companies that are followed by at least three analysts, they may not be highly correlated for many of the small companies contained in the

I/B/E/S data base that have fewer than three analysts' growth estimates and that have outlier growth forecasts. Second, Dr. Woolridge makes no attempt to correct for the statistical problems in studies of analysts' forecasts. For example, Dr. Woolridge makes no attempt to adjust his data for the impact on earnings of unexpected accounting write-offs and special charges. Further, Dr. Woolridge fails to adjust for the high correlation in analysts' forecast errors across companies. Financial researchers have conclusively demonstrated that there is no evidence of analysts' optimism in data sets that are properly adjusted for the impact of one-time accounting write-offs and the correlation in analysts' forecasts errors across companies.[4]

Q. 93 Dr. Woolridge also discusses the results of his study of the relationship between analysts' forecasts for utilities and the utilities' subsequent achieved earnings growth rates. [Woolridge Appendix B, page 13] Do you have any comments on his study?

A. 93 Yes. First, Dr. Woolridge has misspecified the time frame of his analysts' earnings growth forecasts. In his study, Dr. Woolridge claims that he compares an analysts' forecast made in a particular quarter to the company's realized earnings growth rate in the same quarter four years hence. In making this comparison, Dr. Woolridge fails to recognize that the time frame of the analysts' growth forecast is an indefinite, long-run period that may differ from one analyst to another. Dr. Woolridge has provided no evidence that analysts' growth

[4] *See* Jeffery Abarbanell and Reuven Lehavy, "Biased Forecasts or Biased Earnings? The Role of Reported Earnings in Explaining Apparent Bias and Over/underreaction in Analysts' Earnings Forecasts," *Journal of Accounting and Economics,* 36 (2003) 105 – 146; Stephen J. Ciccone, "Trends in Analyst Eranings Forecast Properites," *International Review of financial Analysis*, 14 (2005) 1 – 22.

estimates were intended to forecast actual results for a period exactly four years hence. Second, Dr. Woolridge has not distinguished between normalized and non-normalized earnings. The analysts' forecasts are generally intended to be normalized earnings growth forecasts, meaning that they are forecasts of earnings in the absence of extraordinary events and one-time write-offs. It is likely that many forecast deviations in Dr. Woolridge's sample are due to extraordinary events and one-time write-offs rather than to problems with the analysts' forecasts of normalized earnings.

4. Risk Premium

Q. 94 What is the risk premium approach to estimating the cost of equity?

A. 94 The risk premium approach is based on the principle that investors expect to earn a return on an equity investment in KAWC that reflects a "premium" over the return they expect to earn on an investment in a portfolio of long-term bonds. This equity risk premium compensates equity investors for the additional risk they bear in making equity investments versus bond investments. Using the risk premium approach, the cost of equity is given by the following equation: cost of equity = interest rate plus risk premium.

Q. 95 How do you estimate the interest rate component of the risk premium approach?

A. 95 I estimate the interest rate component of the risk premium approach using the forecasted yield to maturity on A-rated utility bonds.

Q. 96 Does Dr. Woolridge have any criticisms of your use of the forecasted yield to maturity on A-rated utility bonds to estimate the interest rate component of the risk premium approach?

A. 96 Yes. Dr. Woolridge argues that my use of the forecasted yield to maturity on A-rated utility bonds inflates the required return on equity because: (1) the forecasted yield is above the current yield on A-rated utility bonds; and (2) long-term utility bonds are not risk free, that is, they are subject to both interest rate risk and credit risk [Woolridge at 71 - 72].

Q. 97 Why do you use the forecasted yield to maturity rather than the current yield to maturity on A-rated utility bonds to estimate the interest rate component of the risk premium approach to estimating the cost of equity?

A. 97 I use a forecasted yield to maturity on A-rated utility bonds rather than a current yield to maturity because the fair rate of return standard requires that a company have an opportunity to earn its required return on its investment during the forward-looking period during which rates will be in effect. Because current interest rates are depressed as a result of the Federal Reserve's extraordinary efforts to keep interest rates low in an effort to stimulate the economy, current interest rates at this time are likely a poor indicator of expected future interest rates. Economists project that future interest rates will be higher than current interest rates as the Federal Reserve allows interest rates to rise in order to prevent inflation. Thus, the use of forecasted interest rates is consistent with the fair rate of return standard, whereas the use of current interest rates at this time is not.

Q. 98 Do you agree with Dr. Woolridge's criticism of your use of the yield to maturity on A-rated utility bonds to estimate the interest rate component of the risk premium approach?

A. 98 No. Dr. Woolridge fails to recognize that the risk premium approach does not require that the interest rate be “risk free.” Indeed, the only requirement of the risk premium approach is that the same interest rate be used to estimate the interest rate component as is used to estimate the risk premium component. Since the risk premium approach suggests that the cost of equity equals (the interest rate) plus (the required return on equity minus the interest rate), the cost of equity should be approximately the same in a risk premium analysis, no matter what interest rate is used as the benchmark interest rate. Thus, use of the interest rate on A-rated utility bonds in a risk premium analysis will produce a higher interest rate component than use of a government bond interest rate, but this difference will be offset by the correspondingly lower risk premium. The lower risk premium arises because the difference between the return on equity and yield on A-rated utility bonds is less than the difference between the return on equity and the yield on long-term government bonds.

Q. 99 Why do you use the yield on A-rated utility bonds rather than the yield on Treasury bonds in your risk premium studies?

A. 99 I use the yield on A-rated utility bonds rather than the yield on Treasury bonds in my risk premium studies because I believe that utility bond yields are better indicators of utilities’ cost of equity than Treasury bond yields. First, because the U.S. dollar is the major currency for international trade, foreign governments tend to hold their currency reserves in U.S. Treasury bonds. Thus, Treasury bond yields are highly sensitive to changes in international economic conditions, whereas the U.S. utilities’ cost of equity is not.

Second, since U.S. Treasuries are considered to be the safest investment in the world, investors across the world tend to flock to investments in U.S. Treasuries at times of widespread global economic turmoil. In such periods of turmoil, the required return on risky investments such as utility bonds and stocks increases while the yield on U.S. Treasury bonds declines.

Third, yields on U.S. Treasury bonds are highly sensitive to efforts by the Federal Reserve to stimulate the economy. Although most Federal Reserve monetary policy operations are conducted using short-term U. S. Treasury bills, yields on long-term Treasury bonds frequently move in the same direction as yields on short-term Treasury bills. In addition, the Federal Reserve has recently begun to purchase long-term Treasury bonds in an effort to further reduce long-term Treasury yields.

Fourth, to the extent that there are economic developments that are specific to the utility industry, such as changes in environmental regulations and energy policy, such factors will be reflected both in utility bond yields and the utility cost of equity, but not in U.S. Treasury bond yields. Thus, that utility bond yields reflect utility-specific risks is an argument for—not an argument against—the use of utility bond yields to indicate changes in the utility cost of equity.

Q. 100 How do you estimate the risk premium component of the risk premium approach?

A. 100 I estimate the risk premium component of the risk premium approach in two ways. First, I estimate the difference between the DCF cost of equity for a comparable group of companies over the previous 183 months and the

concurrent yield to maturity on A-rated utility bonds in those months, and then adjust the average risk premium to account for changes in interest rates. This estimate is my "ex ante risk premium approach." Second, I estimate the risk premium from an historical study of stock and bond returns over the period 1937 to the present. This second risk premium approach is my "ex post risk premium approach."

Q. 101 Why does Dr. Woolridge criticize your ex ante risk premium approach?

A. 101 Dr. Woolridge criticizes my ex ante risk premium approach because it relies on analysts' forecasts to estimate the required return on equity using the DCF model. [Woolridge at 72 - 73]

Q. 102 Have you addressed this criticism elsewhere in this rebuttal testimony?

A. 102 Yes, I rebut Dr. Woolridge's criticisms of the use of analysts' forecasts above.

Q. 103 Does Dr. Woolridge agree with your use of historical stock and bond returns to estimate the equity risk premium?

A. 103 No. Dr. Woolridge states:

> There are a number of flaws in using historic returns over long time periods to estimate expected equity risk premiums. These issues include: (a) biased historic bond returns; (b) the arithmetic versus the geometric mean return; (c) the large error in measuring the equity risk premium using historical returns; (d) unattainable and biased historic stock returns; (e) company survivorship bias; and (f) the "peso problem—U.S. stock market survivorship bias. [Woolridge Appendix D, page 1]

Q. 104 Why does Dr. Woolridge believe that historical bond returns are biased?

A. 104 Dr. Woolridge states:

> Historic bond returns are biased downward as a measure of expectancy because of capital losses suffered by bondholders in the past. As such, risk premiums derived from this data are biased upwards. [Woolridge Appendix D, page 2]

Q. 105 Do you agree with Dr. Woolridge's statement that historical bond returns are biased downward because of capital losses suffered by past bond investors?

A. 105 No. Because of capital gains and losses, historical bond returns may be higher or lower than what investors expected at the time they purchased the bonds. During the period since 1982, for example, historical bond returns have been biased upward as a measure of expectancy because of the large capital gains achieved by bondholders over this period. However, over the entire period considered in my ex post risk premium study (from 1937 to the present), capital gains and losses on bonds have approximately offset each other, and consequently there is no significant bias as a result from either capital gains or losses.

Q. 106 What is the difference between an arithmetic and a geometric mean return?

A. 106 An arithmetic mean return is an additive return that is calculated by summing the achieved return in each time period and dividing the total by the number of periods. In contrast, the geometric mean return is a multiplicative return that is calculated in two steps. First, one calculates the product of (1 plus the return) in each period of the study. Second, one calculates the n^{th} root of this product and subtracts 1 from the result. Thus, if there are two periods, and r_1 and r_2 are the returns in periods one and two, respectively, the arithmetic mean is calculated from the equation: $a_m = (r_1 + r_2) \div 2$. The geometric mean is calculated from the equation,

$$a_g = [(1 + r_1) \times (1 + r_2)]^{.5} - 1.$$

Q. 107 Please describe Dr. Woolridge's concern regarding the use of geometric versus arithmetic mean returns.

A. 107 Dr. Woolridge believes that my ex post risk premium study is biased because I calculate the expected risk premium using the arithmetic mean of past returns, whereas he believes I should have calculated the expected risk premium using the geometric mean of past returns. [Woolridge Appendix D, pp. 1 – 3]

Q. 108 Is Dr. Woolridge's criticism valid?

A. 108 No. As explained in Ibbotson® SBBI® Valuation Edition 2013 Yearbook (SBBI®), the arithmetic mean return is the best approach for calculating the return investors expect to receive in the future:

> The equity risk premium data presented in this book are arithmetic average risk premia as opposed to geometric average risk premia. The arithmetic average equity risk premium can be demonstrated to be most appropriate when discounting future cash flows. For use as the expected equity risk premium in either the CAPM or the building block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless rates is the relevant number. This is because both the CAPM and the building block approach are additive models, in which the cost of capital is the sum of its parts. The geometric average is more appropriate for reporting past performance, since it represents the compound average return. [SBBI® at 56]

A discussion of the importance of using arithmetic mean returns in the context of CAPM or risk premium studies is contained in my direct testimony, Exhibit__JVW-1, Schedule 6, "Using the Arithmetic Mean to Estimate the Cost of Equity Capital."

Q. 109 Dr. Woolridge also criticizes your ex post risk premium study because it is based on "unattainable and biased historic stock returns." [Woolridge Appendix D, pp. 4 - 5] Is he correct?

A. 109 No. Dr. Woolridge bases his allegation on the assumption that stock index returns such as those reported by Ibbotson are "unattainable to investors." Dr. Woolridge's assumption is false: investors, in fact, can attain the returns achieved by stock indices simply by purchasing the stock index.

Q. 110 Do you agree with Dr. Woolridge's criticism that your ex post risk premium study is characterized by "survivorship bias"? [Woolridge Appendix D, pp. 5 - 6]

A. 110 No. Survivorship bias refers to problems that might arise when data for companies that have failed are excluded from the sample. However, with regard to the U.S. markets that I study, survivorship bias is not a major issue. First, over the period 1937 to the present, there have been relatively few companies in the S&P 500 and the S&P Utilities that have failed. Second, the S&P 500 includes the return on a stock until the day it is dropped from the index, and the effect of a company being dropped from the S&P 500 is generally anticipated by the market well in advance of the delisting. Thus, survivorship is not a material issue with respect to U.S. stocks.

Q. 111 What does Dr. Woolridge mean when he refers to the "peso problem"?

A. 111 Dr. Woolridge uses the term "peso problem" to refer to the fact that U.S. investors have earned higher returns on stock investments than investors in other countries because the U.S. economy has not suffered many of the same

economic calamities as the economies of other countries. This criticism of the use of U. S. stock returns in risk premium studies might be appropriate if one were attempting to estimate the expected rates of return on non-U. S. stocks. However, for U. S. stocks, since there is no indication that the U. S. will suffer the economic calamities of other countries, such as hyper-inflation or military invasion, there is no reason why the returns on U. S. stocks would be biased upward. As Morningstar states with respect to "survivorship bias" and the closely-related "peso problem":

> While the survivorship bias evidence may be compelling on a worldwide basis, one can question its relevance to a purely U.S. analysis. If the entity being valued is a U.S. company, then the relevant data set should be the performance of equities in the U.S. market. [SBBI® at 62]

Q. 112 Dr. Woolridge claims that his 5.0 percent market risk premium estimate in his CAPM analysis is reasonable because it is consistent with the 6.13 percent long-term forecasted return on the S&P 500 published in February 2013 by the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters [Woolridge at 50]. Is the Survey of Professional Forecasters a reliable source of cost of equity estimates?

A. 112 No. The economists included in the survey are macro economists who are primarily concerned with forecasting factors such as GDP growth, inflation rates, unemployment rates, job growth, and other macroeconomic indicators. The 6.13 percent forecast of the long-term expected return on the S&P 500 is inherently unrealistic as an estimate of the required return on the S&P 500 because this expected return as of February 2013 is sixty-three basis points less than the Energy Information Administration's current 6.78 percent

forecasted yield on AA-rated utility bonds. Since equity investments in the S&P 500 are more risky than investments in AA-rated utility bonds, the required rate of return, or cost of equity, on the S&P 500 must certainly be significantly higher than−not less than−the yield to maturity on AA-rated utility bonds.

Q. 113 Dr. Woolridge also claims that his risk premium estimate is reasonable because it is consistent with the risk premium estimate found in the CFO Magazine survey of Chief Financial Officers in March 2013 [Woolridge at 49]. Do you agree that surveys of business managers provide useful information on the expected or required return on equity?

A. 113 No. Surveys of business managers provide little information on the expected or required return on equity because: (1) managers have no incentive to take the survey seriously; (2) their responses are not typically based on market transactions or actual investment decisions; (3) their responses may reflect what they think the investigator wants to hear; and (4) the response rate is frequently low.

Furthermore, Dr. Woolridge fails to note that the authors of the CFO survey report that managers responding to their survey typically use a cost of equity or "hurdle rate" in making investment decisions that exceeds the cost of equity estimate implied by their views of the expected return on the S&P 500. As Graham and Harvey state, "Often their [the CFO's] 10-year risk premium is supplemented so that the company's hurdle rate exceeds their expected excess return on the S&P 500." [John Graham and Campbell Harvey, "The Equity Risk Premium in 2013," pp. 8 – 9]

5. Flotation Costs

Q. 114 Why do you include an adjustment for flotation costs in your DCF analysis?

A. 114 I include an adjustment for flotation costs because, without such an adjustment, KAWC would not be able to recover all the costs it incurs to finance its investments in plant and equipment.

Q. 115 Does KAWC issue equity in the capital markets?

A. 115 No. Although KAWC does not issue equity in the capital markets, its parent must issue equity to provide KAWC the necessary financing to make investments in its utility operations. If the parent is not able to recover its flotation costs through KAWC's rates, it will have no incentive to invest in KAWC.

Q. 116 Does Dr. Woolridge agree with your flotation cost adjustment?

A. 116 No. Dr. Woolridge claims that a flotation cost adjustment is inappropriate because: (1) the company has not presented any evidence that it actually incurs flotation costs when it issues new equity; and (2) it is frequently asserted that a flotation cost adjustment is required to prevent dilution of the company's existing shareholders, but existing shareholders cannot suffer dilution as long as the company's stock price is above book value. [Woolridge at 68 - 70]

Q. 117 Do you agree with Dr. Woolridge's assertion that the company did not provide any evidence that it incurs flotation costs when it issues new equity?

A. 117 No. In Appendix 3 of my direct testimony, I present evidence that all companies incur flotation costs when they issue new equity securities, that flotation costs

represent approximately five percent of the company's pre-issue stock price, and that the company will not be able to earn a fair rate of return on its investment if it does not recover its flotation costs.

Q. 118 Do you justify flotation costs on the grounds that flotation costs are required to prevent dilution of existing shareholders?

A. 118 No. I justify flotation costs on the grounds that the company will not be able to earn a fair rate of return if it does not recover the flotation costs it incurs when it issues new equity. My flotation cost adjustment is unrelated to the company's market-to-book ratio.

Q. 119 Does this conclude your rebuttal testimony?

A. 119 Yes, it does.

KENTUCKY AMERICAN WATER COMPANY
REBUTTAL SCHEDULE 1
DR. WOOLRIDGE'S RISK COMPARISON OF WATER AND GAS UTILITIES COMPARABLE GROUPS[5]

	BETA	SAFETY RANK	FINANCIAL STRENGTH	FINANCIAL STRENGTH (NUMERICAL)	EARNINGS PREDICTABILITY	PRICE STABILITY
WATER COMPARABLE GROUP						
American States Water Co.	0.70	2	A	3	90	90
American Water Works Co., Inc.	0.65	3	B	6	20	95
Aqua America, Inc.	0.60	2	B++	4	100	100
Artesian Resources Corp.	0.55	2	B++	4	85	100
California Water Service Group	0.65	3	B+	5	90	100
Connecticut Water Service, Inc.	0.75	3	B+	5	85	90
Middlesex Water Company	0.70	2	B+	5	85	95
SJW Corporation	0.85	3	B+	5	80	80
York Water Company	0.70	2	B++	4	100	95
Average	**0.68**	**2.4**	**B+**	**4.6**	**82**	**94**
GAS COMPARABLE GROUP						
AGL Resources Inc.	0.75	1	A	3	75	100
Atmos Energy Corporation	0.70	2	B++	4	90	100
Laclede Group, Inc.	0.55	2	B++	4	80	100
Northwest Natural Gas Co.	0.60	1	A	3	90	100
Piedmont Natural Gas Co., Inc.	0.65	2	B++	4	100	100
South Jersey Industries, Inc.	0.65	2	B++	4	85	100
Southwest Gas Corporation	0.75	3	B	6	75	100
WGL Holdings, Inc.	0.65	1	A	3	95	100
Average	**0.66**	**1.8**	**B++**	**3.9**	**86**	**100**
GAS COMPARABLE GROUP AND NISOURCE						
AGL Resources Inc.	0.75	1	A	3	75	100
Atmos Energy Corporation	0.70	2	B++	4	90	100
Laclede Group, Inc.	0.55	2	B++	4	80	100
NiSource	0.80	3	B+	5	80	95
Northwest Natural Gas Co.	0.60	1	A	3	90	100
Piedmont Natural Gas Co., Inc.	0.65	2	B++	4	100	100
South Jersey Industries, Inc.	0.65	2	B++	4	85	100
Southwest Gas Corporation	0.75	3	B	6	75	100
WGL Holdings, Inc.	0.65	1	A	3	95	100
Average	**0.68**	**1.9**	**B++**	**4.0**	**86**	**99**

[5] Data from Dr. Woolridge's Exhibit JRW-4 and Value Line report for NiSource.

KENTUCKY AMERICAN WATER COMPANY
REBUTTAL SCHEDULE 2
COMPARISON OF WATER COMPANIES' AND GAS UTILITIES'
VALUE LINE SAFETY RANKS AND STANDARD & POOR'S BOND RATINGS[6]

LINE	COMPANY	SAFETY RANK	S&P BOND RATING	S&P BOND RATING (NUMERICAL)
1	Amer. States Water	2	A+	3
2	Amer. Water Works	3	BBB+	6
3	Aqua America	2	A+	3
4	California Water	3	A+	3
5	Middlesex Water	2	A-	5
6	SJW Corp.	3	A	4
7	**Average**	**2.5**	**A**	**4.0**
8	**Amer. Water Works**	**3**	**BBB+**	**6**

LINE	COMPANY	SAFETY RANK	S&P BOND RATING	S&P BOND RATING (Numerical)
1	AGL Resources	1	BBB+	6
2	Atmos Energy	2	BBB+	6
3	NiSource Inc.	3	BBB-	8
4	Northwest Nat. Gas	1	A+	3
5	Piedmont Natural Gas	2	A	4
6	South Jersey Inds.	2	BBB+	6
7	WGL Holdings Inc.	1	A+	3
8	**Average**	**1.7**	**A-**	**5.1**

[6] Data from Value Line Investment Analyzer, Standard & Poor's.

KENTUCKY AMERICAN WATER COMPANY
REBUTTAL SCHEDULE 3
SUMMARY OF DISCOUNTED CASH FLOW ANALYSIS
FOR WATER UTILITIES AT FEBRUARY 2013

LINE	COMPANY	D_0	P_0	VALUE LINE EPS GROWTH	I/B/E/S GROWTH	AVE GROWTH	MODEL RESULT
1	Amer. States Water	1.42	49.452	5.50%	6.00%	5.75%	8.9%
2	Amer. Water Works	1.00	38.155	9.00%	8.50%	8.75%	11.8%
3	Aqua America	0.70	26.672	7.00%	7.30%	7.15%	10.1%
4	California Water	0.64	18.973	6.00%	5.00%	5.50%	9.3%
5	Conn. Water Services	0.97	29.923	7.50%	6.10%	6.80%	10.6%
6	Middlesex Water	0.75	19.345	7.00%	2.70%	4.85%	9.3%
7	SJW Corp.	0.73	26.213	8.00%	14.00%	11.00%	14.4%
8	Average						10.6%
9	Market-weighted Average						11.0%
10	Average Line 8 and 9						10.8%

Notes:

d_0 = Most recent quarterly dividend.
d_1, d_2, d_3, d_4 = Next four quarterly dividends, calculated by multiplying the last four quarterly dividends per *Value Line* and Yahoo Finance by the factor (1 + g).
P_0 = Average of the monthly high and low stock prices during the three months ending February 2013 from Thomson Reuters.
FC = Flotation costs expressed as a percent of gross proceeds.
g = I/B/E/S forecast of future earnings growth February 2013.
k = Cost of equity using the quarterly version of the DCF model shown by the formula below:

$$k = \frac{d_1(1+k)^{.75} + d_2(1+k)^{.50} + d_3(1+k)^{.25} + d_4}{P_0(1-FC)} + g$$

KENTUCKY AMERICAN WATER COMPANY
REBUTTAL SCHEDULE 4
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THE EFFICACY OF ANALYSTS' EARNINGS FORECASTS

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REBUTTAL SCHEDULE 4 (CONTINUED)
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THE EFFICACY OF ANALYSTS' EARNINGS FORECASTS

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VERIFICATION

STATE OF NORTH CAROLINA)
) **SS:**
COUNTY OF DURHAM)

The undersigned, **Dr. James H. Vander Weide,** being duly sworn, deposes and says he is a Research Professor of Finance and Economics at Duke University, the Fuqua School of Business and President of Financial Strategy Associates, that he has personal knowledge of the matters set forth in the foregoing testimony, and the answers contained therein are true and correct to the best of his information, knowledge, and belief.

Dr. James H. Vander Weide
DR. JAMES H. VANDER WEIDE

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13 day of May, 2013.

Lucia Carbajal
Notary Public

(SEAL)

LUCIA CARBAJAL
Notary Public
Durham County
North Carolina
My Commission Expires Mar 26, 2018

My Commission Expires:
March 26, 2018

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	**)**	
	)	
THE APPLICATION OF KENTUCKY-AMERICAN WATER COMPANY FOR AN ADJUSTMENT OF RATES ON AND AFTER JANUARY 27, 2013	**)**	**CASE NO. 2012-00520**

REBUTTAL TESTIMONY OF GARY M. VERDOUW

May 15, 2013

KENTUCKY AMERICAN WATER COMPANY
CASE NO. 2012-00520
DIRECT TESTIMONY
GARY M. VERDOUW

BACKGROUND

Q. Please state your name and business address.

A. My name is Gary M. VerDouw and my business address is 727 Craig Road, Saint Louis, Missouri 63141.

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

A. I am employed by American Water Works Service Company ("Service Company") as the Director of Rates for American Water's seven-state Central Division, which includes Kentucky-American Water Company ("Kentucky American" or the "Company"). The Service Company provides support services to American Water's subsidiaries, including Kentucky American, and is a subsidiary of American Water Works Company, Inc. ("American Water").

Q. Have you previously submitted direct testimony in this proceeding?

A. Yes, I have.

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is (1) to respond to the questions and issues that have been presented regarding Kentucky American's Business Transformation ("BT") project; (2) respond to the pre-filed Direct Testimony of Stephen M. Rackers on behalf of

the Kentucky Office of the Attorney General ("AG") and Lexington-Fayette Urban County Government ("LFUCG") regarding his recommendations to the Commission to deny the Company's proposed Distribution System Improvement Charge ("DSIC") and Purchased Power and Chemicals Charge ("PPACC") Tariff Riders, and (3) to address his proposed recommended changes to the Company's proposed DSIC mechanism should the Commission approve the DSIC.

Q. What rebuttal exhibits are you sponsoring?

A. I am sponsoring the following rebuttal exhibits:

GMV Reb-1	AWWA Research Foundation, "Guidance for Management of Distribution System Operation and Maintenance"
GMV Reb-2	EPA Water Sense, "Using Water Efficiently"
GMV Reb-3	EPA, "Distribution System Integrity, Integrity and Water Quality"
GMV Reb-4	Response to Commission Staff's Third Request for Information, Question 19
GMV Reb-5	Kentucky American Water Company, Purchased Power and Chemicals Expenses 2006-2012

Q. What have you done to formulate your opinions and prepare your rebuttal testimony?

A. I have reviewed the testimony and exhibits filed by the AG, LFUCG and the Community Action Council for Lexington-Fayette, Bourbon, Harrison, and Nicholas Counties, Inc. ("CAC"). For purposes of this testimony, I focused on the testimony and exhibits of Stephen M. Rackers on behalf of the AG and LFUCG, in addition to reviewing supporting workpapers and responses to data requests from Kentucky American to all parties.

RESPONSES TO QUESTIONS AND ISSUES REGARDING BT

Q. Explain the process by which Kentucky American, as an operating subsidiary of American Water, decided that BT was both necessary and reasonable in cost.

A. The Comprehensive Planning Study, which was attached in response to Item No. 168 of the Attorney General's First Request for Information, establishes the need for BT. American Water made a significant investment in comprehensive planning to determine the best option available for replacing or upgrading the software systems used to support its water and wastewater subsidiaries.[1] Comprehensive planning studies are the same process used by Kentucky American to determine investment necessity. Kentucky American does not support the unnecessary duplication of resources or investments. It would have been imprudent and wasteful for the Company (and its sister companies) to have performed its own need analysis when American Water had already performed one.

Kentucky American has determined that the BT costs are reasonable and necessary using the same internal capital investment management budgeting review process that Kentucky American employs for all major capital projects. Further, American Water employed the same cost control measures for the BT program that Kentucky American uses for all of its major capital projects. The measures include competitive bidding, ongoing project feedback from key stakeholders in the business (including representatives of Kentucky American), and ongoing project budget management. An additional cost control measure was the negotiation of a fixed fee "not to exceed"

[1] See line 11 on Schedule BT-1.1, an exhibit to my pre-filed direct testimony.

contract element. These processes, and Kentucky American's involvement in the project management, ensure cost reasonability for Kentucky American.[2]

The LFUCG and Attorney General's position that cost reasonableness cannot be ascertained without a separate cost analysis to determine if Kentucky American could have developed or purchased a system on its own is unreasonable, and is discussed in detail below. Kentucky American, through the American Water process involving a Comprehensive Planning Study, the competitive bidding process, the fixed fee "not to exceed" contract stipulation, and the involvement of the business in the BT project, has demonstrated and documented the benefits, need, and cost reasonability of the BT project for Kentucky American.

Q. Did Kentucky American ever consider replacing its outdated information systems on a stand-alone basis rather than sharing a portion of the American Water-wide purchase of BT?

A. No, it did not. This is not a solution that would have benefited Kentucky American's customers, and thus was not an option in which the Company invested resources. Kentucky American depends on the use of shared personnel and information technology support for much of its day-to-day operations and nearly all of its administrative and customer accounting functions. The Service Company provides Kentucky American a

[2] The competitive bidding documents and other cost control support were supplied in response to Item Nos. 67, 68, and 69 of the Commission Staff's Second Request for Information. Documents regarding Kentucky American's involvement include the Company's response to Commission Staff's Third Request for Information, Item 24.

number of services that enable Kentucky American to fulfill its public utility responsibilities. The Service Company provides effective information technology support and solutions to meet Kentucky American's business needs both in the office and the field through standardized technology and processes. Examples of these services include customer service, water quality testing, innovation and environmental stewardship, human resources, communications, information technology, finance, accounting, tax, legal, engineering, supply chain, and insurance services. The Service Company operates two customer service centers in Alton, IL and Pensacola, FL that handle customer calls, billing, and collection activities for Kentucky American. The customer service centers handle customer inquiries and correspondence and processes service order requests 24 hours per day, seven days per week. The Service Company operates Field Resource Coordination Centers responsible for tracking and dispatching service orders for Kentucky American's field representatives and contractor crews. The Service Company also provides a variety of financial and accounting services for Kentucky American including payroll, human resources data management, utility plant accounting, cash management, general accounting and reporting, accounts payable, and tax that rely on integrated technology platforms and shared resources. Attempting to purchase, develop, operate and maintain comprehensive core information technology systems independent from that used by the employees in these functions is simply not feasible, and, if even possible, would have created extraordinary inefficiencies due to constant duplication of efforts, reconciliation, conversion, and the transport of data simply to conduct day to day business.

Q. How is Kentucky American certain that that the BT costs in this case are reasonable and necessary? Do the costs seem reasonable given the Company's size?

A. As described above, the cost reasonableness of BT has been documented and demonstrated through the same processes used by Kentucky American for its other investments. Namely, cost reasonableness is ensured through competitive bidding, ongoing project feedback from key stakeholders (including Kentucky American representatives), and ongoing budget management. Additionally, cost reasonableness is ensured through fixed fee "not to exceed" contract stipulations. Also described above, project necessity is likewise determined by the same process used by Kentucky American for its other investments. Kentucky American's investment of approximately $12 million does indeed seem reasonable in the context of similar investments by comparable utility companies in Kentucky.

Q. Is it accurate to say there has been no assessment of the benefits that BT will generate for Kentucky American customers? If there has been an assessment, please explain how that is different than a study of the "financial effects" BT will generate.

A. No, it is not accurate to say there has been no assessment of benefits. In fact, a comprehensive benefit analysis was performed, and numerous benefits to Kentucky customers have been identified in this case. In Item No. 60 of the Commission Staff's Second Request for Information, the Company was asked if any studies or analyses had been performed for either of two distinct items: financial effects or benefits to Kentucky American. The Company responded by citing numerous examples of benefit assessment.

The first was to reference my pre-filed direct testimony, which includes two pages devoted exclusively to describing the benefits of the BT project on pages 44 through 45. The second was to cite the Comprehensive Planning Study, which devotes the "Project Recommendations" section on pages 35-52 to delineating the benefits and costs of the recommended project.[3] Please see these documents for the benefits Kentucky American and its customers can expect.

The Company separately responded that a financial effect analysis had not been performed, but that is not to say that extensive efforts were not undergone to optimize a solution with the least cost. Indeed, as discussed above, cost control measures employed for the BT project are the same capital cost control measures that Kentucky American uses for its capital projects. The cost control measures include competitive bidding, ongoing project feedback from key stakeholders in the business, and ongoing budget management. An additional measure was put in beyond this to define a fixed fee "not to exceed" threshold.

The case cited in several data requests (Kentucky Public Service Commission Case No. 2008-00563) denied recovery of software due to two failures: failure to document cost reasonability and failure to identify the benefits of the computer software to ratepayers. Neither condition applies here. The Company devoted extensive energy to ensuring cost

[3] This document was submitted as an attachment to the response to Item No. 168 of the Attorney General's First Request for Information.

reasonability and ensuring operational and customer service benefits, and those efforts are well documented in this proceeding.

Q. Assuming that BT includes features and benefits that will be utilized by Kentucky American, are there features of BT that the Company will not utilize? If so, how will Kentucky American be certain that it is not paying for features that are not being utilized?

A. Kentucky American will utilize all features of BT. Unlike in the utility in Case No. 2008-00563, the BT Project was developed for the benefit of American Water's regulated water and wastewater utilities, not for its market-based businesses.

Q. Do you agree with the Attorney General that Kentucky American's decision to exit the billing agreements should result in Kentucky American's customers receiving a credit toward BT costs?

A. Not at all. Please see the discussion in Cheryl Norton's Direct Testimony and Rebuttal Testimony regarding the decision to exit third party billing. Furthermore, BT costs are lower than they would have been had third party billing been continued, and are thus already discounted due to billing discontinuation. The Company's response to the Commission Staff's Second Request for Information, Item 78, outlines these and other revenue requirement reductions due to the billing service discontinuation.

RESPONSE TO TESTIMONY OF STEPHEN M. RACKERS ON BEHALF OF THE AG AND LFUCG

Q. What is Mr. Rackers' recommendation regarding Kentucky American's request to implement a DSIC?

A. It is Mr. Rackers' recommendation that the Kentucky Public Service Commission ("Commission") deny Kentucky American's request for a DSIC.

Q. What reasons does Mr. Rackers give for recommending that the DSIC be denied by the Commission?

A. Mr. Rackers provides four reasons for recommending that the DSIC be denied. First, Mr. Rackers questions Kentucky American's need to accelerate and increase the level of its distribution system infrastructure replacement investment based on: (i) the Company's current achieved level of lost water being 11.79%; and (ii) by claiming that the statistics provided by Kentucky American relative to the state of the nation's water systems infrastructure, and their respective cost of replacement, are overstated in that they reflect water system infrastructure beyond distribution system facilities. Second, Mr. Rackers takes issue with the fact that Kentucky American has not specifically identified the projects that will be addressed by the DSIC, nor has it written procedures or policies to rank or prioritize the replacement of aging water mains. Third, Mr. Rackers argues that the Company has no expectation of achieving savings (in the near-term), nor has it provided assurances that it will file less base rate cases as a result of implementing a DSIC. Finally Mr. Rackers asserts that the DSIC (and PPACC) represent single issue ratemaking, which can skew the relationship between revenues, expenses and rate base and lead to the Company potentially earning above its authorized rate of return.

I address each of Mr. Rackers' concerns in my testimony below.

Q. Mr. Rackers, on page 8, lines 9 through 19 of his testimony, claims that the Company does not provide an identification of specific projects the DSIC will address. He also states the Company has no written procedures or polices to rank or prioritize the replacement of aging mains and therefore the DSIC should not be authorized. Do you agree with this recommendation?

A. No, I do not. Mr. Williams' testimony, subsequently adopted by Ms. Bridwell, describes the factors and the processes used in the preparation of the Company's forecasted capital construction, as well as the intent of its planning process and the criteria used in the design of the various components of a potable water system. On pages 14 and 15 of Mr. Williams' testimony and in Exhibit LEW-1, he details the Company's system of water mains; how much of the system is 75 years old and older (the approximate expected useful life of a water main); the Company's current replacement rate in miles of main; its current replacement dollar expenditures for 6" and smaller mains; and, the number of years it would take the Company to replace all mains that are currently 75 years and older, as well as for just those mains that are 6" and smaller. The testimony clearly indicates that Kentucky American's current replacement rates are not adequate and must be accelerated and increased on a sustained basis if the Company is to begin to address the magnitude of its infrastructure replacement needs, as well as the importance of the issue to the Company's ability to continue to provide safe and reliable water service to its customers. This acceleration of replacement mains is paramount to allowing the Company to address the 82 miles of 6" and smaller mains that are currently 75 years of

age or older, as well as the additional 220 miles of 6" and smaller main that will reach 75 years or older in the next 30 years.[4] In response to Item No. 100 of the Commission Staff's Second Request for Information, the Company indicated it currently evaluates and prioritizes water line replacement needs based on multiple criteria including pipe age, material, diameter, joint type, interior lining, exterior protection, number of main breaks, type of breaks, water quality, difficulty in repair, cost to repair, hydraulic adequacy, pressure adequacy, fire flow adequacy, type and number of customers impacted by main breaks, coordination with others utilities, and pipe shut down tolerance.

Kentucky American engineering personnel identify proposed main replacements and meet with operations personnel to prioritize main replacements within proposed annual budget spending and the potential timing of construction, based on the above-listed criteria and other needs in order to meet customers' expectations. These projects are then placed in the annual replacement program based on the available funds that remain after taking into consideration replacement projects associated with required relocations caused by city, county and state improvement projects.

While not articulated in a written policy, Kentucky American actually uses a fairly extensive and comprehensive process for identifying and implementing replacement main projects. This process allows for flexibility in implementation as opposed to a formal ranking and prioritization process.

[4] Exhibit LEW-1, pages 7 through 10 - derivation of 220 miles.

Q. Do you agree with Mr. Rackers' concern that the Company has not identified the specific projects that it will be undertaking through the DSIC?

A. No, I do not. The Company's DSIC proposal requires a filing be made 90 days prior to the effective date of each DSIC implementation that provides a listing of the projects it anticipates undertaking in the upcoming DSIC year based on the above criteria, the associated revenue requirement and the applicable DSIC rate. Thereafter, the Company's proposal calls for an Annual Reconciliation filing to be made not later than 60 days after the conclusion of the DSIC year, through which the Company will provide a detailed listing of each project completed and placed in service during the DSIC year, and the applicable DSIC revenue requirement for those projects. The Commission will have the opportunity to review all aspects of the Reconciliation filing, including verifying that the projects are DSIC-qualifying and that completion of the projects is prudent. Based upon its review, the Commission could make any necessary adjustments to the Company's calculated revenue requirement. Accordingly, the Company believes Mr. Rackers' concerns are unwarranted.

Q. Do you agree with Mr. Rackers' representation of the information and data actually provided by the Company in support of its need for the DSIC (page 9, lines 3 – 5)?

A. No I do not. Mr. Rackers mischaracterizes the information and data provided by the Company, and also attempts to undermine the significance of the infrastructure replacement issue facing the water utility industry. In my pre-filed direct testimony on pages 17 and 18, I addressed the state of water systems infrastructure and estimates of the costs of infrastructure replacement, both nationally and for the Commonwealth of

Kentucky - some of which is cited by Mr. Rackers. However, Mr. Rackers does not acknowledge the pre-filed direct testimony of the Company's witness Mr. Williams. Mr. Williams provides details of Kentucky American's water system infrastructure as it pertains to its system of mains. The overall findings and conclusion of each the United States Environmental Protection Agency's ("USEPA") Drinking Water Infrastructure Needs Survey and Assessment Reports are that the magnitude of the national and state need for infrastructure replacement is large, and is a challenge confronting water utilities as they deal with an infrastructure network that has aged considerably since the systems were constructed, in many cases, 50 to 100 years ago. Mr. Rackers' testimony acknowledges this - "The need identified by the USEPA Study for future distribution facilities is significant …" (Page 9, lines 12-13). More specifically, Mr. Williams' testimony again clearly demonstrates that the Company's current replacement rates of its own system water mains are inadequate and must be accelerated and increased on a sustained basis if it is to begin to address its distribution system infrastructure replacement needs. The issue is critical to the Company's continuing ability to provide safe and reliable water service to its customers.

Q. **Is the need to replace aging water system infrastructure or the utilization of a DSIC-type mechanism as proposed by the Company newly discovered?**

A. No. As evidenced by the USEPA's Assessment Reports discussed above, as well as the American Society of Civil Engineers' 2009 Report Card for America's Infrastructure discussed in my pre-filed direct testimony (which graded the nation's water infrastructure at a 'D-' level, and now graded as a 'D' level in the updated American Society of Civil

Engineers' 2013 Report Card for America's Infrastructure), the issue of aging water infrastructure has literally been years in the making. Even before the above-mentioned reports were issued, regulators and industry personnel were aware of the aging water utility infrastructure and the need to accelerate remediation of that aging infrastructure. As part of that awareness, regulators begin to adopt mechanisms to assist water utilities in meeting those infrastructure replacement needs. In 1999, the National Association of Regulatory Utility Commissioners ("NARUC") endorsed the infrastructure rider mechanism as an innovative regulatory tool that agencies such as the Board should consider. The NARUC Board of Directors adopted the following resolution in February 1999 that addresses the issue, as follows, in pertinent part:

> ***Resolution Endorsing and Co-Sponsoring***
> ***"The Distribution System Improvement Charge"***
>
> **WHEREAS,** The Pennsylvania Public Utility Commission and the Pennsylvania Legislature have adopted a promising and unique regulatory approach that encourages the acceleration of the needed remediation of aging water utility infrastructures; *and*
>
> **WHEREAS,** The Distribution System Improvement Charge is an automatic adjustment charge that enables recovery of infrastructure improvement costs on a quarterly basis in between rate cases for projects that are non-revenue producing and non-expense reducing . . . ; *and*
>
> **. . . .**
>
> **WHEREAS,** The U.S. EPA . . . has identified a magnitude of national infrastructure needs of $77.2 billion in pending expenditures; *and*
>
> **WHEREAS,** As the magnitude of need may be too great to be accomplished under traditional ratemaking methodologies; *and*
>
> **WHEREAS,** The Distribution System Improvement Charge provides benefits to ratepayers . . . ; *and*

> **WHEREAS,** Ratepayer protections are incorporated in the Pennsylvania approach . . .; *now, therefore, be it*
>
> **RESOLVED,** That the Board of Directors . . . agrees to endorse the mechanism as an example of an innovative regulatory tool . . . .[5]

The NARUC Board reiterated its support for consideration of infrastructure replacement surcharge programs as a "Best Practice" in a Resolution passed in July of 2005. The Resolution noted: "To meet the challenges of the water and wastewater industry which may face a combined capital investment requirement nearing one trillion dollars over a 20 year period, the following policies and mechanism were identified to help insure sustainable practices in promoting needed capital investment and cost-effective rates:…b) the distribution system improvement charge…".[6]

Q. Do you have examples of how various regulatory jurisdictions have responded to the need for accelerated and increased infrastructure replacement investment?

A. Yes, such examples are provided in my pre-filed direct testimony at pages 20 and 21, wherein a listing of state regulatory jurisdictions that have adopted DSIC tariff riders endorsed by NARUC as a best practice and as proposed by the Company in this proceeding.

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[5] http://www.naruc.org/Resolutions/Distribution%20System%20Improvement%20Charge.pdf.

[6] http://www.naruc.org/Resolutions/BestPractices_s0705.pdf

Q. Do you agree with Mr. Rackers' assessment (page 10, lines 11 through 15 of his testimony) that Kentucky American's average water loss percentage during the period 2010 through 2012 was 11.79% and is at the lower end of the range when compared to other American Water affiliates, and therefore a DSIC is not necessary?

A. No, I do not. As described in response to Item No. 10 of the LFUCG's Second Request for Information, Kentucky American's unsold water line loss in 2012 was 11.7%. Even though Kentucky American is at the lower end of the range when compared to other American Water affiliates, there is a concerted effort across all companies to reduce lost water by aggressive leak detection, quick response to repairs, and replacement of underperforming water mains. Mr. Rackers further states on page 10, lines 18 through 23, that the *Survey of State Agency Water Loss Reporting Practices* prepared for the American Water Works Association ("AWWA") in 2002 reported that 15% was the most common benchmark for lost water. The AWWA Leak Detection and Accountability Committee (1996) recommend a benchmark of 10% for lost water for water providers.[7] In addition, the Environmental Protection Agency's WaterSense partnership program lists a water industry goal for lost water at 10% to encourage system improvement that leads to efficient water use to allow the USEPA to meet its goal to improve water quality, maintain aquatic ecosystems and protect drinking water resources.[8] Kentucky American has worked aggressively over the past years with its leak detection program to identify

[7] As cited by the AWWA Research Foundation "Guidance for Management of Distribution System Operation and Management. Attached as Exhibit GMV Reb-1.

[8] Attached as Exhibit GMV Reb-2

and repair leaks to maintain a lost water percentage similar to the 11.7% experienced in 2012. As discussed in the Environmental Protection Agency's *Distribution System Inventory, Integrity and Water Quality* report dated January 2007, there is evidence that pipes very often leak prior to breaking and leak detection is becoming a significant tool in reducing breaks.[9] However, lost water is only one indicator of the performance of the distribution system, not the only indicator used to determine the requisite level of effort needed for infrastructure replacement. One of Kentucky American's concerns is the level of aging infrastructure and the need to maintain a sufficient replacement rate to address a potential problem that could make it difficult to maintain and improve on the lost water percentage. Small diameter mains near the end of their useful life provide reduces or even no fire protection, increased water quality concerns, customer service degradation, aesthetic concerns, and limited system reliability. Accordingly, the Company believes Mr. Rackers' sole use of water loss percentage does not take into account these additional factors that may come into play when determining whether or not a main needs to be replaced.

Q. Do you agree with Mr. Rackers, at page 13, lines 5 through 11 of his testimony, that Kentucky American has not provided any evidence of a significant main break problem similar to Missouri American Water, which helped prompt the Missouri American Water DSIC-like mechanism approval?

[9] Pg. 18 Attached as Exhibit GMV Reb-3.

A. No I do not. Over the past four years, Kentucky American has experienced 569 main breaks within its distribution system. Of these main breaks, approximately 388, or 68%, were associated with distribution mains 6" and smaller, despite the fact that this group only represents 37% of the total distribution system. Currently, 5% of the mains (107 miles) in Kentucky American's distribution system are greater than 75 years old. Over the next 30 years, 394 additional miles of mains, or 20% of the current miles of main in Kentucky American's distribution system, will reach the end of their useful life and be more susceptible to breaks caused by deterioration and loss of main integrity. With the DSIC program, the replacement of the aging mains can be accelerated and allow Kentucky American to proactively address underperforming mains prior to failure and reduce the need for a reactive response caused by a break. The DSIC program will also allow the Company to be better prepared to meet emerging demands that will require mains to be replaced at a greater pace than the current replacement rate of two (2) miles per year. As outlined in the USEPA January 2007 *Distribution System Inventory, Integrity and Water Quality* report, not only is the physical condition of the pipes important in determining the need to replace mains but water quality performance is becoming almost as important.[10] Due to tightening regulatory requirements of the water provided to customers at the point of use the potential for a disruption in the equilibrium of the chemical and biological conditions within the pipe due to changes in treatment or water conditions may lead to the water not meeting the upcoming regulatory requirements. Overall, it is expected (due to the additional demands and requirements on

[10] Pg. 18

the distribution system) that the tightened water quality requirements will lead to the reduction in the useful life of the older mains and result in the need to increase the replacement at a rate greater than that determined by only the age. As a result, the Company believes Mr. Rackers' concerns do not account for the additional factors that need to be taken into consideration regarding infrastructure replacement. Kentucky American realizes the need for an accelerated main replacement program, and the need for the Company to address the increasing age of its distribution system that will make it more susceptible to main breaks in the future. Kentucky American believes the DSIC program as proposed will assist in addressing the need for an accelerated main replacement program.

Q. Mr. Rackers' recommendation to deny the Company's DSIC proposal is in part that Kentucky American has no expectation of achieving savings as a result of implementing the new regulatory mechanism (page 13, lines 19 through 23). Please respond.

A. First and foremost, it must be understood that the purpose and goal of the DSIC rate mechanism is to accelerate the needed remediation of aging water utility infrastructure on a proactive and sustained basis. The Company believes that the need for and the magnitude of the cost of water infrastructure replacement is well established. The DSIC mechanism is an innovative regulatory approach that will serve as a tool for the Company to help address the DSIC's objectives. The Company stated in its response to Item No. 51 of the Commission Staff's Second Request for Information that, in the near term, the Company does not anticipate savings in O&M costs as the percentage of the Company's

infrastructure with over 50 years of service continues to rise. However, over the long-term, the Company may, with accelerated levels of infrastructure replacement, realize reductions in energy usage, pumping costs, costs associated with unaccounted for water, reductions in expenses related to responding to main breaks, and answering customer complaint/inquiry calls regarding water service or quality. The savings will benefit customers' rates when they are captured in base rates in future filings. Absent a significant acceleration of infrastructure replacement investment, there will be an increase in the number and frequency of main, hydrant and service line breaks as more and more of this critical infrastructure is not being replaced in a manner that is coincident with the end of its useful life. Accordingly, O&M costs associated with the emergency repair of such breaks and/or capital costs associated with the investment in unplanned replacements could significantly increase over current levels.

Q. Do you agree with Mr. Rackers' concern that the Company has provided no assurance that it will file fewer base rate cases?

A. No. Kentucky American believes that all other things being equal, the DSIC Tariff Rider will reduce the frequency of its base rate cases. The purpose of the DSIC is to provide an incentive to increase the level of targeted infrastructure replacement. However, the DSIC Tariff Rider is for a narrowly focused component of capital improvements; not all capital improvements. As such, not all capital expenditures made by Kentucky American would be included in the DSIC. There are many other areas of capital and expense items that will not be covered by the DSIC, that will still be subject to a lag in rate recovery and over which the Company may have little or no control. Here again, the purpose of the

DSIC is to provide an incentive to increase the level of targeted infrastructure replacement. This may mean that the frequency of base rate cases will not decrease, but the rate of infrastructure replacement does increase. Having said that, anecdotal historical evidence as provided by the Company in its response to Item No. 19 of the Commission Staff's Third Request for Information indicates that some companies have increased the time between base rate case filings after implementing a DSIC, or its equivalent, thereby reducing the frequency of base rate cases.[11]

Q. Please respond to Mr. Rackers' testimony on page 11 wherein he discusses the acceptance or rejection of the DSIC mechanism in other American Water states and notes that mechanisms were enacted under different circumstances than are present in this case and may have different mechanism terms than those sought by Kentucky American.

A. The regulatory tool commonly known as the DSIC has indeed been implemented across various regulatory jurisdictions in several contexts. In some states legislation was required; in some it was implemented through a rulemaking proceeding; while in others it was authorized in base rate case proceedings. The Company believes Commission has the authority to implement the DSIC within this proceeding. This is discussed in more detail below in the discussion on whether the DSIC constitutes single-issue ratemaking.

[11] Attached as Exhibit GMV Reb-4.

Q. **On page 12, lines 3-11, Mr. Rackers states that DSIC constitutes single-issue ratemaking since it represents a rate adjustment. He further states that rate adjustments should only occur after all relevant factors have been examined and considered in the determination of revenue requirement, and that to do otherwise could result in a utility earning above its authorized return. Do you agree that this "matching" principle to which Mr. Rackers is alluding to should bar adoption of the regulatory rate mechanisms proposed by the Company in this case, i.e. the DSIC and PPACC?**

A. No I do not agree. While such a matching principle has been recognized, it is not the only principle applicable to effective ratemaking, nor is it even an appropriate end in itself. It should be viewed, as with many other policies, in the context in which it promotes high quality, cost effective service and properly balances the interests of both the utility and customers. The single most important protection provided to consumers by rate regulation is assuring the ability of the utility to continue providing high quality, essential public utility services to customers. Review of the costs of providing that service to determine if they are reasonable is obviously an important element of Commission review; however, the purpose of the review of costs is fundamentally to assure the continued ability to provide service. This means balancing the interests of both the customers and the utility investors who are the source of the capital necessary to provide that service. The DSIC, as well as the PPACC that has been proposed by Kentucky American, would actually enhance review of these costs. Both require at least annual review of charges and contain additional protections for customers. These reviews are likely to be more focused than they would in the context of a base rate case. The DSIC

and PPACC proposed in this case are entirely consistent with the need for periodic regulatory review of costs. Where there are flaws in the regulatory model that impede achievement of these goals, the "matching" principle should not be invoked to preclude rate mechanisms such as the DSIC that address these flaws and provide protections to ratepayers.

Q. Has the Commission implemented innovative rate mechanisms that balance the interests of both the utility and customers?

A. Yes. The Commission has implemented many innovative rate mechanisms, particularly for the electric and gas utilities it regulates. These include: Case No. 2001-00092, in which the Commission approved an Accelerated Main Replacement Program for Union Light, Heat and Power Company[12]; Case No. 2009-00141, in which the Commission approved a settlement agreement permitting Columbia Gas of Kentucky, Inc. to implement an Accelerated Main Replacement Program and corresponding tariff[13]; and Case No. 2012-00222, in which the Commission approved a settlement agreement permitting Louisville Gas and Electric Company to implement a Gas Line Tracker

[12] Case No. 2001-00092, In the Matter of: Adjustment of Gas Rates of the Union Light, Heat and Power Company (Ky. PSC Jan. 31, 2002).

[13] Case No. 2009-00141, In the Matter of: Application of Columbia Gas of Kentucky, Inc. for an Adjustment in Rates (Ky. PSC Oct. 6, 2009).

program for the recovery of costs associated with replacing customer service risers, replacing and installing service lines, leak mitigation and main replacements.[14]

Q. Please address the concern that the proposed DSIC could result in the Company earning above its authorized return.

A. The proposed DSIC tariff contains provisions for an Annual Reconciliation filing to ensure that the actual revenues collected equal the level of revenues authorized by the Commission. Over or under recoveries would be taken into account as an adjustment when the next DSIC surcharge calculation is made. The tariff also caps the surcharge at ten percent of revenue billed to customers. In addition, the DSIC applies only to qualified non-revenue producing replacement plant investment. While the Company believes these provisions provide substantial protection for ratepayers, it would be more than willing to consider the inclusion of a DSIC provision that addresses earnings in excess of the Company's authorized ROE. Such a provision would not alter the basic purposes and goals of the DSIC program.

Q. On pages 11 and 12, Mr. Rackers cites several of the terms utilized by other states in their DSIC mechanisms and concludes that Kentucky American's proposed DSIC terms are some of the most advantageous that have been approved. Please comment.

[14] Case No. 2012-00222, In the Matter of: Application of Louisville Gas and Electric Company for an Adjustment of its Electric and Gas Rates, a Certificate of Public Convenience and Necessity, Approval of Ownership of Gas Service Lines and Risers, and a Gas Line Surcharge (Ky. PSC Dec. 20, 2012).

A. First, he indicates that three states (Pennsylvania, Illinois and Indiana) have DSIC revenue caps of 5.0%, as compared to the 10% Kentucky American has proposed. While true for the latter two, Pennsylvania's cap is 7.5% for water utilities. Not mentioned by Mr. Rackers are the 10.0% and 12.75% caps in Missouri and Ohio, respectively. Second, Mr. Rackers states the DSIC-type mechanisms in Illinois and Missouri require the plant to be 'in-service' prior to its inclusion in the DSIC, while Kentucky American's proposed DSIC charge is established on an annual prospective basis utilizing 13 month average end-of-month balances. Here again Mr. Rackers is not entirely correct. First, Kentucky American's proposal to implement the DSIC charge on a prospective plant basis is consistent with the Commission's regulation of base tariff rates based on prospective 13 month average balances for a forecasted test year. The initial DSIC implementation year is the 12 month period following the forecasted test year utilized in the base rate case. At the conclusion of each DSIC year, the Company's DSIC proposal requires an Annual Reconciliation filing. That filing will true-up any difference between the revenue requirement on the actual DSIC-qualified plant placed into service during the DSIC year and the DSIC revenues collected during the DSIC year, with any difference refunded to or recovered from customers. Accordingly, the DSIC ultimately reflects rate recovery only on the actual projects placed in service to the Company's customers. Second, this is essentially the very same process provided for in Illinois, the only other state currently with a DSIC-type mechanism that also utilizes a forecasted test year. Third, Mr. Rackers references an over-earning provision utilized in Illinois, which type of provision I discussed in the prior response. Finally, he references a provision in Missouri that requires the utility to file a base rate case within three years of the establishment of a

DSIC-like mechanism. The Company does not believe it is desirable to the Company's customers or stockholders to establish a mandatory time requirement for filing a base rate case. If the DSIC mechanism provides an opportunity to extend the time between cases, then the benefit to customers would be automatically eliminated by the arbitrary deadline.

Q. Even though Mr. Rackers recommends the Commission deny the Company's proposed DSIC, does he also recommend changes to the Company's DSIC proposal should the Commission find the DSIC is appropriate?

A. Yes, on page 14 of his testimony he lists various recommendations.

Q. What is your response to Mr. Rackers' recommendation that Kentucky American should not be allowed to implement a DSIC or increase the current DSIC charge if the Company is earning at or above its authorized ROE at the time of the filing?

A. The Company has indicated it is willing to consider the inclusion of a DSIC provision that addresses earnings in excess of the Company's authorized ROE. The Company does not agree with the approach recommended by Mr. Rackers because his approach assumes that any over-earnings applicable to the historical period used as the basis of his calculation would equally apply to the prospective DSIC period. Rather, the DSIC should be implemented for the prospective DSIC year based upon the applicable revenue requirement. Thereafter, when the Company prepares its Annual Reconciliation filing at the conclusion of the DSIC year, it would, in addition to calculating any over-or-under recovery of DSIC revenues based upon the revenue requirement of actual completed plant in service, provide an earnings calculation applicable to the completed DSIC year.

If the actual earnings for the DSIC year exceed the ROE allowed in the Company's last base rate case, revenues collected under the DSIC charge would be reflected as a credit against the next applicable DSIC charge to the extent that such revenues contributed to the realization of earnings in excess of the last approved level.

Q. Please comment on Mr. Rackers' second recommendation to include the change in accumulated depreciation ("AD") and accumulated deferred income taxes ("ADIT") reserves associated with the plant previously included in rate base in the most recent rate case as an offset to the DSIC-eligible plant.

A. First, the Company's proposed DSIC Tariff Rider is for a narrowly focused component of capital improvements. Many other capital expenditures on utility plant being placed in service and expense items will not be covered by the DSIC. It would not be appropriate to offset DSIC-eligible plant with AD and ADIT on all plant, while only a portion of the Company's utility plant is included in the DSIC. Here again, the purpose of the DSIC rate mechanism is to provide an incentive to increase the level of infrastructure replacement investment. The DSIC proposal as put forth by the Company will incent that investment.

Q. Please comment on Mr. Rackers' third recommendation that the AD and ADIT reserves that are associated with the DSIC eligible plant should be reflected as an offset to the DSIC-eligible plant.

A. With respect to DSIC-eligible plant, the Company's DSIC proposal in fact already includes the associated AD reserve referenced by Mr. Rackers in the calculation of the

applicable DSIC revenue requirement; i.e., the DSIC formula. The Company's DSIC formula does not include the ADIT reserve associated with DSIC-eligible plant as an offset. Based on the Company's understanding of the DSIC formula employed in most states, the ADIT is not a component. The Company therefore does not believe it is a necessary component.

Q. Do you agree with Mr. Rackers' fourth recommendation that, as part of each subsequent DSIC filing, Mr. Rackers' recommendations 2 and 3 as detailed above should be updated as part of the DSIC calculation?

A. No, I do not. As it pertains to the AD component of Mr. Rackers' third recommendation, the Company's DSIC proposal is in agreement. As noted above, the Company's DSIC formula does not include ADIT reserve calculated on the DSIC-eligible plant. As detailed above, the Company disagrees with Mr. Rackers' second recommendation and accordingly therefore disagrees with that part of this recommendation.

Q. The Company's DSIC revenue requirement formula includes recovery of incremental new property taxes associated with DSIC eligible plant. Mr. Rackers' fifth recommendation attempts to specify the property taxes that would be eligible for inclusion. Please comment.

A. The Company's proposal is consistent with his recommendation except that rather than "paid" as indicated by Mr. Rackers, the Company's calculation would reflect all applicable property taxes actually owed for the applicable DSIC investment, which is the amount that will be expensed on the Company's income statement.

Q. The Company's proposal requires it to make its annual DSIC filing 90 days prior to the effective date of each DSIC implementation. Mr. Rackers' recommendation is that the filing be automatically docketed and filed at least 120 days prior to the DSIC implementation to allow more time for review by interested parties.

A. As detailed in my pre-filed direct testimony, the DSIC will apply only to DSIC-qualified, investments that have not been included in rate base in a prior rate case or DSIC. The qualified plant additions would be reduced by the projected retirements associated with the DSIC additions in the calculation of applicable depreciation and property tax expense. Based on these components, the Company calculates the associated revenue requirement and DSIC rate. Considering the components of this filing, the Company believes its proposal to file each DSIC 90 days prior to its implementation will provide sufficient time for a proper review. The Company envisions the more time consuming and detailed review would involve the Annual Reconciliation filing that is proposed to be made not later than 60 days after the conclusion of the DSIC year. In that filing, the Company will provide a detailed listing of each project actually completed and placed in service during the DSIC year and the associated DSIC revenue requirement. A reconciliation of that actual DSIC revenue requirement to the actual DSIC revenues collected during the DSIC year will also be provided, with any difference returned to or collected from customers through the calculation of the next applicable DSIC. The Commission will have the opportunity to review all aspects of the Reconciliation filing including verification that the included projects are DSIC qualifying and the prudency of the projects. Based upon its review, the Commission would make any necessary adjustments to the Company

calculated revenue requirement. There are no time constraints involving the Commission's review of the Annual Reconciliation filing.

Q. Similar to his recommendation to make each annual DSIC implementation filing a docketed proceeding, Mr. Rackers recommends the same for each Annual Reconciliation filing and that automatic intervention should be granted to all parties who participated in the Company's most recent Base Rate case. Do you agree?

A. No. The Commission can make a determination to docket these matters when and if they determine it is necessary. If these filings become docketed matters, all parties to the prior rate case should not be granted automatic intervention. There can be parties in rate cases that only involve themselves with specific issues, e.g. rate design, ROE, etc., who would not have an interest in a DSIC filing.

Q. Lastly, on page 15, lines 1 through 3, Mr. Rackers cites certain DSIC mechanism terms and their interrelationship in his view. He recommends such terms should be defined in the terms of the DSIC tariff. Do you agree?

A. I have addressed each of these specific DSIC terms earlier in this testimony. Having said that, if Mr. Rackers' point is that the final terms of an authorized DSIC should be captured in the DSIC tariff, the Company agrees. To that end, the Company included its proposed DSIC tariff rider as part of the tariffs filed in this proceeding.

Q. On pages 19 through 21, Mr. Rackers recommends the Commission deny the Company's proposal for a PPACC tariff rider. What reasons does he cite?

A. First, Mr. Rackers states that trackers in general should be avoided. Second, Mr. Rackers states that the annual changes in these costs are not significant enough to warrant a change in the regulatory treatment of these costs.

Q. Do you agree?

A. No. To start with, Mr. Rackers' testimony does not accurately detail the Company's proposed PPACC tariff rider. He states the Company has requested a tracker for increases in chemical and electricity expenses that would allow it to defer increases in these costs, in excess of the amount included in base rates in the current case, and recover the deferred amount through an amortization in the next base case. First, the Company's proposed PPACC tariff rider provides for the deferral of incremental changes in these costs over the level established in base rates, be they an increase or a decrease. Second, any such increase or decrease would not be deferred until the next base rate case as he indicates; instead, through the PPACC tariff rider, it would be recovered or credited to customers over a one year period as a separate line item on the customer's bill.

Q. What is your understanding of Mr. Racker's two reasons why he is against the use of trackers (page 20 of his testimony)?

A. First, he states the use of a tracker allows the utility to pursue single-issue ratemaking. I discussed why this was incorrect earlier in this testimony, as Mr. Rackers also raised this argument regarding the Company's proposed DSIC mechanism. Second, he states that the use of a tracker eliminates the inherent incentive of a utility to minimize expenses and maximize revenues between base rate cases.

Q. Why are these reasons not appropriate for denying the proposed trackers?

A. Mr. Rackers' arguments fail because Kentucky American has very limited ability to affect either the quantity or the price of power and chemicals addressed by the PPACC, which is explained further in my pre-filed direct testimony. Mr. Rackers does not dispute that these costs are generally outside the control of the utility. My testimony also discusses the rigorous steps Kentucky American takes to ensure it obtains the best pricing possible when it purchases these commodities. In addition, under the Company's proposed PPACC Tariff Rider, the burden remains on the Company to demonstrate that its expenditures are reasonable and prudent. The Commission will continue to have oversight over the prudency of the Company's expenditures. For these reasons, Mr. Rackers' incentive argument fails.

Q. Mr. Rackers claims that the annual change in the costs of chemicals and electricity are not significant enough to warrant a change in regulatory treatment (page 20, line 17, through Page 21, line 6). Do you agree?

A. No. First, his claim is based on a simple comparison of the annual cost of these expenses (actual 2010-2012 and budget for 2013) and the average annual change over that time. That type of comparison fails to recognize that the level of these expenses in any given year is impacted not only by price changes, but also by the level of actual water usage (sales) of the Company's customers. It is the annual cost of these expenses on a unit cost of water sales basis that needs to be examined to assess actual volatility, as well as the impact on actual rate recovery. Attached to my testimony is a schedule that details these

expenses on a unit cost basis utilizing actual results for 2006 through 2012.[15] The Company's proposed PPACC Tariff Rider is a rate adjustment mechanism that would provide for recovery from or crediting to customers the incremental changes in these costs above or below the level authorized in the Company's most recent rate case. Exhibit GMV Reb-5 clearly demonstrates the volatility that exists year over year on both an increasing and decreasing basis, and also the potential that exists for these costs to either be over- or under-recovered and the resulting detrimental impact on customers or shareholders. The PPACC will ensure the most accurate, fair and efficient means of matching costs with recoveries.

Q. Does Mr. Rackers then go on to provide alternatives to the PPACC in his testimony?

A. Yes; on page 21, Mr. Rackers offers two alternatives. One, if Kentucky American sees significant changes in these costs it can file a base rate case to capture those costs in cost of service. Two, it may file for Commission authority to create a deferred debit to address significant changes in these costs.

Q. Do you agree with these alternatives?

A. No, I do not. Mr. Rackers misrepresents why the Company is seeking the PPACC tracker for these costs. In presenting his two alternatives he begins by stating "if KAWC foresees significant changes in chemical and electrical costs…" The Company is seeking trackers for these costs because it continues to experience volatility, but cannot

[15] Attached as Exhibit GMV Reb-5

"foresee" the changes to the costs, which is the reason why trackers are proposed. In addition, filing a rate case is costly and time consuming for all parties and does nothing to address the volatile nature of these costs between cases. Given the utilization of targeted regulatory rate mechanisms by this Commission, such as the Fuel Adjustment Clause for electric utilities and Gas Supply Cost Clause for gas utilities, it is not good regulatory policy to require a rate case filing to address the recoverability of these costs, which are necessary and significant to the Company, volatile and difficult to predict, and are to a great extent outside the control of the Company. The PPACC tracker allows the Company to recover its actual costs for these items, but also benefits customers by more accurately, and quickly, reflecting cost decreases for these expenses.

Q. What is your understanding of the alternative to request Commission authority to create a deferred debit?

A. It is the Company's understanding that a deferred debit, or regulatory asset, is only appropriate if the expense falls within one of four categories: (1) an extraordinary, nonrecurring expense which could not have reasonably been anticipated or included in the utility's planning; (2) an expense resulting from a statutory or administrative directive; (3) an expense in relation to an industry-sponsored initiative; or (4) an extraordinary or nonrecurring expense that, over time, will result in savings that fully offset the cost.[16] The Company's purchased power and chemical costs do not fall within

[16] Case No. 2012-00102, In the Matter of: Request of Shelby Energy Cooperative for Approval to Establish a Regulatory Asset in the Amount of $443,562.75 and Amortize the Amount over a Period of Five Years (Ky. PSC April 16, 2012)

any of these categories. Moreover, even if the Commission were to allow the Company to establish a deferral for these expenses between base rate cases, it would not alleviate the Company's concerns about the timely recovery or crediting to customers of these costs, and instead delays such treatment. The PPACC will ensure the most accurate, fair and efficient means of matching costs with recoveries.

Q. Does this conclude your prepared rebuttal testimony?

A. Yes, it does.

VERIFICATION

STATE OF MISSOURI)
) **SS:**
CITY OF ST. LOUIS)

The undersigned, **Gary M. VerDouw,** being duly sworn, deposes and says he is the Director of Rates for Kentucky-American Water Company, that he has personal knowledge of the matters set forth in the foregoing testimony, and the answers contained therein are true and correct to the best of his information, knowledge, and belief.

Gary M. VerDouw
GARY M. VERDOUW

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of May, 2013.

Staci A. Olsen (SEAL)
Notary Public

My Commission Expires:

STACI A. OLSEN
Notary Public - Notary Seal
STATE OF MISSOURI
St. Charles County
My Commission Expires: March 20, 2017
Commission #13519210

Guidance for Management of Distribution System Operation and Maintenance

Subject Area:
Distribution Systems

Unaccounted for Water (UAF) Reduction

Management of UAF is an important responsibility for utility managers. The USEPA report, *Guidelines for Water Conservation Plans* (1998), defines water conservation as "Any beneficial reduction in water losses, waste, or use". Reduction of UAF is, therefore, a primary component of a water conservation plan. The definition of UAF varies from utility to utility. As a part of these guidelines, USEPA (1998) has included a system for water use accounting and definition of UAF.

In 1996, the AWWA Leak Detection and Accountability Committee recommended 10% as a standard UAF benchmark for utility operation. However, the amount of UAF a water utility can achieve varies significantly based on factors such as system age, size, materials, and population density. Also, different systems may have varying economic conditions that affect the cost-effectiveness of UAF reduction. Therefore, it is recommended that a utility base its target UAF on individual cost-benefit (Beecher and Flowers 1999).

Reduction of UAF can have a significant financial impact on a water utility. Water lost to leaks can represent a significant cost to the utility in terms of extra raw water purchase (where applicable), treatment, and pumping. Leaks in the distribution system can also contribute to water main breaks by eroding pipe bedding and increasing the impacts of soil corrosion. Unbilled usage does not directly impact reliability or water quality, but excessive amounts can reflect negatively on the system if customers perceive that the utility is not operating efficiently. Water conservation (including UAF reduction) may also allow a utility to postpone or avoid capital projects resulting from increased production needs (USEPA 1998). A comprehensive program to reduce UAF may involve improved water accounting practices, leak detection and repair, and meter calibration.

Water Use Accounting

In water utilities, UAF is often calculated as water purchased (or produced) minus water sold. This definition does not adequately differentiate between water that is truly "lost" to leaks and unauthorized connections, and water that is actually consumed in the execution of water

Using Water Efficiently

Ideas for Utilities

Efficient water use can have major environmental, public health, and economic benefits by helping to improve water quality, maintain aquatic ecosystems, and protect drinking water resources. By using water more efficiently and by purchasing more water efficient products, we can also help mitigate the effects of drought. This list of measures is not meant to be comprehensive, but rather a starting point.

Getting Started:

- Designate a water efficiency coordinator.
- Develop a water efficiency plan.
- Educate and involve employees, residents and school children in water efficiency efforts.

System Improvements—Keep a tight system, look at alternative sources:

- Implement a water-loss management program (e.g. repair leaks). The water industry goal for unaccounted-for-water is 10 percent.
- Utilities should strive for universal metering.
- Consider a reclaimed wastewater distribution system for non-potable uses.
- Ensure that fire hydrants are tamper proof.
- Equipment changes—set a good example by using water efficient equipment.
- Install high-efficiency toilets, or retrofit water-saving devices on existing ones.
- Install faucet aerators and low flow shower heads in municipal buildings.
- As municipal appliances or equipment wear out, replace them with water-saving models.
- Eliminate "once-through" cooling of equipment with municipal water by recycling water flow to cooling tower or replacing with air-cooled equipment.
- Minimize the water used in space cooling equipment in accordance with manufacturer's recommendations. Shut off cooling units when not needed.
- Consider installing new water-saving pool filters.

Policies and Programs to Encourage Efficient Water Use:

- Ensure the utility rate structure encourages water efficiency, or at least does not discourage it.
- Make retrofit kits for residences and businesses available free or at cost. Kits may contain low flow faucet aerators, high efficiency showerheads, leak detection tablets, and replacement valves.
- Promote water-efficient landscape practices for homeowners and businesses, especially those with large, irrigated properties. Practices include use of native plants, landscape renovation to reduce water use, and more efficient irrigation.
- Offer incentive programs (rebates/tax credits) to homeowners and businesses to encourage replacement of plumbing fixtures and appliances with water-efficient models.
- Conduct water-use audits of homes, businesses and industries. Audits provide users with invaluable information about how water is used and how usage might be reduced by specific measures.

Other Measures—For a full list of municipal water efficiency measures, see Appendix A (PDF) (20 pp, 196K, About PDF) of the U.S. EPA Water Conservation Plan Guidelines.

*The U.S. EPA Water Conservation Plan Guidelines may be obtained from the Office of Water Resource Center at 202-260-7786.

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Connect with WaterSense
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Environmental Protection
Agency

Office of Water (4601M)
Office of Ground Water and Drinking Water
Total Coliform Rule Issue Paper

Distribution System Inventory, Integrity and Water Quality

January 2007

PREPARED FOR:

U.S. Environmental Protection Agency
Office of Ground Water and Drinking Water
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PREPARED BY:

American Water Works Association

Background and Disclaimer

The USEPA is revising the Total Coliform Rule (TCR) and is considering new possible distribution system requirements as part of these revisions. As part of this process, the USEPA is publishing a series of issue papers to present available information on topics relevant to possible TCR revisions. This paper was developed as part of that effort.

The objectives of the issue papers are to review the available data, information and research regarding the potential public health risks associated with the distribution system issues, and where relevant identify areas in which additional research may be warranted. The issue papers will serve as background material for EPA, expert and stakeholder discussions. The papers only present available information and do not represent Agency policy. Some of the papers were prepared by parties outside of EPA; EPA does not endorse those papers, but is providing them for information and review.

Additional Information

The paper is available at the TCR web site at:

http://www.epa.gov/safewater/disinfection/lt2/compliance.html

Questions or comments regarding this paper may be directed to **TCR@epa.gov.**

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Distribution System Infrastructure Inventory and Integrity

Abstract

This white paper reports on the availability of data about distribution system infrastructure, and the ability to answer selected questions using these data. The paper does not address water quality, policy needs, or potential research projects. Water distribution systems comprise complex networks of infrastructure components. Currently, available data provide more information on distribution systems than existed a decade ago. At the national level, data with which to describe distribution systems is good, but the information has not in all cases been verified. The data reported are mainly from recent AwwaRF reports, AWWA's Water Industry Data Base and Water://Stats surveys, and EPA's Community Water System Survey (CWSS) and Needs Survey. Data on the extent of water mains, finished water storage, hydrants, some types of valves, and customer service lines are generally good. Very little data are available on other components of distribution systems or on premise plumbing. The practice of condition assessment is intended to support asset management programs rather than general conclusions about the overall condition of the nation's water distribution system infrastructure. Implementation of asset management systems that require condition assessment varies from utility to utility - some utilities have complex data systems, while many utilities rely on paper files, maps, and the experience of the utility staff.

Distribution System Infrastructure Inventory and Integrity

1.0 Introduction

The purposes of this white paper are to report on the availability of data about distribution system infrastructure and to summarize answers to selected questions that can be supported by the data. In simple terms the purpose of the water distribution system infrastructure is to supply water to all customers at sufficient pressure and volume to provide for their needs as well as for fire suppression (water quantity aspects), while also protecting the quality of the water as prescribed by various standards (water quality aspect). It is important that distribution systems deliver water reliably and protect the quality of the water that is delivered (National Research Council, 2006). These water distribution systems involve complex networks of infrastructure components consisting of pipes, joints, valves, and other appurtenances. In addition, water travels through service lines and premise plumbing systems before arriving at the customer's tap.

Throughout the paper, infrastructure issues are discussed using terminology that is not in all cases standardized. When terms are introduced, working definitions are presented, and acronyms are explained when they appear.

The term "inventory" refers to the identification, location, and description of distribution system components such as pipe segments, valves, and other parts. The term "condition" refers to appraisal of the current physical integrity of a component compared to its original designed condition. In this instance "physical integrity" of a component is a measure or estimate of flaws, defects, or decay that could reduce its service life (time from installation to replacement), as compared to original physical condition.

While distribution systems may affect drinking water quality and while water quality may affect health, this paper does not address these possible effects. It also does not make recommendations about policies or needed research. The paper is principally focused on reporting about sources and extent of data that is available and how it bears on the following questions:

- How much and what types of pipe and fittings are in service today?
- How much and what types of pipe are being installed and renewed today?
- How many and what types of storage tanks exist?
- How many and what types of fire hydrants and valves are in service today?
- How is the condition of distribution systems assessed? What is the knowledge base about the condition of distribution systems?
- What other appurtenances can be assessed?

The knowledge base about distribution system infrastructure has improved greatly since the 1986 Amendments to the Safe Drinking Water Act (SDWA). Prior to that date, neither individual utility studies nor national surveys were very extensive in their reporting of infrastructure data. The emergence of electronic database and Geographic Information System (GIS) technology, along with recent waves of activity in vulnerability assessment and "asset management" have led to more interest in conducting infrastructure inventories. An inventory of a distribution system comprises identification, location, and description of components such as pipe segments, valves, and other appurtenances.

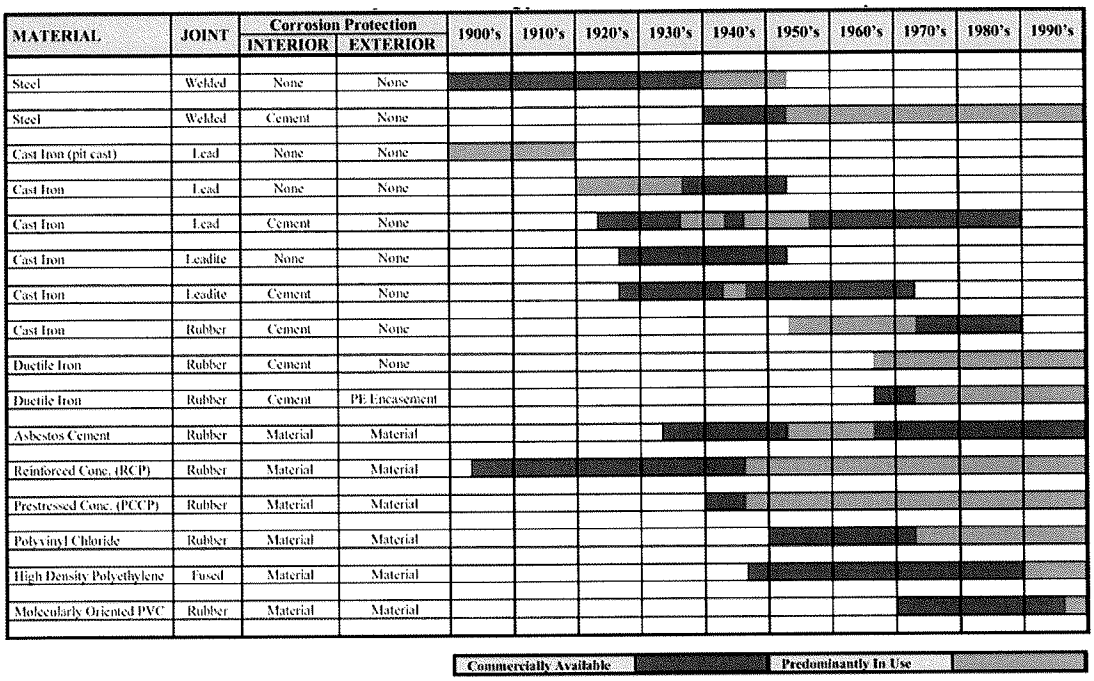
Although extensive distribution system infrastructure data were not published prior to about 1986, utility surveys by the American Water Works Association (AWWA) actually began much earlier. Additionally, prior to about 1960 the literature contains a number of short papers about problems and remedies with cast iron water mains. During the 1970s more information and basic data were collected, but the data available increased more rapidly after 1986. The data available has been collected using different means. The primary categories of data are AWWA and EPA surveys and AwwaRF case studies of one or more utilities. Other studies have been published, but they rely on data from these primary sources. A list of references is available in Grigg (2004), which provides a synthesis of the information available on water distribution system infrastructure.

2.0 Buried Infrastructure Challenges Facing the Water Industry

The buried infrastructure challenges facing the water industry were summarized in one of a series of papers that were prepared for EPA to provide information about potential distribution system requirements being evaluated under the 6-year review of the Total Coliform Rule (TCR) (American Water Works Service Co., Inc., May 2002).

The paper outlines how most distribution pipes installed from the late 1800s to the late 1960s in the United States were of cast iron. It describes how casting technologies changed from pit casting to centrifugal casting, which made a thinner pipe wall and lighter pipe possible. The paper also outlines how cement mortar pipe lining improved resistance to internal corrosion, how jointing changed from lead to a plasticized sulfur cement compound called "leadite," and how "leadite" joints failed more often than the older lead joints. Further improvements in jointing occurred with the introduction of rubber gaskets. The next major advancement was the development of ductile iron pipe, which has a different internal metallic structure due to the metal's graphite content. Then, polyvinyl chloride (PVC) and high-density polyethylene (HDPE) pipe technologies were developed, that are not subject to the corrosion processes that affect iron pipe. The paper does not discuss reinforced concrete pipe or prestressed concrete cylinder pipe (PCCP). Some PCCP has experienced catastrophic failures due to production processes that led to failure of reinforcing bands. The paper does not discuss the use of asbestos cement (AC) pipe, which was significantly used in the 1950s and 1960s but was discontinued due to concerns over asbestos. However, the paper does contain a diagram, which is reproduced here as Figure 1, which shows the eras when asbestos cement and other types of pipe were predominant.

Figure 1. Timeline of Pipe Technology in the U.S. in the 20th Century (American Water Works Service Co., Inc., 2002)



3.0 AWWA and AwwaRF Studies and Surveys

The most comprehensive inventory information on distribution systems is furnished by AWWA's Water Industry Data Base and Water://Stats surveys. In addition, AWWA and the AWWA Research Foundation (AwwaRF) have conducted a number of studies about distribution systems, both relying on existing data and on limited surveys and/or case studies. These studies report on problems and management practices by utilities, and taken together, provide a valuable set of data about distribution system infrastructure.

3.1 AWWA and AwwaRF Studies

Table 1 provides a list of AWWA and AwwaRF studies that contain data about distribution system infrastructure.

These and other studies are summarized in Grigg (2004), which also presented information collected from approximately 50 utilities in three workshops, site visits, and surveys. Results of this canvassing showed that use of technologies is advancing in asset management, but a very significant gap remains between utilities that use sophisticated technologies and practices and others that do not. Examples of leading practices include: materials analyses, comprehensive condition assessment, use of GIS, maintenance scheduling, databases to manage pipe data and track leaks and main breaks, capital improvement planning for renewal, and use of trenchless renewal methods.

Table 1. List of AWWA and AwwaRF studies on distribution system infrastructure

Study author	Summary
O'Day et al. (1986)	Surveyed six utilities (New York, Denver, Philadelphia, Louisville, East Bay, and Kenosha). Report contains often-cited information about failure mechanics, condition assessment, management methods and other topics.
Deb et al. (1990)	Studied seven utilities and surveyed 35 utilities about renewal practices. Most appurtenances were replaced rather than rehabilitated. Valves and hydrants were both replaced and rehabilitated. Shows that renewal is practiced, especially in large utilities, but other than cleaning and lining, new technologies were not in widespread use.
Kirmeyer et al. (1994)	Surveyed twenty utilities in 1992. Also summarized AwwaRF's three expert workshops on distribution systems, held in 1990, 1991, and 1992. This research needs section of this report is often cited for its presentation of distribution system statistics.
Stratus Consulting (1998)	AWWA commissioned an independent assessment of distribution system needs that led to a 20–year estimate of $325 billion.
Deb et al. (1998)	This report about a prioritization model also reviewed distribution system statistics.
Deb et al. (2000)	Surveyed 37 utilities about O&M, including European utilities. Leak detection was the least common maintenance activity, among tasks such as hydrant flushing and testing. 81% had corrosion control procedures and 60% had procedures for main breaks. 70% had maintenance history databases. While statistics show that utilities engage in the activities, they do not reveal the extent to which they implement them.
Cromwell et al. (2001a)	Surveyed 20 utilities and reported needs of more than $250 billion over the next 30 years to replace pipes and infrastructure. This does not include more than $12 billion per year that utilities spend on infrastructure repairs or Safe Drinking Water Act compliance.
Cromwell et al. (2001b)	Benchmarking and process comparisons of asset management practices between 15 North American and 2 Australian utilities.
Deb et al. (2002)	Found from WATER:\STATS that in 1995 there were 23-breaks/100 miles/year. Break rates in Europe are higher, on the order of 50-breaks/100 miles/year. The data show scatter in break rates, especially for small utilities.
Grigg (2004)	Collected and synthesized data from approximately 50 utilities in three workshops, site visits, and surveys

While these are examples of leading practices, the effectiveness and extent to which they are used varies widely. Two utilities may report in a survey that they use a computer-based maintenance management system, but one may have a system that is highly integrated with their asset management strategy and yielding significant benefits, while the other may have just purchased a stand-alone work order management system off the shelf, which limits the benefits obtainable in asset management unless it is used in an integrated fashion. So far, the extent to which utilities are benefiting from these technologies is mostly contained in case studies, such as those in the reports given in Table 1.

While more recent survey data is available, the Kirmeyer et al. (1994) report for AwwaRF offers a comprehensive view and useful statistics because a main activity of the study was to process and analyze the available AWWA and utility data about distribution system infrastructure, whereas data from more recent AWWA surveys requires further analysis to determine trends and conclusions. The study's authors conducted their own surveys, used the AWWA Water Industry Data Base (WIDB) survey data, and visited utilities. Tables 2, 3, and 4 are based on the Kirmeyer et al. (1994) study, and present in a capsule form key data about inventories and management practices. The more recent surveys confirm the basic data in these tables.

The data in Table 2 was compiled using a number of approaches. First, data was compiled from results of AwwaRF projects available at the time, including three expert workshops on distribution systems. Twenty utilities were studied in depth. The expertise of a project advisory committee that included experts who had completed past projects was tapped. And, a special workshop during AWWA's 1992 Distribution Systems Symposium was conducted to collect data and opinions from additional utilities. The data in Table 2 is described by Kirmeyer et al. (1994) as based on the above project information, AWWA's Water Industry Data Base (predecessor to AWWA's Water://Stats database), and reports of the Water Industry Technical Action Fund (WITAF).

Table 2. Statistics of U.S. distribution systems (Kirmeyer et al., 1994)

Distribution system elements	Project findings
Estimated length of distribution piping	880,000 miles
Estimated replacement value of piping	$348 billion
Condition of piping more than 30 years old	28% excellent, 43% good, 26% fair, 3% poor (these composite figures are based on surveys of 20 utilities and their reports of condition for water quality, structural performance, and hydraulic performance)
Estimated number of pipe breaks	237,600 breaks/year (27-breaks/100 mi/yr) (note: this is a different data set than Deb et al., 2002, which reported 23-breaks/100 mi/yr)
Primary types of existing piping	48% cast iron, 19.2% ductile iron, 15.1% AC*
Estimated new piping	13,200 miles/year (DIP*47.7%. PVC* 38.7%), CPP* 12.5%) (cost $2.8 billion per year)
Estimated pipe replacement	4,400 miles per year
Value of replacement	$1.742 billion per year
Lead service lines	2.3 to 5.1 million
Cost to replace lead service lines	$10-14 billion
Fire hydrants	5.85 million
Percent of O&M* budgets to T&D*	36.2%
Total O&M budget to T&D	$4.5 billion per year
Inadvertent system losses (defined as losses other than "authorized" losses, e.g., leaks, inaccurate meters, etc.)	10%
Cost of water losses	$2.8 billion per year

* Key to table: AC = asbestos-cement; DIP = ductile iron pipe; PVC = polyvinyl chloride; CPP = concrete pressure pipe; O&M = operations and maintenance; T&D = transmission and distribution.

As shown above, Kirmeyer et al. (1994) estimated that some 2.3 to 5.1 million lead service lines are still in service. Replacement of the utility portion was estimated to cost $3.4 to $5.1 billion. Complete replacement of the utility and residential portions of existing lead service lines was estimated to cost $10 to $14.1 billion.

Table 3 was prepared from a survey question posed by Kirmeyer et al. (1994) that asked utilities to list the five most common causes of main breaks. The data did not distinguish between types of materials. Table 4 is based on survey responses to the question: "What are your criteria for deciding whether a particular section of pipe is to be replaced?" Note that the top criterion for pipe replacement is "number of leaks or breaks." This might be construed to imply a reactive approach, but some would argue that leaks and breaks are, in fact, the most cost-effective and integrated measures of pipe condition that are available to support a predictive approach to replacement (Cromwell, 2001b; Hughes, 2002).

Table 3. Causes of main breaks (Kirmeyer et al., 1994)

Causes of main breaks	Percent of utilities reporting
Materials/deterioration	55
Weak joints	35
Earth movement or settling	30
Freezing	30
Internal corrosion	25
Corrosive soils	25
Construction or utility digging	25
Stray DC current	20
Seasonal changes in water temperature	15
Heavy traffic load	10
Tidal influences	5
Changes in system pressure	5
Water hammer	5
Air entrapment	5

Table 4. Criteria for pipe replacement (Kirmeyer et al., 1994)

Criteria for pipe replacement	Percent reporting
Number of leaks or breaks	75
Age of pipe	45
Low flow	40
Condition or type of material	30
Size changes required	30
Water quality	15
Soil condition	15
Location	10
Street construction work	10
Elimination of dead ends	5
Amount of damage by leaks/breaks	5

A survey by CH2M Hill was reported at AWWA's 1985 Distribution System Symposium and described by (O'Day et al., 1986). This limited survey is significant in that it demonstrates the variability in distribution system management actions taken among small, medium, and large utilities. Percentages of reported actions are shown in Table 5. The data show the expected results that small utilities participated in infrastructure management activities to a lesser extent than larger utilities.

Table 5. Percentage of surveyed utilities practicing management activities shown (O'Day et al., 1986)

Management activity	Small < 5 mgd	Medium 5-50 mgd	Large > 50 mgd
Leak detection surveys	16	19	40
Method to determine replacement need	63	77	100
Computer model of system hydraulics	48	58	90
Reports of main breaks	27	66	80
Steps to remove scale and tuberculation	13	31	30
Revenue to finance renewal program	59	69	80
Budget and planning for replacement	48	67	90

3.2 AWWA's Water://Stats Database

AWWA's Water://Stats database (AWWA, 2004) is the most current survey of the drinking water industry produced by AWWA. AWWA's water industry surveys began before 1900, and the information they provide can serve as a historical reference and current source of information about water distribution infrastructure.

A compilation of the surveys since 1945 was provided by AWWA (Keeley, 2003). It shows that surveys were conducted every five years from 1945 through 1970, then surveys were conducted more frequently. The number of utilities responding varies from a low of 211 (1985 survey) to a high of 1,397 (1981 survey), with the average between 1945 and 1985 being 770 utilities (Seidel, 1985). Grigg (1988) reviewed data in the 1984 survey. Prior to about 1980, the surveys focused on water production and rates. Survey data and associated reports show that management attitudes have changed, requiring the collection of different data. For example, discussion at the 1985 AWWA annual conference stressed the need for capital management programs to sustain infrastructure (O'Day et al., 1986). However, the attitude among 33 of the large utilities surveyed was that O&M expenditures were adequate to maintain reliability even though 23 of them had reported some deferred maintenance.

The modern survey effort was launched as a joint AWWA/AwwaRF project in 1989/1990 as the Water Industry Data Base (WIDB). It was intended to develop detailed profiles of individual utilities that could also be aggregated to profile the large system segment of the industry (Cromwell et al., 1990). The initial survey was sent only to the 3,000 water systems that serve more than 10,000 people. Some 1097 responses were obtained, representing only 2% of community water systems, but about half of the total population served by community water systems (112 million). Respondents reported a total of 436,000 miles of distribution pipe, broken

down as: 50% cast iron, 20% ductile iron, 15% AC pipe, and 15% other materials. Pipe replacement rates were 0.6%/yr versus 1.6%/yr for pipe expansion. The survey also documented the presence of 11,000 storage facilities, broken down as: 60% steel tanks, 15% concrete tanks, and 20% below-ground clearwells and reservoirs.

The AWWA/AwwaRF Water Industry Data Base effort was renamed WATER://STATS in 1996, and since then, surveys focus on specific subjects, such as finance (1999 survey of 672 utilities), distribution systems (2002 survey of 337 utilities) and rates (2004 survey of more than 250 utilities).

The 2002 Water://STATS Distribution Survey (AWWA, 2004) includes a set of questions that focus on the distribution system rather than on general utility profiles. It was sent to 3,000 water utilities and the response rate was 11%. Data were collected between June 2002 and April 2003. The survey covers pipe materials, valves, fire hydrants, finished water storage facilities, corrosion control, pumping capacity, metering, customer service lines, water auditing, leakage management and infrastructure needs. Water audit and leakage management data is in a format developed in 2000 by the International Water Association.

The 337 utilities that were surveyed served 59,389,902 in population, and had 14,339,261 customer service lines, and 146,435 wholesale connections. Total length of pipe was 202,000 miles for the population served, and if increased by ratio to current total population (2004 US population of 292.5 million), it reaches 980,000 miles, a figure that is roughly comparable to the 1992 estimate of 880,000 miles (Table 2, above) drawn from the prior WIDB survey (Kirmeyer et al., 1994). It is noted, however, that both WIDB and WATER://STATS results indicate that the length of pipe per capita varies with system size, so using overall averages to extrapolate is only a broad approximation.

Data available are summarized in the next section. They include utility information, types of services provided, pipe material, finished water storage, water conveyance, valves, fire hydrants and flushing, customer metering, customer service lines, customer service lines responsibilities, corrosion control, water supply auditing, leakage management, and infrastructure.

More analysis is needed to separate wholesale and retail customers before ratios such as miles of line and valves per capita can be compared meaningfully. Also, the data must be processed to homogenize values and to facilitate comparison. Data in the 2002 survey do not show expansion and replacement by pipe type.

The data from the 2002 survey might suggest that both pipe expansion and replacement have slowed since the WIDB-based estimates by Kirmeyer et al. (1994). But interpretation of these broad extrapolations should not be stretched that far. In contrast, the more detailed inventory of distribution system components, profiled in the 2002 Water://Stats Survey is useful in providing deeper insights into more parameters.

Table 6. Comparison of population-based extrapolations to national totals from AWWA 1989/90 WIDB survey results and AWWA 2004: Water://Stats 2002 survey

Item	WIDB (1097 utilities) (Kirmeyer et al., 1994)	Water://Stats 2002 (337 Utilities) (AWWA, 2003)
Miles of pipe	880,000	980,000
Expansion per year, miles	13,200	5,100
Replacement per year, miles	4,400	3,590

Shown below are:

- A matrix showing availability/quality of the data available for each subject;
- An assessment of the capability to disaggregate national figures into regional and/or system size categories; and,
- An analysis of whether trends can be observed for regions or system sizes

Table 7. Matrix of data availability in AWWA 2004: Water://Stats 2002 survey

Data	Available	Quality of data
Pipe data	Yes	Data on miles of pipe by type is very detailed. Data on expansion and renewal does not specify pipe materials. Data on pipe condition and on failure mechanics is only anecdotal.
Finished water storage tanks	Yes	Inventory data is very detailed by type of tank. Condition data is not available. Data is available on maintenance.
Joints and gaskets (not included)	No	Data not available.
Hydrants	Yes	Inventory data and data on maintenance and exercising is detailed.
Customer service lines	Yes	Inventory data on customer service lines is provided. Data is available on type of line, but not on condition of lines.
Distribution system meters	No	No data is available.
Customer meters	Yes	Inventory data is provided, but no data on condition or reliability is available.
Valves (gate, butterfly, PRV)	Yes	Data on number of gate, butterfly, and pressure reducing valves is available, but condition data is not available.
Pumps	No	Data not available
Backflow preventers	No	Data not available in Water://Stats.
Other system appurtenances (e.g., blowoffs, air release valves)	No	Data not available

Table 8 presents the results from the 2002 Water://Stats data. The raw data could be disaggregated by size of pipe and size of system, But such assessment was beyond the scope of this paper to address. Note that the data on percent of total miles of pipe is based on averages of reported data by utilities of this statistic, and is not computed from the data on miles in place as reported in Table 8. This method of computing the averages will produce small differences in the right hand column of Table 8, but is not significant in terms of estimating the national inventory of pipe.

Table 8. Pipe Inventory of AWWA 2004: Water://Stats 2002 Survey

Pipe material	Miles in place (WaterStats, 2002)	% of total miles of pipe * (as reported by utilities)
Ductile iron, CML	35,118	19.7
PVC	29,835	16.6
Asbestos cement	30,484	15.2
Cast iron, unlined	37,433	14.4
Cast iron, CML	34,039	14.4
Ductile iron, unlined	9,886	4.3
Steel	7,821	3.8
Other 1	3,071	2.4
Concrete pressure	4,774	1.9
Polyethylene	1,377	1.1
Other 2	2,294	0.3
Other 3	977	0.2
Other 4	5,049	0.1
Misc./unknown	6,000	N/A
Total	202,158	*

* (Percentages do not add to 100 because of data inconsistencies).

Responses for the "other" categories were: galvanized iron, HDPE, wrought iron, black iron, copper, steel cylinder pipe, plastic, cement-stove, fiberglass (Permastrand), concrete lined steel cylinder, steel, arch concrete masonry, polybutylene, and unknown. Utilities listed different materials for "Other (1, 2, 3, 4)," and these cannot be correlated with pipe material type, such as HDPE, black iron, etc.

Finished water storage tank data from the 2002 Water://Stats survey show a total of 4,929 storage tanks among the surveyed utilities. The types of tanks are shown in the Table 9. Capacities are also reported, but quality of the data in the survey tables should be assessed before totals can be reported. Some utilities may have reported capacity in gallons, rather than millions of gallons, and an analysis of the data should be carried out before total capacities are reported. Hydrant data from the 2002 survey are reported in Table 10. Data on repairs and inspections are on an annual basis.

In Table 11, data on customer service lines are shown. The total number of lines surveyed was 14,120,646, which serve a population of over 59 million customers. Extrapolation of the reported value of 3.3% for lead pipe suggests that there are some 2.3 million lead service lines in use, and this estimate compares well to the estimate by (Kirmeyer et al., 1994) of 2.3 to 5.1 million lead service lines still in service.

Table 9. Storage facilities (AWWA 2004: Water://Stats 2002 survey)

Storage tank type	Number in service
Welded ground storage	1,395
Welded elevated	910
Reinforced Concrete	577
Basins	522
Welded standpipes	427
Other	406
Wirewound	353
Bolted ground storage	224
Bolted standpipes	47
Tendons	38
Composite	30
Total	4,929

Table 10. Hydrant data (AWWA 2004: Water://Stats 2002 survey)

Item	Profile data
Hydrants in system, dry barrel	959,437
Hydrants in system, wet barrel	415,751
Total hydrants	1,375,188
Hydrant repairs, dry barrel	77,082
Hydrant repairs, wet barrel	15,852
Hydrant inspection, dry barrel	614,277
Hydrant inspection, wet barrel	216,051
Miles of pipe flushed annually	67,655
Hydrants flushed	437,696

Table 11. Customer service lines (AWWA 2004: Water://Stats 2002 survey)

Service line type	Percent *
Copper pipe	56.3
Lead pipe	3.3
Polybutylene	2.4
Polyethylene	11.4
Polyvinyl chloride	5.8
Steel	1.5
Cast iron	1.2
Galvanized	8.0
Asbestos cement	0.2
Other 1	1.8
Other 2	0.3

* Percentages do not sum to 100 due to inconsistencies in reporting of data.

Reported in "other" categories are: ductile iron, plastic, brass, CAI, DUC, wrought iron, Tubelog, cement lined wrought iron, KITEC (aluminum/PE composite), Tuballoy, and HDPE. Data summaries do not clearly distinguish which are "Other 1" and "Other 2."

Data in Table 12 represents the data available on the valve types and size in service as reported by the surveyed utilities.

Table 12. Valve data (AWWA 2004: Water://Stats 2002 survey)

Valve type	Number in service
Gate valves, 12 in and smaller	2,575,071
Gate valves, larger than 12 in	200,988
Butterfly valves, 12 in and smaller	92,110
Butterfly valves, larger than 12 in	58,421
PR valves, 12 in and smaller	37,993
PR valves, larger than 12 in	804

Other equipment and appurtenances (general data is not available on these elements of the distribution system):

- Pumps
- Backflow preventers
- Other system appurtenances (e.g., blowoffs, air release valves)
- Joints and gaskets
- Distribution system meters
- Customer meters

The surveyed population of 59,389,902 is about 20% of the national population in 2004. Table 13 summarizes data and extrapolates it to the year 2004 population, simply on the basis of population. The tenuous nature of such extrapolation should be respected.

Table 13. Summary of population extrapolations from AWWA 2004: Water://Stats 2002 survey

Dist. system infrastructure components	Surveyed population served of 59.4 million	Extrapolated to 2004 U.S. population of 292.5 million
Pipe miles	202,158	995,644
Storage tanks	4,929	24,276
Total hydrants	1,375,188	6,772,910
Total service lines	14,120,646	69,545,307
Total valves	2,965,387	14,604,767
Expansion, miles	1,052	5,181
Replacement, miles	740	3,645

4.0 EPA Surveys and Other Federal Government Analyses

Studies sponsored by the Environmental Protection Agency (EPA) include surveys and case-based research. Surveys were produced to support needs studies for infrastructure funding, and case-based research studies include studies by the Cincinnati and Edison Laboratories, and comprehensive reports such as Smith et al. (2000).

EPA's Community Water Systems Survey is based on an extensive, stratified sample of systems (EPA, 2002a). It includes estimates of miles of pipe in place (by diameter), miles replaced, and replacement costs. The survey also includes information on storage facilities (by type), connections, customers, and cross connection and backflow controls. It provides information on pipe age, but not about materials. It does not include information on appurtenances.

EPA's Drinking Water Infrastructure Needs Survey collects data on funding needs that include replacement of distribution infrastructure, but it does not inventory the actual infrastructure in place or its condition (EPA, 2001a). EPA has also conducted a study on modeling the costs of infrastructure (2001c) in support of the Needs Survey.

EPA's 2002 Clean Water and Drinking Water Infrastructure Funding Gap Analysis (EPA, 2002b) makes national projections of pipe replacement investment needs derived from estimated pipe age profiles in 20 cities developed by AWWA (Cromwell, 2001a). It concludes that most of the funding need for pipe replacement lies beyond the 20-year horizon of the study, with needs ramping up continually through a projected peak in 2040.

The General Accounting Office and Congressional Budget Office also conduct studies of distribution system issues from time to time, but they normally do not conduct original surveys (GAO, 1980, 2001; CBO, 2002). These studies rely on data available from other sources and on limited surveys to develop policy recommendations with budgetary implications for the federal

government. They have broadly concurred that investment needs for replacement investment are growing and will present a large need.

4.1 EPA Community Water System Survey (EPA, 2002a)

The Community Water System Survey (CWSS) is a broad profile survey of the industry that has been replicated by EPA in 1976, 1982, 1986, 1995, and 2000. The most recent replications introduced a carefully designed stratified sampling design intended to represent the diversity of systems types and sizes. The 1,806 systems included in the 2000 survey sample represent a census of systems serving more tan 100,000 population. The response rates ranged from 56 to 63% for system serving more than 3,300 persons. EPA performed field visits to boost response rates to the 85 to 99% range in systems size categories serving fewer than 3,300 persons. EPA also applied a QA protocol to review of the 1,246 survey responses.

The 2000 CWSS results show that, overall, 47% of all capital expenditures is devoted to distribution and transmission infrastructure, a proportion that is fairly consistent across system size categories. The overall proportion of capital expenditures for storage facilities is 12%, which tends to be higher - up to 20% - of total outlays in small systems.

Data on pipe age shows 78% is less than 40 years old; 18% is 40 to 80 years old; and only 4% is more than 80 years old. As shown in Table 14, the age profile of pipe assets documented in the 2000 CWSS is markedly different by system size, with large systems being generally older than small systems. This is consistent with the fact that roughly half of all small systems are suburban systems that are necessarily younger than the urban areas they adjoin. Overall replacement rates are less than 1% per year, varying from 0% to almost 2%, from small to large systems.

Table 14. EPA 2000 Community Water System Survey Data on Pipe Assets

System size (pop served)	Percent of pipe per system by age class (yrs)			Average miles of pipe per system by diameter (inches)		
	< 40	40 - 80	> 80	< 6	6 – 10	> 10
< 100	90.6	9.4	0.1	1.1	0.1	0
101-500	88.3	11.7	0.1	3.4	0.5	0.1
501-3300	85.7	13.3	1	23.9	3.0	0.7
3300-10,000	84.3	12.9	2.8	60.8	18.0	4.5
10-50,000	81.4	15.3	3.4	121.4	78.0	31.1
50-100,000	70.2	23.4	6.4	141.6	121.6	78.7
100,000-500,000	60.9	29.7	9.4	259.9	181.8	139.5
500,000 +	56.3	34.4	9.2	819.0	915.7	684.0
Overall	78.0	18.0	4.0			

The 2000 CWSS provides data for each system size category on the total miles of pipe in place by diameter. As shown in Table 14, mains greater than 10-inches in diameter exist mainly in larger systems. Systems serving fewer than 3,300 persons typically have less than 1-mile of such pipe. In addition, the CWSS has data on the number of service connections in each system size category, enabling estimates of the total number of service lines in place nationally, by extrapolation. This combination of factors should also enable a good basis for developing miles of pipe/connection relationships by system size that could be used for extrapolation to estimate national totals for pipe assets by diameter and age. Since the CWSS also documents the number of storage facilities and their capacities, extrapolation to national totals for storage tanks should also be possible.

The 2000 CWSS also contains details about the presence of cross connection and backflow controls. It clearly documents a lesser degree of penetration of such practices in small systems.

4.2 EPA Drinking Water Infrastructure Needs Survey (EPA, 2005)

The EPA Needs Survey has been replicated in 1995, 1999, and 2003 to serve as the basis for reports to Congress documenting the extent of investment requirements in support of the State Revolving Loan Fund program. The survey is conducted with the assistance of state governments who have a stake in assuring a high response rate in order to substantiate the need for their share of SRF funds. The 2003 survey was conducted as a census for 1,342 systems serving more than 40,000 persons and as a random sampling of 2,553 systems serving between 3,300 and 40,000 people. For systems serving fewer than 3,300, the 2003 needs estimates were developed by extrapolation from the 1999 results that were based on a sample of 599 systems for which needs were documented by field visits conducted by EPA.

The analytical objective of the Needs Survey is to document projected capital investment needs over a 20-year horizon based on site-specific information provided by respondents to document planned investment projects. The data is subjected to QA protocols at both the state and EPA levels. Because specific projects are less formulated when they are farther off in time, the earlier versions of the Needs Survey were suspected to have understated the total needs by missing some longer term needs. The 2003 survey was implemented with extra measures to enhance the articulation of long-term needs. The result was an estimated total 20-year need of $277 billion, 60% more than the previous estimates of $167 billion. EPA concluded the increase is attributable to longer-term projects. The system size breakdown of the $277 billion total is as follows: $123 billion for large systems (> 50,000 people); $103 billion for medium size systems; and $34 billion for small systems (< 3,300 people). The order of magnitude of the 2003 total needs estimate is consistent with other major national estimates of investment needs.

Of the total estimated need of $277 billion, $184 billion is estimated to be required for transmission and distribution projects and $25 billion is identified for storage projects. Table 15 presents the breakdown of these projected needs by system size.

Table 15. EPA needs survey data on distribution, transmission and storage needs

System size (pop served)	Source & treatment needs	Distribution & transmission needs	Storage needs	Other needs	Total needs ($ 2003)
Large systems (>50,000)	24,807.1	89,779.9	6,994.5	1,270.2	122,851.7
Medium systems (3,300-50,000)	19,299.0	73,454.4	9,473.3	790.9	103,017.6
Small systems (< 3,300)	9,035.1	18,624.3	6,263.8	248.3	34,171.5
All community systems	53,141.2	181,858.6	22,731.6	2309.4	260,040.8

4.3 EPA White Papers on Distribution Systems

As mentioned earlier, a white paper that was prepared for EPA offered a summary of distribution system infrastructure issues facing the nation (American Water Works Service Co., Inc., 2002). Eight other white papers were prepared to address issues about distribution systems and are listed in this section because they may contain information that will help the reader understand infrastructure-related distribution system issues.

The paper on infrastructure covers the problems of aging and corrosion (American Water Works Service Company, 2002). It discusses general issues, such as the current condition of buried infrastructure, capital needs, technical issues of buried infrastructure, and assessment methods.

Several of the papers discuss how infrastructure failures can open paths to contamination. One paper covers how installation and repair of water mains might introduce possible routes to contamination (AWWA and Economic and Engineering Services Inc., 2002a), and another covers the potential health implications of failures at covered storage facilities (AWWA and Economic and Engineering Services Inc., 2002b). A paper on intrusion explains the possible roles of pressure transients, or specialized backflow situations, in contaminating water mains (LeChavallier, Gullick, and Karim, 2002). Another paper, on cross-connection control, explains backflow and cross-connection risks (EPA Office of Ground Water and Drinking Water, 2002). A paper on permeation and leaching is about external threats to pipes, or how chemicals can penetrate plastic pipes (AWWA and Economic and Engineering Services Inc., 2002c).

Three papers focus on water quality issues. One explains decay of water quality over time in distribution systems (AWWA and Economic and Engineering Services Inc., 2002d). Another paper discusses microbes associated with biofilms, diseases, pathogen routes to the DS, and management indicators (EPA, 2002). A third paper (AWWA and Economic and Engineering Services Inc., 2002e) explains nitrification and especially the associated health risks. Nitrification

is explained as a microbial process that mainly involves oxidation of ammonia to nitrite and nitrate.

5.0 Condition Assessment of Water Distribution Pipes

Effective assessment of pipe condition is required to plan renewal programs for water distribution systems. This section of the paper describes utility condition assessment practices as observed in an industry survey, workshops, case studies and various publications. It also summarizes issues faced by utilities in implementing condition assessment.

In March 2002, WERF convened a workshop to define research priorities in asset management (WERF, 2002). The top-ranked research need arose from the lack of standardized guidelines for conducting condition assessments and using such data to understand asset condition and performance. AwwaRF and WERF have a joint project ongoing to address fill this gap (Urquhart, 2004).

The context for understanding the objective of condition assessment is anchored in principles that have been established in the global best practice of asset management, as documented by utility practitioners in Australia and New Zealand in the International Infrastructure Management Manual (NAMS, 2006). The objective of asset condition and performance assessment is not to manage asset condition, but to manage failure risk (Urquhart, 2005). The purpose of condition data is to make an assessment of the remaining life of the asset so that rehabilitation or replacement investment can be planned and implemented before failures occur that would cost the utility more than it would to have avoided such failures through asset management. This risk management context provides the basis on which the cost of condition assessment is justified. In the standard practice of asset management, there is an important risk prioritization step in which a differentiation can be made between "reactive" assets and "proactive" assets (Urquhart, 2004). It is worth noting that the best practice in applying this risk management protocol takes full account of the environmental and social costs of failures in applying the risk management discipline in a triple bottom line sense.

Reactive assets are those for which the consequences of failure are quite low. Main breaks on small lines on residential streets would be an example. Given the cost of condition assessment on small lines and the difficulty of predicting specific failures on a hundred miles or more of individual small lines, it is much more cost-effective to simply fix lines when they break. Some Australian utilities have in fact focused their entire small mains asset management program on that objective by focusing on responsiveness to failure as the best risk management approach – reducing the cost per break repair and the time-out-of-water (Cromwell, 2001b). Condition data is useful in planning rehabilitation and replacement investments for small mains, but these reactive assets are approached as a population of assets, using statistical analysis of pooled data on such parameter as break trends segmented by pipe material and soil type in order to assess overall replacement needs. This type of statistical analysis of aggregate performance data, such as breaks, does not cost as much as some other forms of actual condition assessment of specific lines and is therefore more suitable to lower priority risks.

Typical data used for such analysis includes pipe age, pipe material, pipe diameter, soil conditions, number of breaks, any rehabilitation that might have been conducted on the pipe, pressure of operation, and complaints of taste, odor, color, or low pressure associated with the delivered water. However, the lack of standardized procedures and common terminology for recording data on leaks and breaks has challenged adoption of such programs. For instance, some utilities do not differentiate by pipe failure type, yet the mode of failure can provide insight on the condition of the pipe. It is often assumed that the mode of failure is corrosion failure. While this is an important type of failure, there are a variety of factors that contribute to failure (pipe break). As another example, many northern climate pipe failures occur in the fall and spring, as soil temperatures are either decreasing with the advent of winter, or increasing with spring. These pipe failures tend to be circumferential failures typically due to soil movement, and have little or nothing to do with corrosion. Other types of failures, when properly identified and analyzed, can also yield useful condition information

New factors to consider within this risk management framework have recently come to light and will have to be incorporated. First, there is growing evidence that pipes very often leak before they break. Further, it may be the case that some breaks would not even occur if the leaks had been fixed when they first began, preventing them from potentially undermining pipe foundations and producing stresses where there were none (Hughes, 2002). This suggests that leak detection could become a much more significant tool for proactive efforts, even applied to small mains.

A second major area of concern involves not just the physical condition of pipes (especially small mains), but also their water quality performance. Performance failure is just as important as physical failure. With tightening regulatory requirements on water quality at the tap and the potential disruption of the chemical and biological equilibrium in old pipes when subjected to different waters produced by advanced treatment processes, the useful life of some pipes may be shortened if stable performance in terms of delivered water quality cannot be recovered. Thus, water quality monitoring must be regarded as an essential component of asset condition assessment. In addition to these concerns, there is also growing concern that repeated main breaks in small lines may be an important source of contamination threats. This could have the effect of either increasing the cost of main repairs or decreasing the number of failures that should be endured prior to replacement. The effect is the same - shorter pipe life.

"Proactive" assets are those for which the consequences of failure are quite high, making it worthwhile to be proactive about managing failure risk. An example would be the loss of a large main lying under Main Street, causing significant damage and disruption in addition to substantial service outage. Because so much is at stake, the cost entailed in conducting and evaluating condition assessment data is more than justified for such "proactive" assets that are also called "critical assets" in the parlance of vulnerability assessments recently conducted in the US.

At this time the accepted method of recording results of condition assessments for 'proactive" assets (or, critical assets) is a five-point scoring system, such as the following (Morrison, 2005):

1. Little or no deterioration, performance more than adequate.
2. Minor deterioration, performance adequate.
3. Mildly deteriorated, short-term performance just adequate, however will require renewal or replacement soon.
4. Severely deteriorated and in need of repair, renewal or replacement.
5. In danger of immediate failure, requires emergency repair or replacement.

Non-destructive inspection is commonly done in wastewater lines using closed-circuit television (CCTV) cameras. This technology has provided valuable information to wastewater managers and the five point scoring system has actually been put to use for wastewater mains using such data. However, the application of CCTV is much less valuable in the potable water environment where failure modes are different, access to these pressurized systems is much more limited, and pipes are usually smaller. The unique nature of pressurized water distribution system presents a significant technical challenge for universal scoring protocols. This requires adaptable tools and training to address the myriad pipe sizes, materials, and ages, as well as fittings with tight bends and other constrictions. Advanced applications will be required for the future, which may include real-time assessment, smart pigs, automated pipe data registration and other technologies.

Most non-destructive inspection technologies require some type of hardware access to the interior of the pipe, and for the pipe to be dewatered for effective inspection. The requirement for access to the interior of the pipe can result in high first-time inspection costs because water systems may need to modify their system. For instance, a major US city recently spent approximately $700,000 for inspection of one mile of 36-inch diameter pipe. Most of this cost was associated with gaining access to the interior of the pipe. Approximately 17% of the cost was the actual inspection. The dewatering requirement, traffic control, inspection manhole installations, and pavement restoration in an urban environment can result in high indirect costs, and also severely limit the timeframes when inspection is feasible. The overall cost of nondestructive inspection at this time limits the economic application of these technologies to larger diameter pipe (typically 24-inches or greater in the US). The failure of large pipes in this size range is a rare event, but typically creates significant direct damage and service outage issues and thus makes the associated cost justifiable — if the utility recognizes the inherent risk management context of asset management.

One of the greatest success stories of non-destructive testing in the potable water sector has resulted from a number of catastrophic failures of large diameter PCCP due to failure of metal reinforcing bands. Ingenious use of magnetic, acoustic and fiber optic technologies have produced a substantial toolkit for utilities facing this risk (Johnson and Shenkiryk, 2006), demonstrating that perhaps technology can rise to the challenge in this area.

Additional research has been called for during the past decade (Kleiner, 2005) to include nondestructive test methods for determining the condition of existing pipe, improved leak detection equipment and methods to measure losses, studies of causes for pipe, joint, lining,

and coating deterioration, including corrosion, and development of better in-situ methods to test condition. Taking into account the evolution of research and trends in the water supply industry, it seems likely that in the future utilities will more actively manage distribution systems with more monitors, safeguards, and protective systems. For instance, recent work on water accounting has developed a defined set of terms and a considerably increased understanding of water leakage. Partly due to these developments work is now ongoing to improve real-time pressure management, which is directly related to leakage, and leak detection hardware. While this is just one example, it is representative of a general trend.

Both technologies and methods are evolving to improve condition assessment capabilities. This conclusion is based on a recent synthesis of AwwaRF reports on distribution system infrastructure. AwwaRF has commissioned a number of recent studies on distribution system infrastructure, and experts recommended more and continued research on failure mechanisms with different types of pipe, causes for pipe, joint, lining, and coating deterioration, and continuing integration of results, along with more focused and practical guidance for utilities in this complex arena. In general, the goal is to develop more accurate, user-friendly test methods to determine condition of pipe, to expand understanding of causes for deterioration, leaks, and breaks, and to prevent problems and predict length of life under various conditions.

6.0 Conclusions

The paper summarized the available data on the inventory and condition of the nation's water distribution infrastructure. Taken together, the available data and companion studies provide much more information on distribution systems than existed even as recently as a decade ago. EPA has conducted a number of studies about distribution systems, including surveys and research investigations, and more detailed data is available in AWWA's Water://Stats program. AWWA and AwwaRF have also conducted a number of separate studies, both relying on existing data and on surveys and/or case studies.

At the national level, the database of inventory information on distribution systems is fairly good. However, the national database is built from utility-level information that has not in all cases been verified. While some data on age of constructed facilities is available, data on condition of systems is weak.

The paper reported on data contained in the literature and distribution system data from AWWA's 2002 Water://Stats survey, which is the latest available. The matrix of data availability shows that data on pipes, finished water storage, hydrants, some types of valves, and customer service lines is generally good. Very little data is available on other components of distribution systems.

National data from EPA surveys and the AWWA Water://Stats surveys can be disaggregated to provide regional and/or system size categorical data. Trends can be analyzed for regions or system sizes, and by comparisons with previous surveys, time trends can be evaluated.

From recent research, the water industry has a good understanding of how condition assessment is practiced by utilities. Condition assessment is not done consistently by utilities, and system condition is not well known by most utilities. Gross indicators such as "poor" or "good" condition are normally reported, rather than remaining life and more definite indicators. The art and science of condition assessment need further improvements. While tools for condition assessment hold promise, more development and training are necessary to advance the state of knowledge.

7.0 References

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KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2012-00520
COMMISSION STAFF'S THIRD REQUEST FOR INFORMATION

Witness: Gary M. VerDouw

19. List each American Water subsidiary that currently uses a tariff rider similar to Kentucky-American's proposed DSIC and state the frequency of its general rate adjustment proceedings for the 10 years prior to implementing the tariff rider and the frequency of general rate adjustment proceedings since adopting the tariff rider.

Response:

Please see the attached schedule.

Response to Commission's Third Request for Information
Item 19

Company	Docket No.	Filing Date	Days	Years
Pennsylvania American	R-860397	4/30/1986		
	R-870825	10/2/1987	520.00	1.4
	R-891208	1/27/1989	483.00	1.3
	R-901652	3/16/1990	413.00	1.1
	R-911909	7/19/1991	490.00	1.3
	R-922428	7/24/1992	371.00	1.0
	R-932670	10/28/1993	461.00	1.3
	R-943231	10/28/1994	365.00	1.0
	DSIC Authorized in 1996 with first DSIC Effective 1/1/1997			
	R-973944	4/4/1997	889.00	2.4
	R-994638	4/30/1999	756.00	2.1
	R-00016339	4/27/2001	728.00	2.0
	R-00038304	4/30/2003	733.00	2.0
	R-00072229	4/27/2007	1,458.00	4.0
	R-2009-2097323	4/24/2009	728.00	2.0
	R-2011-2232243	4/29/2011	735.00	2.0
Missouri American	WR 93-204	12/23/1992		
	WR 94-166	11/24/1993	336.00	0.9
	WR 95-145	10/28/1994	338.00	0.9
	WR 96-263	2/9/1996	469.00	1.3
	WR 97-382	3/14/1997	399.00	1.1
	WR 2000-281	10/15/1999	945.00	2.6
	WR 2001-0844	6/21/2001	615.00	1.7
	WR-2003-0500	5/19/2003	697.00	1.9
	ISRS (DSIC) Authorized 2003 with first ISRS rates Effective 12/31/2003			
	WR-2007-0216	12/15/2006	1,306.00	3.6
	WR-2008-0311	3/31/2008	472.00	1.3
	WR-2010-0131	10/30/2009	578.00	1.6
	WR-2011-0337	6/30/2011	608.00	1.7
Indiana American	Cause No. 40103	12/14/1994		
	Cause No. 40703	12/6/1996	723.00	2.0
	Cause No. 41320	10/28/1998	691.00	1.9
	Cause No. 42049 (1)	6/29/2001	975.00	2.7 (1)
	DSIC Authorized in 2000 with first DSIC Effective 3/2003			
	Cause No. 42520	9/30/2003	823.00	2.3
	Cause No. 43187	12/1/2006	1,158.00	3.2
	Cause No. 43680	4/30/2009	881.00	2.4
	Cause No. 44022	5/2/2011	732.00	2.0

Illinois American	Docket 95-0076		2/1/1995			
	Docket 97-0102		1/31/1997	730.00	2.0	
	Docket 00-0340		4/17/2000	1,172.00	3.2	
	Docket 02-0690		9/20/2002	886.00	2.4	
	QIP (DSIC) Authorized 2/1/2005 with first QIP rates Effective 1/1/2006					
	Docket 07-0507		8/31/2007	1,806.00	4.9	
	Docket 09-0319		5/29/2009	637.00	1.7	
	Docket 11-0767		10/27/2011	881.00	2.4	
Long Island Water Corp.						
	Case 93-W-xxxx	(2)	4/30/1993			(2)
	Case 98-W-0475	(3)	3/30/1998	1,795.00	4.9	(3)
	Case 04-W-0577	(2)	5/3/2004	2,226.00	6.1	(2)
	DSIC Authorized Case 3/21/2005 with first DSIC rates Effective 12/1/2006					
	Case 07-W-0508	(2)	5/1/2007	1,093.00	3.0	(2)
	Case 11-W-2011	(2)	4/29/2011	1,459.00	4.0	(2)
New Jersey American	WR03070511		7/10/2003			
	WR06030257		3/31/2006	995.00	2.7	
	WR08010020		1/14/2008	654.00	1.8	
	WR10040260		4/9/2010	816.00	2.2	
	WR11070460		7/29/2011	476.00	1.3	
	DSIC Authorized 6/4/2012 with first DSIC rates to Effective no sooner than 6/1/2013					
	No DSIC filings made to date					

Notes:

(1) Authorized two-year step rate increase plan.

(2) Authorized three-year step rate increase plan.

(3) Authorized three-year step rate increase plan which was subsequently modified in part and extended through 3/31/2005.

Kentucky Amercian Water Company **Exhibit GMV-Reb-5**
Purchased Power and Chemicals Expenses

	Water Production Expenses		Water Sales	Unit Cost per 1000G Water Sales		Unit Cost Flucuation per 1000G WS	
	Power Cost	Chemical Cost	1000 Gals.	Power Cost	Chemical Cost	Power Cost	Chemical Cost
2006	$ 2,632,000	$ 1,396,000	13,270,532	$ 0.1983	$ 0.1052		
2007	$ 2,822,000	$ 1,581,000	13,966,337	$ 0.2021	$ 0.1132	1.9%	7.6%
2008	$ 3,198,000	$ 1,749,000	13,379,528	$ 0.2390	$ 0.1307	18.3%	15.5%
2009	$ 2,974,000	$ 2,217,000	12,212,482	$ 0.2435	$ 0.1815	1.9%	38.9%
2010	$ 3,696,000	$ 1,816,000	13,059,952	$ 0.2830	$ 0.1391	16.2%	-23.4%
2011	$ 3,663,000	$ 1,885,000	12,155,067	$ 0.3014	$ 0.1551	6.5%	11.5%
2012	$ 3,849,000	$ 1,790,000	12,521,475	$ 0.3074	$ 0.1430	2.0%	-7.8%